

Compensation of the Loss of Fish Habitat – Rapides de Vaudreuil

Technical Specifications

**Final Version
Issued for Submission**

Prepared by:

AECOM

85, Sainte-Catherine Street West

Montreal, Quebec H2X 3P4, Canada

www.aecom.ca

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Signatures

Prepared by:



Diane Zreik, Eng., M.Sc., Ph.D., PMP

February 6, 2017

Verified by:



Sylvain Lacasse, biologist, M. Sc.
Project Manager

February 6, 2017

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END OF SECTION

Section A

Technical Specifications

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work covered by this contract includes the development of areas suitable for spawning, farming and feeding of fish between the Taschereau Bridge and Île aux Pins on the Ottawa River.
- .2 Work includes, but is not limited to:
 - .1 Approximately 282 islands for small-mouth bass spawning in lentic waters over a total area of 28,279 m².
 - .2 Developments of multi-specific spawning grounds in lotic waters covering a total area of 76,506 m².
 - .3 Preparation of sites and stockpiling areas in Sabourin Park and optionally in land owned by the Ministry of Transport, Sustainable Mobility and Transportation Electrification (MTMDET lot).
 - .4 The installation of a fence around Sabourin Park and MTMDET lot.
 - .5 The application of environmental mitigation measures in relation to the works.
 - .6 The application of soil protection measures in site and stockpiling areas.
 - .7 The relocation of 100 m² of hornleaf riverweed.
 - .8 Cleaning Sabourin Park at the end of the work.
 - .9 MTMDET lot Rehabilitation at Completion (if used).

1.3 CONTRACTOR USE OF PREMISES

- .1 Co-ordinate use of premises under direction of the Departmental Representative.
- .2 Use Sabourin Park and MTMDET lot as a construction and stockpiling site in accordance with Section 01 14 00 - Restrictions on Work.
- .3 Find and pay for additional site or stockpiling areas required to perform work under this contract.

1.4 EXISTING SERVICES

- .1 Insure the protection of the existing facilities in the Sabourin Park and the MTMDET lot.

1.5 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.

- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

END OF SECTION

Part 1. General

1.1 ACCESS AND EGRESS

- .1 Design and construct temporary access to work areas, including circulation lanes and ramps in accordance with relevant municipal, provincial and other regulations, and ensure their maintenance.

1.2 REGULATIONS EFFECTIVE

- .1 (L.C. 2001, ch. 26) Canada Shipping Act.
- .2 (C.R.C., ch. 1416 - C.R.C., c. 1416) Collision Regulations.
- .3 (DORS/2005-134 – SOR/2005-134) Navigation Safety Regulations.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Departmental Representative to facilitate work as stated.
- .2 Where security is reduced by work provide temporary means to maintain security.
- .3 The Contractor will place sanitary facilities for use by Contractor's and Departmental Representative's personnel. Keep facilities clean.
- .4 The Contractor shall provide access to the site and floating equipment at any time for the Departmental Representative.
- .5 The Contractor shall be at all times responsible for the transportation of the Departmental Representative personnel on the water during the period of works in the water environment.
- .6 The Sabourin Park and the MTMDET lot located on the other side of highway 20 will be made available to the Contractor free of charge. Any development or modification to accommodate the site will be made at the expense of the Contractor. The boundaries of these lands are as shown in Plan D-1001. These limits may not be exceeded under any circumstance, be it for site installations, stockpiling of materials, or access to these grounds.
- .7 Sabourin Park may be used without restriction for the stockpiling of materials and site facilities until the completion of the work. Access to the advertising sign from Harwood Boulevard must be maintained at all times.
- .8 Sabourin Park is to be used for access to the river until the completion of the work. Only one access point to the river is allowed. This access point will be chosen by the Contractor.
- .9 Access to and from Sabourin Park from Highway 20 is via Sabourin Avenue only.
- .10 The MTMDET lot is made available to the Contractor but its use is optional. However, its use is subject to the following conditions: Allen Avenue cannot be used for access to the lot or for site activities; The facilities of the municipality and any other facilities or infrastructure therein must be protected; the lot can only be accessed from avenues William and Robert which are the property of the City of Vaudreuil-Dorion and are enclosed within the boundaries of the MTMDET lot. These avenue are also made available to the Contractor.

- .11 No soil stripping is permitted at Sabourin Park and the MTMDET lot. The soil shall be protected against rutting by the measures outlined in Section 015200 - Site Installations.
- .12 Deforestation in Sabourin Park is permitted with the exception of trees recently planted along the shoreline and mostly located within the 10 m wide protected riverbank. However, the Contractor must do his best to minimize deforestation. A permit for cutting down the trees from the city of Vaudreuil-Dorion is required.
- .13 Deforestation in the MTMDET lot is permitted but subject to the following conditions:
 - .1 Deforestation shall be prohibited within a strip twenty (20) meters wide along the railway line as shown on Plan D-1001. This wooded strip must be preserved and protected.
 - .2 Folding in authorized areas shall be flush with the ground.
 - .3 Reforestation shall be within a strip twenty (20) meters wide east of Robert Avenue along the railway line as shown on Plan D-1001. The reforestation density and the conditions to be respected are as described in Section 329224 – Rehabilitation of premises.
 - .4 A deforestation plan including the protection measures of the conserved trees and the reforestation plan shall be submitted to the MTMDET for approval prior to the commencement of the works.
 - .5 The Contractor shall use reasonable efforts to minimize deforestation.
- .14 Rehabilitation of Sabourin Park and MTMDET lot is as specified in Sections 32 92 24 - Rehabilitation of premises.
- .15 A traffic plan will be prepared by the Contractor and submitted for approval by the Departmental Representative prior to the commencement of any activity related to the site and stockpiling areas as specified in Section 01 35 00 06 – Traffic Control.
- .16 The Sabourin Park and MTMDET lot shall be fenced along the perimeter indicated on Plan D-1001 and as specified in Section 01 56 00 - Temporary access and protection works.

1.4 EXISTING SERVICES

- .1 Provide for personnel and vehicular traffic.
- .2 Ensure pedestrian safety on sidewalks and cyclist on cycling path along Sabourin Park. Approach signage for the construction work required for the road is also applicable when approaching the bicycle path.
- .3 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.5 SPECIAL REQUIREMENTS

- .1 Work in site and stockpiling areas may be carried out throughout the duration of the contract. Work in the water environment cannot take place between March 15 and July 1 for lotic waters (zones V1 to V10) and between March 15 and September 15 for lentic waters (zones C1 to C4).
- .2 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.

- .5 The Contractor shall plan the works so as to prohibit the delivery by truck of bulk material between the MTMDET lot and Sabourin Park and any other transport of bulk material from the west of the Taschereau Bridge during periods of morning rush hour between 6h30 am and 9h00 am on working days.

1.6 RELATIVE REQUIREMENTS FOR RIVER WORK

- .1 With respect to the use of floating equipment, the Contractor shall:
- .1 Report movements of floating equipment to Canadian Coast Guard Communications and Traffic Services (MCTS). He will also report to the MCTS the start and end times of the construction periods.
 - .2 Provide equipment of sufficient size and capacity to perform all work.
 - .3 Issue a certificate of compliance for each floating equipment to the Departmental Representative prior to the commencement of work.
 - .4 During the performance of the contract, all machinery shall be maintained in good operating condition and shall be repaired properly and quickly at all times. All equipment used must be adapted to the conditions prevailing in the construction area. They must, by virtue of their size, draft and particularities, lend themselves to the execution of the works.
 - .5 Marking floating material with traffic lights in accordance with (L.C., 2001, ch. 26) Canada Marine Act.
 - .6 Provide an on-board radio listening service.
 - .7 Build and maintain buoys and signal lights for the duration of the contract.
 - .8 Provide, install (wet) and maintain at his own expense any buoys or marks required for the proper performance of the work. If, by accident or for any other reason, one or more buoys / marks sink or drift, they shall be raised and / or recovered at the expense of the Contractor. The Contractor is responsible for accidents of any kind caused by improper layout or lack of visibility of buoys / marks, at any time during day or night.
 - .9 Maintain all signals and lights that must be installed on the floating equipment required for the work, as prescribed in (C.R.C., ch.1416 – C.R.C., ch.1416) Collision Regulations and (DORS/2005-134 - SOR / 2005-134) Navigation Safety Regulations. All equipment required for the work shall be properly identified and visible at all times.
 - .10 During working hours, the Contractor's equipment may, if necessary, be located in the navigation channel provided that it does not impede the free movement of vessels along the waterway.
 - .11 The Contractor shall not moor or anchor its floating equipment during periods of inactivity within the navigation channel.
 - .12 In the event that the Contractor causes an obstruction to navigation.
 - .1 He shall notify Marine Communications and Traffic Services (MCTS) and the Departmental Representative.
 - .2 He shall immediately remove this equipment at his own expense.
 - .3 If the Contractor fails to meet these obligations, the Departmental Representative will remove the obstruction and all costs incurred shall be debited to the Contractor.
 - .13 The Contractor's equipment shall at no time affect the operations of the Canadian Coast Guard during the navigation period that runs approximately from May 15 to October 15. These operations consist of seasonal buoyage and towing services.

- .1 The Canadian Coast Guard hovercraft must have a minimum distance of 12 meters on either side of the lateral limits of the navigation channel in order to be able to operate safely and intervene on buoys as required.
 - .2 Operation dates for buoyage vary but are normally between May 15 and June 15, during which periods works in the river cannot occur, while buoy removal is normally conducted after the 15th of October.
 - .3 Towing and / or repositioning buoys may be done during navigation season.
 - .4 When working on any area near the navigation channel (V2, V8, or V9), the Contractor shall accommodate any request from the Canadian Coast Guard for the equipment to be moved in order to allow access to an area for any necessary intervention.
- .2 The movement of ground equipment (excavator or others) is prohibited in potentially exposed work areas in the river or in shallow water depths.
 - .3 Excavation of the bottom of the river for the purpose of clearing a path to floating equipment is prohibited.
 - .4 The movement of machinery on the ice cover in the water environment is prohibited at all times.

1.7 ABORIGINAL POPULATION REQUIREMENTS

- .1 Canada is committed to participating in the economic development of Aboriginal communities. The Contractor must therefore foster Aboriginal participation in the various activities of this mandate.
- .2 The Contractor is required to deal with independent truckers having an Aboriginal status for the transportation of materials. A minimum of 5% of the total number of trucking hours is targeted. In case such a percentage proves impossible to meet at a cost comparable to that prevailing in the industry, the Contractor will have to demonstrate that enough effort was expended in attempting to meet the target (such as contacting ANCAI, Municipality of Kenesatake, and / or other municipalities and Aboriginal communities).

1.8 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

1.9 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

END OF SECTION

Partie 1 General

1.1 Related Requirements

- .1 All Sections included in present Specifications.

1.2 MEASURE

- .1 Method of measure:
 - .1 Provision of materials, labor including supervision, tools, equipment, protection, transport, unloading, customs and administration fees, profits, financing, etc. are included in each of the positions described here, necessary to perform the work of this project, unless otherwise noted.
 - .2 Costs of required related work, not specifically mentioned in the Technical Specifications, but necessary for the realization of the work, have to be included in the most appropriate items of the price schedule.

1.3 PRESENTED ITEMS IN THE TENDER DOCUMENT

- .1 Description of the items in the Tender below.
 - .1 Preparation of site and stockpiling areas.
 - .1 Work Site organization and preparation: This item is an overall price to compensate for all costs incurred for the installation needed for the execution of the work as well as the costs that are not part of other payment items in the tender document, in accordance with the instructions of the technical specifications. The price covers, without limitation:
 - .1 The required coordination of the Contractor with the Departmental Representative, the Ministry of Sustainable Development, Environment and Climate Change (MDDELCC), the Ministry of Forests, Wildlife and Parks(MFFP), local authorities and other stakeholders, including obtaining all required permits for the completion of the work.
 - .2 All that is required in the present specifications and that cannot be charged directly or in a related way to a different part of the Tender document.
 - .3 Maintenance of the site and its access.
 - .4 Development of the stockpiling areas for the materials.
 - .5 Soil strengthening at Sabourin Park and the MTMDET lot.
 - .6 Construction of a dock or other facility from Sabourin Park.
 - .7 Site security fees (if required).
 - .8 Rental fees for a lot and/or materials stockpiling space (other than the Park Sabourin and the MTMDET lot) if required.
 - .9 Energy and telecommunications expenses associated with the site installations.
 - .10 Surveyor costs if the Contractor deems it necessary to do so for one or both of the two lots.
 - .11 Works on the site where site trailers will be installed, including site preparation, backfilling, grading, construction of a platform suitable for motor vehicles, the development of stockpiling areas as well as any incidental expenses.
 - .12 Site trailers including the interior office facilities and their access as well as sanitary installations.

- .13 Site fencing, the access path and trucks waiting areas, the material stockpiling areas, electrical power, water supply and site lighting, furniture, telephone (including internet, fax, etc.), heating and air conditioning of the site offices, scaffolding, site panels and maintenance.
- .14 Any deforestation that the Contractor decides to undertake.
- .2 Maintaining traffic (including pedestrian and cyclist traffic).
 - .1 The Contractor shall include the cost of work related to maintaining traffic and management of impacts for the entire period of works. The total price includes:
 - .1 Supply, installation, preservation, maintenance, moving and dismantling of all traffic management equipment (visual references, work panels, light signaling arrows, barriers, fences, etc.) for all work under the present contract according to the applicable laws and standards and the requirements of the contract documents.
 - .2 The spending in relation with the required interventions in the traffic lanes and all other incidental expenses.
 - .3 The costs associated with special meetings concerning traffic issues.
 - .2 Remuneration of traffic control personnel shall not be included in the overall price but a provision for a total of 4000 hours has to be made and an hourly rate shall be fixed by the Contractor in the schedule of payments. This will allow payment to be made on the basis of the actual working hours of the traffic control personnel. The hourly rate shall include travel and living expenses given that traffic control personnel might be on call during certain periods, in which case, they have to be on site no later than two (2) working days after their presence is requested. A traffic control person cannot be mobilized on site for less than five (5) hours per day.
 - .3 Environmental protection measures.
 - .1 Environmental protection measures in relation to the works on land are paid in aggregate. The price includes all material, labor and methods taken by the Contractor to comply with environmental laws, standards and requirements. The price includes putting measures in place, dismantling them, transporting, off-site loading of waste material into an authorized site, and adding or repeating measures as required by the Departmental Representative. Environmental protection measures in relation to river works such as silt curtains are not included in this item.
 - .4 The Contractor shall submit an overall price for the preparation of the site and stockpiling areas to be paid in 3 installments.
 - .1 The first payment represents 20% of the total and can be claimed at the earliest one month after the effective mobilization of the Contractor on the site. The Departmental Representative will evaluate the progress of the site prior to approval of the first payment.
 - .2 The second installment represents 50% of the total. It can be claimed at the end of June 2017, just prior to the commencement of work in the river, provided that all required site preparation work has been completed to the satisfaction of the Departmental Representative.
 - .3 The third installment represents 30% of the total and can be claimed at the end of June 2018 just prior to the start of the second year's river work.
- .2 Habitats Developed in lentic waters: C1 to C4.
 - .1 This item represents an overall cost that incorporates the following activities: supply of materials (Gravel No. 1, cubic blocks of size 500 mm to 700 mm, flat stones of size 800 to

- 1000 mm), sampling and analysis for the materials quality control, transport of materials, mobilization of marine equipment, and placement of materials in water.
- .2 The overall cost of the Contractor will be divided by the approximate total number of islands, which is 282 islands, resulting in a cost per placed island. This average unit cost will form the basis of payment of the Contractor for this item.
 - .3 Following the contract award, zones C1 to C4 will be divided by the Departmental Representative into sub-zones of approximately 30 m x 30 m (900 m²). The sub-zones will be delimited on a map and their coordinates defined. A table summarizing the approximate characteristics of each sub-zone in terms of its layout will be provided to the Contractor (area of the sub-zone, volume of Gravel No. 1, number of islands, number of blocks, number of flat stones). At the end of each month, the Contractor may claim in his application for payment the sub-zones already completed during the month. The amount allocated to each sub-zone is equal to the approximate number of islands that is theoretically located within this sub-zone multiplied by the average cost of an island as defined above.
 - .4 The number of islands that is the basis for the Contractor's payment is theoretical and may deviate from the actual number of islands that the Contractor will have to place.
 - .5 All quantities that will be included in the table will be calculated theoretically and may differ from actual quantities. In addition, they do not take into account material losses that could occur at different stages before and during the placement. The Contractor's payment shall be made on the basis of the number of islands as defined for each sub-zone before the start of the works. The Contractor shall base his overall cost on his own estimate of the quantities of materials and the overall number of islands according to the information provided in these specifications on the islands configuration and spacing, the total area of the zones, and any other relevant information.
 - .6 For each sub-zone, the Contractor's payment will be made in two installments, one corresponding to 90% of the cost allocated to the sub-zone and the second of 10% related to the quality control of the materials placement carried out by a diver as described in Section 353125 - Materials placement in the water.
 - .7 Control by a diver (at the expense of the Departmental Representative) shall begin, weather permitting, on the working day following completion of all the island placements in the zone or immediately thereafter. Under no circumstance shall the Departmental Representative be held liable for any loss of materials or a change in the configuration that may have occurred between the completion of the work in the area and the inspection by the diver.
- .3 Habitats developed in lotic waters: V1 to V6.
- .1 This item represents an overall cost that includes the following activities: material supply (Gravel No. 2, cubic blocks of size 800 mm to 1000 mm), sampling and analyses required for quality control of materials, transport of materials, mobilization of marine equipment, placement of materials in water, environmental measurements (including silt curtains), and bathymetric surveys.
 - .2 The overall cost given by the Contractor will be divided by the total area of V1 to V6, i.e. 57,937 m², to obtain a cost per developed square meter (m²). This average unit cost will form the basis of payment of the Contractor for this item.
 - .3 Following the contract award, zones V1 to V6 will be divided by the Departmental Representative into sub-zones of approximately 21 m x 21 m (441 m²). The sub-zones will be delineated on a map and their coordinates defined. A table summarizing the approximate characteristics of each sub-zone in terms of its layout will be provided to the Contractor (area

of the sub-zone, volume of Gravel No. 2, number of blocks for reinforcement, length of simple perimeter, length of doubled perimeter). At the end of each month, the Contractor may claim in his payment application the sub-zones already completed during the month. The amount allocated to each sub-zone is equal to its area multiplied by the average cost per m² as defined above.

- .4 All quantities that will be included in the table will be calculated theoretically and may differ from actual quantities. In addition, they do not take into account material losses that could occur at different stages before and during placement. Payment of the Contractor shall be made on the basis of surface areas as defined for each sub-zone before the start of the works. The Contractor shall base his overall cost on his own estimate of the quantities to be placed according to the information provided in these specifications on the layout of the habitats, the spacing of the reinforcement blocks as well as the rows of reinforcement blocks, the total surface of the zones, as well as any other relevant information.
 - .5 For each sub-zone, payment of the Contractor will be made in two installments, one corresponding to 90% of the cost allocated to the sub-zone and the second of 10% related to the quality control of the material placement as described in Section 353125- Placement of materials in water.
 - .6 The bathymetry of each zone shall take place, weather permitting, on the working day following the completion of the works in the zone or immediately thereafter. However, the Contractor has the latitude to delay this bathymetry until the date of his choice. Nevertheless, in no case may the Departmental Representative be held liable for any loss of materials that may have occurred between the completion of the work in the zone and the bathymetry. At all times the difference between the initial bathymetry and the one following the completion of works on a zone is considered representative of the quantity of materials that the Contractor has placed in water.
 - .7 The diver control shall commence immediately after completion of the development of the zone, weather permitting, or as soon as feasible afterwards. Under no circumstances shall the Departmental Representative be held liable for any loss of materials or change in the configuration that may have occurred between the completion of the work in the zone and the inspection by the diver.
- .4 Habitats developed in lotic waters with 20-yearflood water velocities: V7 to V10.
- .1 This item represents an overall cost that includes the following activities: material supply (Gravel No. 3, cubic blocks of size 800 mm to 1000 mm), sampling and analyses for material quality control, transport of materials, mobilization of marine equipment, placement of materials in water, environmental measures (including silt curtains), and bathymetric surveys. It should be noted that the cost of the silt curtains and bathymetric surveys must be allocated to the cost of the surfaces V1 to V6 and that of V7 to V10. The cost of mobilizing the marine equipment should be spread on the cost of the three types of developments (C1 to C4 and V1 to V10).
 - .2 The overall cost of the Contractor will be divided by the total area of V7 to V10, i.e. 18,569 m², resulting in a cost per square meter (m²). This average unit cost will form the basis of payment of the Contractor for this item.
 - .3 After the contract is awarded, zones V7 to V10 will be divided by the Departmental Representative into sub-zones of approximately 21 m x 21 m (441 m²). The sub-zones will be delineated on a map and their coordinates defined. A table summarizing the approximate characteristics of each sub-zone in terms of its layout will be provided to the Contractor (surface area of the sub-zone, volume of Gravel No. 3, number of blocks for reinforcement,

- length of blocks for reinforcement, length of simple perimeter, length of doubled perimeter). At the end of each month, the Contractor may claim in his application for payment the sub-zones already completed during the month. The amount allocated to each sub-zone is equal to its area multiplied by the average cost per m² as defined above.
- .4 All quantities that will be included in the table will be calculated theoretically and may differ from actual quantities. In addition, they do not take into account material losses that could occur at different stages before and during placement. Payment of the Contractor shall be made on the basis of the surface areas as defined for each sub-zone before the start of the works. The Contractor shall base his total cost on his own estimate of the quantities to be placed according to the information provided in these specifications, on the layout of the habitats, the spacing of the reinforcement blocks, the total surface of the zones, and any other relevant information.
 - .5 For each sub-zone, payment of the Contractor will be made in two installments, one corresponding to 90% of the cost allocated to the sub-zone and the second of 10% related to the quality control of the material placement as described in Section 353125- Material placement in water.
 - .6 The bathymetry of each zone shall take place, weather permitting, on the working day following the completion of the development of the zone or immediately thereafter. However, the Contractor has the latitude to delay this bathymetry until the date of his choice. Nevertheless, under no circumstance shall the Departmental Representative be held liable for any loss of materials that may have occurred between the completion of the works in the zone and the bathymetry. At all times the difference between the initial bathymetry and that following the completion of work on a zone is considered representative of the quantity of materials that the Contractor has placed in the water.
 - .7 The diver control shall commence on the working day following the completion of the development of the zone, weather permitting, or immediately thereafter. Under no circumstance shall the Departmental Representative be held liable for any loss of materials or a change in configuration that may have occurred between the completion of the work in the zone and the inspection by the diver.
- .5 Relocation of the Hornleaf Riverweed.
- .1 Removal and relocation of the required Hornleaf Riverweed surfaces shall be paid in one installment (lump sum) upon completion of the operation to the satisfaction of the Departmental Representative. Payment will include mobilization, equipment, labor, and any other expense related to this item.
- .6 Demobilization and rehabilitation of sites.
- .1 This item is a global price to offset all costs incurred at the end of the river works. The price includes, but is not limited to.
 - .1 Dismantling of all site facilities and off-site evacuation.
 - .2 Removal of soil protection layer and geotextiles
 - .3 Final cleaning of work sites.
 - .4 Rehabilitation of the sites in accordance with the requirements of these specifications.
 - .2 Once all activities related to this article have been finalized, the Contractor must submit an application for the sites to be inspected by the Departmental Representative. The Departmental Representative will conduct an on-site inspection with the Contractor to identify defects and deficiencies. The Contractor shall make the corrections requested.

- .3 When all corrections are completed, submit an application for the final inspection to be carried out jointly by the Departmental Representative and the Contractor.
- .4 Where the Departmental Representative considers that deficiencies and defects have been remedied and the contractual requirements appear to be essentially met, the final payment of the demobilization and site rehabilitation costs will be made.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by the Departmental Representative are specified under sections as follows:
 - .1 Section 01 35 43 – Environmental Procedures.
 - .2 Section 01 45 00 - Quality control.
 - .3 Section 01 52 00 – Construction Facilities.
 - .4 Section 01 56 00 - Temporary barriers and enclosures.
 - .5 Section 32 92 24 - Rehabilitation of premises.
 - .6 Section 35 31 24 – Stone production for spawning sites.
 - .7 Section 35 31 25 – Placement of materials in water.

1.2 APPOINTMENT AND PAYMENT

- .1 The Departmental Representative shall designate the laboratory that will perform the required quality control tests (other than quality control for the placement of the materials in water as detailed in Section 35 31 25) and will appoint and pay for the services of the testing laboratory except in the cases:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests to be carried out by the Contractor as specified in the other sections of these specifications.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by the Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative at least 3 work days in advance of operations to allow for assignment of laboratory personnel and scheduling of test and other control measures.

- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications.

1.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings every 2 weeks throughout the progress of the work in the water domain and ensure the management of the points that are the responsibility of the Contractor.
- .2 The Departmental Representative will prepare the agenda for the meetings.
- .3 The Departmental Representative will notify the Contractor in writing of the occurrence of a meeting 3 days in advance of the meeting date.
- .4 The Departmental Representative will provide physical space and make arrangements for meetings.
- .5 The Departmental Representative will preside at meetings.
- .6 The Departmental Representative will record the meeting minutes, will include significant proceedings and decisions, and will identify actions by the different parties.
- .7 The Departmental Representative will reproduce and distribute copies of minutes within 7 days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within fifteen (15) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. A seasonal restart meeting will also take place one (1) month before the mobilization of the second season of work in the water domain.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 The Departmental Representative will establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Information to be transmitted to the Departmental Representative during the quick-off meeting:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of product and material samples, in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site signing, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

- .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .6 Health and Safety Requirements as per Section 01 35 29.06.

1.4 PROGRESS MEETINGS

- .1 Major Subcontractors involved in work and Departmental Representative are to be in attendance at bi-weekly meetings during the waterworks and the restart meeting.
- .2 The Departmental Representative has to notify the parties at least five(5) days prior to the meetings.
- .3 The Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within five(5) days after meeting.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review of proposed changes and their potential effect on construction schedule and on completion date.
 - .12 Health and Safety.
 - .13 Environment Protections.
 - .14 Other items.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications.

1.2 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by the Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to allow for progress reporting.
- .4 The Award of Contract or time of beginning, rate of progress, the periods of restriction of work in the river in lentic and lotic waters, and issuance of Final Certificate are defined stages of the project and constitute the essence of this contract.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit to the Departmental Representative, not later than 10 working days after contract is awarded, the method of work including, but not limited to, detailed construction procedures, traffic plan, and all environmental measures which will be put in place.
- .3 Submit to the Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .4 Submit Project Schedule to the Departmental Representative within 5 working days of receipt of acceptance of Master Plan.
- .5 The schedule should cover all planning of the work to be carried out which includes, but is not limited to, preparation of site and stockpiling areas, environmental measures, spawning areas development, and site rehabilitation according to the requirements of these specifications.
- .6 The schedule must fully meet the specifications and requirements of the project as described in these plans and specifications.
- .7 Calendar activities should be detailed and grouped in a structured manner.
- .8 Submit to the Departmental Representative an electronic copy of the source file and a PDF for the reference calendar and each revised schedule of execution. The schedule must be completed with MS Project 2013.
- .9 The Departmental Representative will issue a Notice of Compliance, otherwise he will provide the Contractor with a detailed list of corrections to be made.
- .10 When the Notice of Compliance is issued, the project schedule will serve as a baseline for project follow-up and to allow for extensions when appropriate.
- .11 The Contractor shall submit during each site meeting a timetable indicating the updates to the schedule by specifying the date on which unpredictable site conditions or modifications requested by the Departmental Representative or any other reasons modifying the schedule reference occurred. All changes to the schedule must be justified by the Contractor and approved by the Departmental Representative.

1.5 PROJECT MILESTONES

- .1 All plans must be approved before the start of work.
- .2 Soil protection measures at Sabourin Park and MTMDET lot must be put in place prior to the commencement of movement of trucks transporting materials to the sites.
- .3 The traffic plan must be approved by the Departmental Representative prior to the commencement of truck movement transporting materials.
- .4 Preparations of site and stockpiling areas must be completed prior to commencement materials placement in water.
- .5 Silt curtains must be installed prior to the placement of materials in the zones corresponding with them.
- .6 The essential work completion date is December 31st, 2018 and it corresponds with the completion date of the works in the water environment.
- .7 All work, including rehabilitation and demobilization of site, stockpiling and access areas, must be completed by May 31st, 2019.

1.6 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days to the Contractor.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become the Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 The schedule must fully meet the specifications and requirements of the project as described in these plans and specifications.
- .3 Calendar activities should be detailed and grouped in a structured manner.
- .4 Submit to the Departmental Representative an electronic copy of the source file and PDF for the reference calendar and each revised schedule of execution. The schedule must be completed with MS Project 2013.
- .5 The Departmental Representative will issue a Notice of Compliance, otherwise it will provide the Contractor with a detailed list of corrections to be made.
- .6 When the Notice of Compliance is issued, the implementation schedule will serve as a baseline for project follow-up and to allow for extensions when appropriate.
- .7 The Contractor shall submit during each site meeting a timetable indicating the updates to the schedule by specifying the date on which unpredictable site conditions or modifications requested by the Departmental Representative or any other reasons modifying the schedule occurred. All changes to the schedule must be justified by the Contractor and approved by the Departmental Representative.
- .8 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award of contract/Issuance of an order form.
 - .2 Working method.
 - .3 Quick-off meeting.
 - .4 Shop Drawings, Samples.
 - .5 Permits/authorizations.
 - .6 Selection of material sources.
 - .7 Mobilization.
 - .8 Preparation of site and stockpiling areas.
 - .9 Soil reinforcement.
 - .10 Infrastructure for access to water.
 - .11 Installation of silt curtains.
 - .12 Environmental Measures.
 - .13 Supply of materials
 - .14 Lotic waters zones to develop during first work period.

- .15 Lotic waters zones to develop during second work period.
- .16 Lentic waters zones to develop during first work period.
- .17 Lentic waters zones to develop during second work period.
- .18 Removal and relocation of hornleaf riverweed.
- .19 Dismantling of equipment and facilities.
- .20 Rehabilitation of premises.
- .21 Demobilization.

1.8 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on a biweekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays and other unpredictable events will be discussed and their remedial measures negotiated.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .9 Keep one reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Accompany submissions with transmittal letter, in duplicate, containing :
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .2 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.

- .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
- .3 After Departmental Representative's review distribute copies.
- .4 Submit 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .5 Submit 3 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .6 Submit 1 electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .7 Submit 3 copies and 1 electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .8 Submit 1 electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .9 Submit 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .10 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .11 Submit 1 electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.

1.4 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

- .2 Deliver samples prepaid to Departmental Representative's.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where color, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

- .1 Erect mock-ups in accordance with Section 01 45 00 - Quality Control.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit documents required by the Commission of Standards, equity, health and safety (CNESST).

END OF SECTION

Part 1. General

1.1 REFERENCES

- .1 Quebec Ministry of Transportation, Sustainable Mobility and Electrification.
 - .1 Collection Standards – Road Work, Table I to VIII.
 - .2 Directory of road signaling devices. (<http://www.rsr.transports.gouv.qc.ca/>).
 - .3 City of Montreal.

1.2 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 No equipment may be placed on travelled way.
- .3 No lanes of traffic shall be closed without written authorization from the Departmental Representative and the MTMDET, both authorizations being required.
- .4 Before diverting traffic, install appropriate signage in accordance with the requirements of this document. Public traffic can only be impeded on an occasional basis during certain preparation work specific to the Sabourin Park and the MTMDET lot (such as the preparation of access roads). The activities of material supply, storage and transport of materials to Sabourin Park and the MTMDET lot, as well as between the MTMDET lot and Sabourin Park, must not cause road closures or traffic diversion. The Contractor shall take all necessary measures to minimize the disruption of traffic throughout the course of the work.
- .5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
- .6 The Contractor shall prepare a truck traffic plan to be approved by the Departmental Representative prior to commencement of stockpiling activities or any transportation of materials to the work site. The truck traffic plan shall include the stockpiling site chosen by the Contractor in the event that he chooses to use a site other than the MTMDET lot.

1.3 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices in accordance with the Standards – Road Works Collection, Tomes I to VIII of the Department of Transport, Sustainable Mobility and Electrification of Transportation.
- .3 Place signs and other devices in locations recommended in Standards – Road Works Collection, Tomes I to VIII of the Department of Transport, Sustainable Mobility and Electrification of Transportation.
- .4 Meet with the Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of the Departmental Representative.

- .5 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent traffic control personnel for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .4 For emergency protection when other traffic control devices are not readily available.
 - .5 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

1.5 TRAFFIC RESTRICTIONS

- .1 The Contractor shall submit his traffic management plan for approval within ten (10) working days of the award of the Contract. This traffic management plan should allow for minimizing traffic obstructions during peak hours and taking into account other construction sites planned in the surrounding area during the work period. This traffic management plan will be shared with the concerned authorities. It must incorporate the following restrictions.
 - .1 Maintain existing conditions for traffic throughout period of contract. Only when required for activities under this contract and after measures have been taken as specified and approved by the Departmental Representative to protect and control public traffic, existing conditions may be modified.
 - .2 Access to Park Sabourin will be via Sabourin Avenue only. No other access road can be set up.
 - .3 Access to the MTMDET lot will be via Robert Avenue and/or William Avenue only. No other access road can be set up. Allen Avenue cannot be used as an access to the MTMDET lot.
 - .4 The movement of inbound and outbound trucks from Sabourin Park and the MTMDET lot should be from existing roads and traffic lights. No additional traffic lights or road lights are permitted.
 - .5 Trucks leave Sabourin Park by turning only to the right. Trucks wishing to return to the MTMDET lot or to leave the site via Highway 20 on the west side should cross the Taschereau Bridge to make the U-turn by following the route outlined in plan D-1001 in Pincourt.
 - .6 Trucks exit the MTMDET lot only to the right on Harwood Boulevard. Trucks wishing to return to Sabourin Park or leave the site via Highway 20 on the east side will proceed to the intersection located approximately 60 m on the west side and take the loop formed by avenues Saint-Henri and Saint-Charles to make the U-turn intended for this purpose and regulated with existing traffic lights.

- .7 The Contractor shall plan his work so as to prohibit the transport by truck of bulk material between the MTMDET lot and the Sabourin Park and any other transport of bulk material from the west of the Taschereau Bridge during periods of morning rush hour on working days, between 6:30 am and 9:00 am.
- .8 Provide a traffic control person at Sabourin Park entrance at all times during actual trucking operations to ensure safe movement of Manoir des Îles residents, cyclists and pedestrians, as well as management of entrances and exits of the work site, including sound management of traffic on the road network adjacent to the work area. When and if needed, provide a traffic control person to manage access to the MTMDET lot.
- .9 Keep pedestrian and bicycle paths clear of obstacles at all times.
- .10 No lane obstacles are permitted including the cycling path.
- .11 Install two Truck Passage panels (TD-270-11-D and TD-270-11-G) 450 x 450 mm in dimension (dimensions proportional to panels with dimensions of 600 x 600 mm available in the Quebec Traffic Devices Directory) at a 40 meters distance from each side of every access to the Sabourin Park and the MTMDET lot.

Part 2. Products

2.1 SIGNALING DEVICE

- .1 Signal devices shall be kept in good condition for the duration of the work. They must be cleaned regularly and stored so as to maintain the required reflectivity. The devices must conform to the standards so that they are clearly seen and understood by the drivers.

Part 3. Execution

3.1 TRAFFIC MANAGEMENT PRINCIPLES

- .1 The Contractor shall perform the signaling and marking work in accordance with the requirements and recommendations of the Departmental Representative. The Contractor shall, at his own expense, correct the deficiencies observed by the Departmental Representative in the signing of works, marking, installation of bollards, self-supporting fences and any other deficiencies in connection with traffic control devices during The work. If the correction of deficiencies requires a relocation of the Contractor's teams, therefore a new mobilization on the site, the Contractor fully assumes the costs. No expenses can be charged by the Contractor to the Ministry following a correction of deficiencies.

3.2 SCOPE OF TEMPORARY SIGNALING WORK

- .1 The work shall include, but not be limited to, the provision and installation of temporary signaling for the maintenance of traffic and the protection of workers during all work activities specified in the entire contract documents.
- .2 The objectives of maintaining traffic and signage are to ensure the safety of road users, sidewalks and bicycle lanes, worker safety, access to riparian and commercial properties, the circulation of emergency vehicles and public services, as well as to maintain the fluidity of road traffic. The Departmental Representative may request additional temporary signaling work to meet these objectives. In this case, the Contractor must be able to provide the services within the prescribed time.

- .3 The Contractor shall take the necessary measures with its teams, as well as with its subcontractors, to ensure that the equipments, materials, installations, movement of vehicles at the site, as well as work activities do not interfere with the traffic, the operation of the public services or the surrounding businesses, as the case may be.
- .4 In addition to maintaining traffic, temporary signaling and impact management, the work also includes.
 - .1 Preparation of all boards for maintaining traffic, signaling, site access, and marking and erasure signed and sealed by an engineer who is a member of the Ordre des Ingénieurs du Québec.
 - .2 Providing, mobilizing, maintaining, servicing, moving and demobilizing of temporary signage, all according to the signal boards produced by the Contractor.
 - .3 Obstructions to traffic shall be in accordance with the standardized drawings of the "Standards - Roadworks, Volume V, Road Signs" for signaling long-term urban works.
 - .4 The manufacture, mobilization, maintenance, relocation and demobilization of additional signs (available in the Québec Directory of Highway Signal Devices), as indicated in section 1.3 of this document in addition, the Departmental Representative may require complementary additional traffic signs to satisfy traffic management scenarios and to ensure the safety of road users and workers.
- .5 Maintaining, at all times, access to local residents.
- .6 The Contractor shall take the necessary measures and arrangements to ensure that the traffic lanes are in a safe condition for vehicular traffic and cycling traffic.
- .7 Maintenance of pedestrian corridor at all times; When a curb is obstructed due to work, a temporary passage of at least 1.5 m must be laid out on site or off-street.
- .8 Providing, installing, maintaining, moving and removing self-supporting fences, if required for the protection of pedestrians and cyclists.
- .9 The presence of traffic control persons as needed during work periods to ensure sound movement management in the work area and on the road network adjacent to the work area.
- .10 In the absence of work, the storage of signaling devices shall be such as to keep the traffic lanes and sidewalks free from obstructions.
- .11 Restricted traffic lanes shall be returned to traffic free from debris.
- .12 Where appropriate, the Contractor shall coordinate his obstructions with those of neighboring construction sites; The coordination of work must be reflected on the signal boards.

3.3 TEMPORARY SIGNS

- .1 For each work phase, the Contractor shall submit to the Departmental Representative boards of temporary signs signed and sealed by an engineer who is a member of the Ordre des Ingénieurs du Québec. These boards must be approved by the Departmental Representative at least five (5) days prior to the placement of the signage of each respective phase of work.
- .2 Signal boards shall be true to the actual conditions on site and shall contain details of the signaling devices and their location. The boards must be prepared in accordance with the "Standards - Road Works, Volume V, Volumes 1 and 2, Road Signs", the applicable laws and regulations, the requirements of the Occupational Health and Safety Commission, and Requirements of this

document. The Departmental Representative reserves the right to make any modification deemed necessary to ensure the safety of road users and workers.

3.4 SPECIAL EVENTS

- .1 On statutory holidays and special events which cause an impact on traffic in the vicinity of the work, the Departmental Representative reserves the right not to authorize the closure of streets or sidewalks or to modify their time slots without further compensation.

END OF SECTION

Part 1. General

1.1 GENERAL NOTES

- .1 In this section, the term "site" extends to installations located on the site where the operations are taking place (site itself, access, infrastructure, parking lots, stockpiling areas, etc.). It includes the Sabourin Park, the MTMDET lot, any other lot used as a stockpiling area, and the area in the water body where the habitats are located.

1.2 RELATED REQUIREMENTS

- .1 All the sections included in the present Specifications.

1.3 REFERENCES

- .1 Province of Quebec.
- .2 L.R.Q., c. S-2.1 Loi sur la santé et la sécurité du travail.
- .3 L.R., 1985, ch. N-22 Loi sur la protection de la navigation.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative, and the CNESST the site-specific prevention program, as outlined in the article "GENERAL REQUIREMENTS", at least 10 days prior to the start of work.
- .3 Departmental Representative will review Contractor's site-specific prevention program and provide comments to Contractor within 10 days after receipt of the document. Revise plan as appropriate and resubmit to Departmental Representative within 5 days after receipt of comments from Departmental representative. Departmental Representative reserves the right not to authorize the start of work on the construction site as long as the content of the prevention program is not satisfactory. The Contractor shall then update his prevention program and resubmit it to the Departmental Representative if the scope of work changes or if the working methods of the Contractor differ from his initial plans or for any other applicable new condition.
- .4 Departmental Representative's review of Contractor's site-specific prevention program should not be construed as an approval of the program and does not reduce the Contractor's overall responsibility for Health and Safety requirements during the work.
- .5 Submit to the Departmental Representative at least once a week the reports corresponding to the site health and safety inspection carried out by the Contractor's authorized delegate.
- .6 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard. The investigation report shall contain at least the following:
 - .1 Date, time and place of accident.
 - .2 Name of sub-contractor involved in the accident.

- .3 Number of persons involved and condition of wounded.
- .4 Witness identification.
- .5 Detailed description of tasks performed at the time of the accident.
- .6 Equipment being used to accomplish the tasks performed at the time of the accident.
- .7 Corrective measures taken immediately after the accident.
- .8 Causes of the accident.
- .9 Preventive measures that have been put in place to prevent a similar accident.
- .8 Submit to Departmental representative WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 – Submittals. Contractor must also keep one copy of these documents on the construction site.
- .9 Medical Surveillance: where prescribed by legislation, regulation or prevention program, submit certification of medical surveillance for construction site personnel prior to commencement of Work, and submit additional certifications for any new construction site personnel to Departmental representative.
- .10 Submit to Departmental representative an on-site Emergency Response Plan at the same time as the prevention program. The Emergency Response plan must contain the elements listed in the article “GENERAL REQUIREMENTS” of this section.
- .11 Submit to Departmental representative copies of all training certificates required for the application of the prevention program, in particular (if applicable) for the following:
 - .1 first aid in the workplace and cardiopulmonary resuscitation.
 - .2 work likely to release asbestos dust (mandatory for all work where asbestos is present).
 - .3 work in confined spaces (mandatory for all work in confined spaces).
 - .4 lockout-tagout procedures (mandatory for all work requiring lockout).
 - .5 Any other requirement of Regulations or the safety program.
 - .6 In addition, the certifications of the General Health and Safety Training for Construction Sites shall be available on demand on the construction site.
- .12 Engineer’s plans and certificates of compliance: Contractor must submit to the Departmental representative and to the Commission des normes, de l’équité, de la santé et de la sécurité du travail (CNESST) a copy signed and sealed by engineer of all plans and certificates of compliance required pursuant to the Safety code for the construction industry (S-2.1, r.4) or by any other legislation or regulation or by any other clause in the specifications or in the contract. The Contractor must also submit a certificate of conformity signed by an engineer once the facility for which these plans were prepared has been completed and before a person uses the facility. A copy of these documents must be available on site at all times.

1.5 FILING OF NOTICE OF CONSTRUCTION SITE OPENING

- .1 Notice of construction site opening shall be submitted to the CNESST before work begins. A copy of such notice and acknowledgment of receipt from the CNESST shall be submitted to Departmental representative.
- .2 At the completion of all the work, a notice of construction site closing shall be submitted to the CNESST, with a copy to Departmental representative.

- .3 The Contractor shall assume the role of being the Principal Contractor in the limits of the construction site and elsewhere where he must execute work within the framework of this project.
- .4 The Contractor shall recognize the responsibility of being the Principal Contractor of the project and identify himself as such in the notice of the construction site opening he provides to the CNESST.
- .5 The Contractor shall accept to divide and identify the construction site adequately in order to define time and space at all times throughout the course of the project.

1.6 SAFETY ASSESSMENT

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

1.7 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental representative prior to commencement of Work.
- .2 Contractor's representative with decision power must attend any meetings at which construction site safety and health issues are to be discussed.
- .3 If it is anticipated that there will be 25 workers or more on the construction site at any given time, the Contractor shall set up a worksite committee and hold meetings as required by the Safety code for the construction industry (S-2.1, r. 4). A copy of the minutes of the meetings of the committee shall be provided to the Departmental representative no later than 5 days after the committee meeting.

1.8 REGULATORY REQUIREMENTS

- .1 Comply with all legislation, regulations and standards applicable to the construction site and its related activities.
- .2 Comply with specified standards and regulations to ensure safe operations on a site containing hazardous or toxic materials.
- .3 Always use the most recent version of the standards specified in the Safety code for the construction industry (S-2.1, r.4), notwithstanding the date indicated in that Code.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with the Occupational Health and Safety Act (L.R.Q., c. S-2.1) and the Safety code for the construction industry (S-2.1, r. 4.) in addition to respecting all the requirements of this specification manual.

1.10 RESPONSIBILITY

- .1 The Contractor must acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (L.R.Q., ch. S-2.1) and the Safety code for the construction industry. (S 2.1, r.4)
- .2 The Contractor must be responsible for health and safety of persons on construction site, safety of property on construction site and for the protection of persons adjacent to construction site and the environment to the extent that they may be affected by conduct of the work.

- .3 No matter the size or location of the construction site, the Contractor must clearly define the limits of the construction site by physical means and respect all specific regulation requirements applicable in this regard. This delimitation will be carried out using a fence as specified in Section 01 56 00-Temporary access and protection works.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific prevention Plan.

1.11 GENERAL REQUIREMENTS

- .1 Before undertaking the work, prepare a site-specific prevention program based on the hazards identified according to the article “HAZARD ASSESSMENT” and the article “RISKS INHERENT TO THE WORKSITE” in this section. Apply this program in its totality from the start of the project until demobilization of all personnel from the construction site. The prevention program shall take into consideration the specific characteristics of the project and cover all the work to be executed on the construction site. The safety program must include at least the following:
 - .1 Company safety and health policy.
 - .2 Description of the stages of the work.
 - .3 Total costs, schedule and projected workforce curves.
 - .4 Flow chart of safety and health responsibilities.
 - .5 Physical and material layout of the construction site.
 - .6 Risk assessment for each stage of the work, including preventive measures and the procedures for applying them.
 - .7 Identification of the preventive measures relative to the specific risks inherent to the worksite indicated in the article “RISKS INHERENT TO THE WORKSITE”.
 - .8 Identification of preventive measures for health and safety of employees and / or public works site as indicated in the article “SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC”.
 - .9 Training requirements.
 - .10 Procedures in case of accident/injury.
 - .11 Written commitment from all parties to comply with the safety program.
 - .12 Construction site inspection checklist based on the preventive measures.
 - .13 Emergency response plan which shall contain at least the following:
 - .1 Construction site evacuation procedures.
 - .2 Identification of resources (police, firefighters, ambulance services, etc.).
 - .3 Identification of persons in charge of the construction site.
 - .4 Identification of the first-aid attendants.
 - .5 Communication organizational chart (including the person responsible for the site and the departmental representative).
 - .6 Training required for those responsible for applying the plan.
 - .7 Any other information needed, in the light of the construction site’s characteristics.

- .14 If available the Departmental representative will provide the evacuation procedures to the Contractor who shall then coordinate the construction site procedure with that of the site and submit it to the Departmental representative.
- .15 Departmental representative may respond in writing, where deficiencies or concerns are noted in the prevention program and may request resubmission with correction of deficiencies or concerns.
- .16 In addition to the prevention program, during the course of the work the Contractor shall elaborate and submit to the Departmental Representative specific written procedures for any work having a high risk factor of accident (for example: demolition procedures, specific installation procedures, hoisting plan, procedures for entering a confined space, procedures for interrupting electric power, etc.) or at the request of the Departmental representative.
- .17 The Contractor shall plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment.
- .18 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.
- .19 All mechanical equipment (for example, but not limited to: hoisting devices for persons or materials, excavators, concrete pumps, concrete saws) shall be inspected before delivery to the construction site. Before using any mechanical equipment, the Contractor shall obtain a certificate of compliance signed by a qualified mechanic dated less than a week prior to the arrival of each piece of equipment on the construction site; the certificate shall remain on the construction site and transmitted to the Departmental representative on demand.
- .20 Ensure all inspections (daily, periodic, annual, etc.) for the hoisting devices for persons or materials required by the current standards are carried out and be able to provide a copy of the inspection certificates to the Departmental representative on demand.
- .21 The Departmental Representative can at all times, if he suspects a malfunction or the risk of an accident, order the immediate stop of any piece of equipment and require an inspection by a specialist of his choice.
- .22 The Departmental Representatives must be consulted for the location of storing gas cylinders and tanks on the construction site.

1.12 RISK INHERENT TO THE WORKSITE

- .1 In addition to the risks related to the tasks to be carried out, personnel responsible for the execution of the work on the construction site will be exposed to the following risks, inherent to the area where the work will be executed. At the worksite there is in particular the presence of the following:
 - .1 Overhead power lines.
 - .2 Underground services (electric, gas, vapour, water system, etc.).
 - .3 Trees and landscaping to preserve and protect.
 - .4 Potentially unstable ground.
 - .5 Work in the vicinity and on a water surface whose conditions of water depth, velocity and orientation of the currents are very variable in space and time.
 - .6 Climatic conditions that can be challenging (cold, wind, etc.). The site may also be subject to significant wave agitation and to the presence of ice.
 - .7 Work in the vicinity of a navigation channel.

- .8 Risks associated with transshipment, handling and collision of floating equipment.
- .9 Risks associated with a potential release of petroleum products in open-water and operations related to its containment.
- .10 High rate of transportation by heavy vehicles including access to the work site through a busy highway.
- .2 The Contractor shall process to a risk assessment of the site to validate this information and see if other risks are present on the site. He must include in his prevention program all risks that have been identified.

1.13 SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC

- .1 The worksite is often visited by intruders occasionally due to the porosity of the existing fence, although these persons are not entitled access to the site: The Contractor shall take into account this situation and ensure to:
 - .1 Secure the work site at all time.
 - .2 Control possible egress points
 - .3 Ensure that all dangers within the construction area is well identified and visible to avoid injuries to trespassers, even at night.
- .2 These requirements must be included in the Contractor's site-specific safety plan as well as any other measures provided by the Contractor to protect the health and safety of employees and / or the public on the site.

1.14 UNFORSEEN HAZARDS

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary construction site inspection arises as a result of or in the course of the work, the Contractor must immediately suspend work, notify the person responsible for health and safety on the construction site, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must do the necessary modifications to the prevention program or apply the security measures required in order to resume work.

1.15 HEALTH AND SAFETY CO-ORDINATOR

- .1 If the construction site meets the requirements of article 2.5.3 of the Safety code for the construction industry (S-2.1, r.4), the Contractor needs to hire a competent person authorized as a safety officer and appoint this person full time from the beginning of the work. This person's tasks shall solely be dedicated to the management of health and safety on the construction site. This safety officer must have the following qualifications:
 - .1 Have a safety officer certificate issued by the CNESST.
 - .2 Have site-related working experience specific to the activities associated with the present project.
 - .3 Have working knowledge of occupational health and safety regulations in the workplace.
 - .4 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter the construction site to perform work.

- .5 Be responsible for implementing, enforcing in detail and monitoring site-specific Contractor's Health and prevention program.
 - .6 Be on construction site at all times during execution of work.
 - .7 Inspect the work and ensure compliance with all regulatory requirements and those indicated in the contract documents or the site-specific prevention program.
 - .8 Keep a daily log of actions taken and submitting a copy to Departmental representative each week.
- .2 The safety officer's certificate shall be submitted to the Departmental representative before the start of the work.
 - .3 When the hiring of a safety officer is not required or if this person is hired by the Departmental Representative, the Contractor shall designate a competent person to supervise and take responsibility for health and safety, no matter the size of the construction site or how many workers are present at the workplace. This person shall be on construction site at all times and be able to take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the construction site and likely to be affected by any of the work. The Contractor shall submit the name of this person to the Departmental Representative before the start of work.

1.16 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Province having jurisdiction, and in consultation with the Departmental Representative.
- .2 At a minimum, the following information and documents must be posted in a location readily accessible to all workers:
 - .1 Notice of construction site opening.
 - .2 Identification of principal Contractor.
 - .3 Company OSH policy.
 - .4 Site-specific prevention program.
 - .5 Emergency plan.
 - .6 Minutes of worksite committee meetings.
 - .7 Names of worksite committee representatives.
 - .8 Names of the first-aid attendants.
 - .9 Action reports and correction notices issued by the CNESST.

1.17 INSPECTION AND CORRECTION OF NON-COMPLIANCE

- .1 Inspect the construction site and complete the construction site inspection checklist and submit it to the Departmental representative in accordance with the article "ACTION AND INFORMATIONAL SUBMITTALS" in this section.
- .2 Immediately take all necessary measures to correct any situations deemed non-compliant during the inspections mentioned in the previous paragraph or noticed by the authorities having jurisdiction or the Departmental representative or his agent.
- .3 Submit to Departmental Representative written confirmation of all measures taken to correct the situation in case of non-compliance in matters pertaining to health and safety.

- .4 The Contractor shall give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order cessation and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and construction site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 The Departmental Representative or his agent may order cessation of work if the Contractor does not make the corrections needed to conditions deemed non-compliant in matters pertaining to health and safety. Without limiting the scope of the preceding articles, the Departmental representative may order cessation of work if, in his view, there is any hazard or threat to the safety or health of construction site personnel or the public or to the environment.

1.18 PREVENTION OF VIOLENCE

- .1 Health and safety management of Public Works and Government Services Canada construction sites includes the implementation of measures designed to protect the psychological health of all persons who access the construction site where the work is taking place. Consequently, in addition to physical violence, verbal abuse, intimidation and harassment are not tolerated on the construction site. Any person who demonstrates such actions or behaviors will receive a warning and/or could be definitely expelled from the construction site by the Departmental Representative.

1.19 USE OF PUBLIC ROADS

- .1 Where it is necessary to encroach on a public road for operational reasons or to ensure the security of the workers, the occupants or the public (for example: the use of scaffolding, cranes, excavation work, etc.), the Contractor shall obtain at his own expense any authorizations and permits required by the competent authority.
- .2 The Contractor shall install at his own expense any signage, barricades or other devices needed to ensure the safety and security of the public and the Contractor's own facilities

1.20 EXPOSITION TO SILICA

- .1 For any interior or exterior work generating silica, the Contractor must respect the following requirements, in addition to those in the Safety code for the construction industry (S-2.1, r.4).
- .2 Work in wet environment or use tools with the inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high-efficiency filters not to propagate dust in the environment.
- .3 Clean surfaces and tools with water, never with compressed air.
- .4 Sand and pickle surfaces by using an abrasive containing less than 1% of silica (also called amorphous silica).
- .5 Install shields or other containment device to prevent silica dust from migrating toward other workers or the public.
- .6 Wear individual respiratory and ocular protection equipment during all the operations that could generate silica dust in accordance with the requirements of the Safety code for the construction industry, (S-2.1, r.4).
- .7 Wear coveralls to prevent contamination outside the construction site.
- .8 Do not eat, drink, or smoke in a dusty environment.

- .9 Wash the hands and the face before drinking, eating or smoking.

1.21 SAND BLASTING

- .1 Prior to starting any sandblasting work, the Contractor must:
- .1 Provide a written procedure of the work that meets the requirements of section 3.20. of the Safety code for the Construction Industry, (S-2.1, r.4).
 - .2 Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.
 - .3 All sanding and sandblasting work shall be done by using an abrasive containing less than 1% of silica.

1.22 RESPIRATORY PROTECTION

- .1 The Contractor must ensure that all workers who must wear a respirator as part of their duties have received training for that purpose as well as fit testing of their respirator, in accordance with CSA Standard Z94.4 Selection, use and care of respirators. Submit the certificate of the fit testing's to the Departmental Representative on demand.

1.23 FALL PROTECTION

- .1 Plan and organize work so as to eliminate the risk of fall at the source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
- .2 Every person using an elevating platform (scissors, telescopic mast, articulated mast, rotative mast, etc.) must have a training regarding this equipment.
- .3 The use of a safety harness is mandatory for all elevating platforms with telescopic, articulate or rotative mast.
- .4 Define the limits of the danger zone around each elevating platform.
- .5 All openings in a floor or roof must be surrounded by a guardrail or provided with a cover fixed to the floor able to withstand the loads to which it could be exposed, regardless of the size of the opening and the height of the fall it represents.
- .6 Everyone who works within two meters from a fall hazard of three meters or more must use a safety harness in accordance with the requirements of the regulation, unless there is a guardrail or another device offering an equivalent safety.
- .7 Despite the requirements of the regulation, the Departmental representative may require the installation of a guardrail or the use of a safety harness for specific situations presenting a risk of fall less than three meters.

1.24 LIFTING LOADS WITH CRANE OR BOOM TRUCK

- .1 Unless specified otherwise, the Contractor must prepare a hoisting plan and submit it to the Departmental representative for all lifting operations done with a crane or a boom truck at least 5 days before these lifting operations begin. The hoisting plan must contain at a minimum the information listed at the end of this article.

- .2 The hoisting plan must be signed and sealed by an engineer for the following lifting operations:
 - .1 Lifting of concrete panels.
 - .2 Lifting mechanical/electrical equipment on a roof or on the floor of a building.
 - .3 Lifting of loads encroaching on the public road.
 - .4 Lifting large dimensions or very heavy loads.
 - .5 All other lifting operations, in accordance with the requirements of the Departmental Representative.
- .3 In addition to the above requirements, the Contractor must plan the hoisting operations in a way as to avoid that the loads pass over the occupied zones on the site. When there is no alternative, the hoisting plan must absolutely be signed and sealed by an engineer and must guarantee the security of the occupants in that zone; the plan must also be approved by the Departmental representative. The Departmental representative can, if he deems necessary, require that the work be done at night or on weekends.
- .4 Upon the beginning of the work on the construction site, the Contractor must submit the list of the hoisting plans anticipated for the whole project to the Departmental representative. That list shall be updated as needed if changes occur during the work.
- .5 In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all cranes and boom truck cabs.
- .6 The entire lifting area shall be marked off to prevent the entry of non-authorized persons.
- .7 The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed and scrapped.
- .8 Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.

1.25 MINIMUM CONTENT OF HOISTING PLAN

- .1 Sketch indicating at a minimum, the location of the crane, the surrounding facilities, the zone covered by the hoisting operations, the pedestrian's pathways and vehicular routes, the security perimeter, etc.
- .2 Weight of loads.
- .3 Dimensions of loads.
- .4 List of hoisting devices and weight of each.
- .5 Total weight lifted.
- .6 Maximum height of obstacles to clear.
- .7 Height of loads lifting relative to the surface of the roof (in the case of loads to be placed on roofs).
- .8 Use of guide cables.
- .9 Type of crane used.
- .10 Crane capacity.
- .11 Boom length.
- .12 Boom angle.
- .13 Crane's radius of action.

- .14 Deployment of stabilizers.
- .15 Percentage usage of the crane's capacity.
- .16 Verification confirmation of hoisting equipment.
- .17 Identification of the crane operator and the person responsible for the hoisting operations with date and signatures.

1.26 HOT WORK

- .1 Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning, heating, etc.
- .2 Before the beginning of each shift of work and for each sector, the Contractor must obtain a "Hot Work Permit" emitted by the person responsible for the site.
- .3 A working portable fire extinguisher suitable to the fire risk shall be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.
- .4 The Contractor must appoint an individual to do continuous monitoring of the fire risks for a period of one hour after the end of the shift of hot work. This individual shall sign the section for this purpose on the permit and give it to the person in charge of the construction site after the one-hour period.
- .5 When the hot work is done in areas where there is combustible materials or where the walls, ceilings or floors are made of or covered with combustible materials, a final inspection of the work area must be scheduled four hours after the work has finished. Unless specified otherwise by the Departmental representative, the Contractor must assign a person to carry out this monitoring.

1.27 WELDING AND CUTTING

- .1 In addition to the requirements prescribed in the preceding paragraphs, the Contractor must respect the following requirements:
 - .1 Welding and cutting work must be carried out in accordance with the requirements of the Safety code for the construction industry, S-2.1, r.4 and CSA standard W117.2, Safety in Cutting, Welding and Allied Processes.
 - .2 Air extraction system with filters must be used for all welding and cutting work performed inside.
 - .3 Stop all activities producing flammable or combustible gas, vapours or dust in the vicinity of the welding or cutting work.
 - .4 Store all compressed gas cylinder on a fireproof fabric and make sure that the room is well ventilated.
 - .5 Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the Safety code for the construction industry, (S-2, r. 6).
 - .6 Store the cylinders far from all heat sources.
 - .7 Not to store the cylinders close to the staircases, exits, corridors and elevators.
 - .8 Do not put acetylene in contact with metals such as silver, mercury, copper and alloys of brass having more than 65% copper, to avoid the risk of an explosive reaction.
 - .9 Check that welding equipment with electric arc has the necessary tension and are grounded.

- .10 Ensure that the conducting wires of the electric welding equipment are not damaged.
- .11 Place the welding equipment on a flat ground away from the bad weather.
- .12 Install fireproof canvas when the welding work is done in a superposition and where there is the risk of falling sparks.
- .13 Move away or protect the combustible materials which are closer than 15 metres from the welding work.
- .14 Prohibition to weld or cut any closed container.
- .15 Do not perform any cutting, welding or work with a naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless:
 - .1 They have been cleaned and air samples indicating that work can be done without danger has been taken; and
 - .2 Provisions to ensure the safety of the workers have been made.

1.28 STEEL STRUCTURE ERECTION OR DISMANTLING WORK

- .1 In addition to respecting section 3.24 of the Safety code for the Construction Industry (S-2.1, r.4), the Contractor must also respect the requirements described in the following paragraphs.
- .2 Contractor must submit the following documents to the Departmental representative before the beginning of steel structure erection work:
 - .1 Erecting procedures in accordance with article 3.24.10 of the Safety code for the Construction Industry (S-2.1, r.4).
 - .2 Rescue procedures for the release of a worker suspended in a safety harness within a maximum of 15 minutes; procedures must be adapted to the construction site and in accordance with article 3.24.4 of that same code; the procedure must be accompanied by a written confirmation that it has been tested.
 - .3 Statement from an engineer that the anchor rods have been installed in accordance with the anchoring plan as required by the article 3.24.12 of that same code.
 - .4 Hoisting procedures in cases where the lifting is done in one of the ways described in the article 3.24.15 of that same code.
 - .5 Name of the individual identified as rescuer and his rescue training certificate.
 - .6 Name of the individual identified as first-aid attendant and his first-aid training certificate.
 - .7 The Contractor must make sure that the following documents are available for consultation on construction site at all times:
 - .1 Steel structure manufacturer's erection plan in accordance with the requirements of article 3.24.9 of the Safety code for the Construction Industry (S-2.1, r.4).
 - .2 Column anchor rods's anchoring plan in accordance with the requirements of article 3.24.11 of the Safety code for the Construction Industry (S-2.1, r.4).

1.29 WORK NEAR BODIES OF WATER

- .1 For all work done near a body of water (such as work above water, work on a wharf, work on the edge of a watercourse, etc.), the Contractor must respect the requirement listed in the following paragraphs in addition to those in article 2.10.13 of the Safety code for the Construction Industry.

- .2 The Contractor must plan his work such as to implement safety measures that prevent any worker from falling in the water. The use of these measures should be favored over the wearing of a life jacket.
- .3 Whenever no other safety measures can protect the workers, ensure they wear lifejackets such as to keep the user's head out of the water and to allow him to safely float using his arms.
- .4 Submit the following documents to the CNESST and the Departmental Representative before the beginning of the work:
 - .1 Description of the body of water.
 - .2 Description of the work done next to this body of water.
 - .3 Plan of transportation on water adapted to the work and to the characteristics of the body of water.
 - .4 Rescue plan adapted to the work and to the characteristics of the body of water.
 - .5 List of vessels and work platforms used during the work by specifying their respective use.
 - .6 Evidence that Transport Canada has assessed and inspected each motorized or non-self-propelled craft or platform.
- .5 Each of the document listed above must contain at a minimum the information required in section 11 of the Safety code for the Construction Industry (S-2.1, r.4).
- .6 Every floating equipment shall be equipped with on-board radio listening services as well as functional buoys and traffic lights.
- .7 If there is any possibility that all or part of the work can be done during the winter, the safety measures included in the documents required above must be adapted accordingly.
- .8 The Contractor must submit to the Departmental representative the certificate of training required in article 11.2 of the Safety code for the Construction Industry (S-2.1, r.4) for the following individuals:
 - .1 The person assigned to prepare the documents required in the preceding paragraph.
 - .2 Each person responsible for the transport or rescue operations.
- .9 If the rescue plan stipulates the use of a vessel, the Contractor must submit to Departmental representative the competency card or certificate for the individuals responsible for the rescue operations, issued by Transport Canada.
- .10 The Contractor must include in his weekly inspection checklist the devices required in the articles 11.4 and 11.5 of the Safety code for the Construction Industry (S-2.1, r.4).
- .11 Ensure that a rescue vessel moored and in the water is available at each place where a worker may fall in the water. However, a vessel may serve more than one workplace on the same construction site provided the distance between any of these workplaces and the vessel is less than 30 m.
- .12 Obtain and transmit to the Departmental Representative a letter of compliance issued by Transport Canada for the approval of any vessel (transport, salvage, inspection or other) prior to commencement of work.
- .13 Ensure that the watercraft has the necessary characteristics to accommodate persons likely to be involved in the rescue operation.
- .14 Ensure that the watercraft is available at all times for workers in case of emergency.

- .15 Ensure that qualified personnel are available to operate emergency equipment. This person must hold a Pleasure Craft Operator Competency Card depending on the length of the watercraft being used.
- .16 Establish written emergency procedures that include the following information and ensure that all workers involved in these procedures have the necessary training and information to implement them.
 - .1 A complete description of the procedures, including the responsibilities of persons who are permitted access to the workplace.
 - .2 Location of emergency equipment.
- .17 Where the construction site is a wharf, a pier, a quay or any similar structure, a ladder with at least two rungs below the surface of the water shall be installed on the front of the structure every 60 m.

1.30 DIVING WORK

- .1 The Contractor shall meet the following requirements.
 - .1 Comply with all requirements of the Occupational Health and Safety Regulations (S-2.1, r.19.1), specifically Section XXVII, Diving Work. Also comply with CSA Z275.1 - Hyperbaric Facilities and CSA Z275.4 - Competency Standards for Diving Operations, the most recent editions. If there is a difference between two requirements for the same point, the most severe requirement applies.
 - .2 In addition to the preceding paragraph, in the case of construction work, also comply with the Safety code for the Construction Industry (S-2.1, r.4).
 - .3 Prior to commencement of work, forward to the Departmental Representative the following documents, as required by the Occupational Health and Safety Regulations:
 - .1 Certificate of professional diving training of each member of the diving team OR the document attesting to the recognition of the skills of these persons in accordance with Standard CAN / CSA Z 275.4-02, according to section 312.8 of that regulation.
 - .2 Certificate of first aid training in the work environment of each member of the diving team.
 - .3 The medical certificate of each member of the dive team.
 - .4 For each of the dives in this contract, a diving plan containing the following components, in addition to those required by the regulation on occupational health and safety:
 - .1 Isothermal protection to be used.
 - .2 The repetitive dive factor.
 - .3 The ascent limit without decompression stop.
 - .4 Circumstances requiring interruption of diving.
 - .5 Procedures to ensure that machinery, equipment or devices that may be hazardous have been locked.
 - .6 The decompression table to be used, if required.
 - .5 A notice confirming that a communication system with the Medical Emergency Department for diving emergencies is available at all times at the diving station.
 - .4 The Contractor shall take into account the particulars of the work site and adapt the contents of his dive plan accordingly.

- .5 Where diving occurs at one of the following locations, provide the Departmental Representative with confirmation that the appropriate authorities have been notified.
 - .1 In navigable waterways.
- .6 If the diving station is more than 2 meters above water, forward to the Departmental Representative:
 - .1 The plan of the equipment used to put the worker in water if equipment other than a basket is used as a means of release.
 - .2 The plan of the apparatus used for lifting the basket or other equipment, unless the apparatus is a crane or a boom truck.
- .7 If diving is from a craft, send to the Departmental Representative the following documents:
 - .1 Proof of qualification of boat operator.
 - .2 Certificate of Conformity of Boat Issued by Transport Canada.
- .8 Prior to commencement of work, simulate site rescue procedure as required by section 312.31 of the Occupational Health and Safety Regulations.
- .9 Complete on a daily basis and forward to the Departmental Representative a checklist confirming the presence and condition of the equipment required at the dive site in accordance with the dive plan.
- .10 Ensure that all other documents required by Section XXVI of the Occupational Health and Safety Regulations are available at all times on the site (dive log, diver's log, etc.).
- .11 Comply with the requirements of sections 355 to 357 of the Occupational Health and Safety Regulations for all persons assigned to this warrant and who remain on the surface of the water.
- .12 Where an emergency craft is required to comply with section 357 of the Workplace Health and Safety Regulations, obtain a certificate of compliance from the vessel issued by Transport Canada and forward it to the Departmental Representative.

1.31 TEMPORARY HEATING

- .1 In addition to respecting section 3.11 of the Safety code for the Construction Industry (S-2.1, r.4), the Contractor must also respect the requirements described in the following paragraphs.
 - .1 A portable fire extinguisher must be available at all times near the heating units, no matter what type of heating is used.
 - .2 The heating units must always be used in accordance with the manufacturer's specifications.
 - .3 If applicable, the canvas or tarpaulins used next to the heating units must be solidly fixed so as not to be projected on the heaters, on the pipes connected to the heaters or on any other heat source.
 - .4 The gas cylinders must be installed in a way that they are protected from vehicle and other equipment traffic.
 - .5 For the use of heating units other than electric, the Contractor must install a carbon monoxide detector in the work area, next to the heating units and/or the workers, throughout the course of the heating period. The Contractor must immediately apply the corrective measures required to the heating units if the detector's alarm goes off.
 - .6 The Contractor must ensure a minimum surveillance of the heating units outside the hours of work (nights and weekends). He must submit a surveillance plan to the Departmental representative before the use of the heating units.

1.32 WORK NEAR OVERHEAD POWER LINES

- .1 When there is an overhead power line in the work zone and that the Contractor chooses to apply paragraph b) of article 5.2.2 of the Safety code for the Construction Industry (2.1, r.4), a copy of the agreement with the electrical power company and a copy of the work process, required in the article 5.2.2 b), must be submitted to the Departmental representative before the beginning of the work in relation to these documents.

1.33 HEALTH AND SAFETY SUBORDINATION AGREEMENT

Project: _____ Address: _____

EXTERNAL CONTRACTOR

I hereby agree to submit to the authority of (name of the Principal Contractor's business) _____, which is the Principal Contractor for the project indicated above during the entire duration of our work on the construction site. Accordingly, I confirm that I have reviewed the Principal Contractor's prevention program, and I agree to:

- Inform my employees of the content of the Principal Contractor's prevention program and ensure that its content are complied with at all times;
- Apply the prevention program that is specific to the activities that we carry out under this project;
- Inform the Principal Contractor of my actions or dealings on the construction site and obtain the Principal Contractor's agreement before the start of work; and
- Follow the health and safety directives provided by the representative of the Principal Contractor on the construction site and, depending on requirements, attend training sessions and health and safety meetings organized by the representative of the Principal Contractor.

Name of representative: _____

Name of business: _____

Description of work to be done on the construction site: _____

Approximate dates of work (start-end): _____

Signature: _____

Date: _____

PRINCIPAL CONTRACTOR

I hereby agree to allow the business (name of external contractor) _____ to perform the work under this project indicated above and, as Principal Contractor, to take the necessary steps to protect the health and safety of workers on the construction site. Should the Contractor repeatedly refuse or fail to comply with my directives, I agree to inform PWGSC's Departmental representative of this and to provide documentary evidence of my actions or dealings with the Contractor.

Name of representative: _____

Name of the Principal Contractor's business: _____

Signature: _____ Date: _____

Submit a completed and signed copy to PWGSC's Departmental representative

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications
- .2 Section C of this document contains the mitigation measures that result from the application of the Certificate of Authorization (CA) and must be complied with to the same extent as the articles of these specifications. In the event of a conflict between two mitigation measures, the most restrictive will apply.

1.2 REFERENCE STANDARDS

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water.
 - .1 EPA 832/R-92-005-[92], Storm Water Management for Construction Activities, Chapter 3.

1.3 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for the biodegradable oils for the machinery, used for the work on the water and the shore and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS, conform to section 01 35 29.06 – Health and Safety Requirements.
- .3 Prior to the commencement of construction activities or delivery of materials or equipment to the site, provide an Environmental Protection Plan for review and approval by the Departmental Representative.
- .4 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction task[s].
- .6 Include in Environmental Protection Plan:
 - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name[s] and qualifications of person[s] responsible for manifesting contaminated soil and sediments to be removed from site

- .3 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
- .4 Name[s] and qualifications of person[s] responsible for training site personnel.
- .5 Descriptions of environmental protection personnel training program.
- .6 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements.
- .7 Drawings showing locations of proposed material stockpiling areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Drawings should also show methods to control runoff and to contain materials on site.
- .8 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Ensure plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .9 Work area plan showing proposed activity in each section of the site and identifying areas of limited use or non-use.
 - .1 Ensure plan includes measures for marking limits of areas that can be used and methods for protecting features that have to be preserved within the authorized work areas.
- .10 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .11 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .12 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .13 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .14 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities.
- .15 A plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .16 A noise climate prevention plan, specifying measures to maintain sound level during construction at a level that concords with the guidelines "Lignes directrices relativement au niveau sonore provenant d'un chantier de construction industriel" issued by the Ministry of Sustainable Development, Environment and Climate Change. Particular attention must be paid to the retirement home "Manoir Des Îles" adjacent to Parc Sabourin.
- .17 A water quality protection plan, including measures to be implemented during river works. This plan shall include, without being limited to, the sequence and methods of work in the water environment, the scheduling of the installation of the required silt curtains at the locations specified on Plan C-1002 for the protection of the hornleaf riverweed colonies and feeding habitat of the copper redhorse but also at other locations deemed useful by the Contractor.
- .18 A soil protection plan at Sabourin Park and MTMDET lot when used as site and storage areas.

1.5 FIRES

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

1.6 DRAINAGE

- .1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements. Provide temporary drainage and pumping to keep the site dry.
- .2 Ensure that water that is drained or pumped to a watercourse, sewer, drainage or drainage system does not contain any suspended solids in excess of the allowable limits. For a river discharge, the increase in TSS cannot exceed 25 mg / l compared to the natural TSS content of the river. The Contractor shall transmit to the Departmental Representative the measures for controlling wastewater discharges in order to comply with the C.A..
- .3 Ensure evacuation or disposal of water containing suspended solids or harmful substances in accordance with local authority requirements.
 - .1 For the discharge of water into the hydrographic network, the maximum increase in natural concentration for TSS is 25 mg/L.
- .4 Contractor must plan work to be able to protect water bodies from erosion and gully and limit sediment transport to the Ottawa River. Temporary shoreline access will need to be stabilized if sediments are introduced into water bodies. An anti-erosion fence (sediment barrier) should be installed at Sabourin Park to prevent sediment input to water bodies and be left in place at the end of the works.
- .5 Erosion control barrier: A ready-to-install preassembled system consisting of a geotextile attached to posts that can be pushed into the ground. The geotextile must have a uniform texture and appearance; It must have no defect, weakness or tear that could compromise its physical qualities.
- .6 Erosion control barriers shall be checked at least once a week and after each rain to ensure their effectiveness; Check them daily during extended periods of rain.
- .7 If necessary to carry out work, erosion fences may be removed at the beginning of the working day but must be replaced at the end of the day.
- .8 During construction, the Departmental Representative may request the installation of additional protection structures to correct a temporary situation: berms, mulch, sediment traps, retention and containment ponds, and other measures necessary to correct a particular situation. Temporary improvements must remain in place as long as they are necessary or until the Departmental Representative decides otherwise.
- .9 Unless otherwise specified by Departmental Representative, remove temporary erosion control and sediment transport systems after completion of work (except for the sediment barrier along the riparian buffer strip in the Sabourin Park).
- .10 Carry out periodic inspections of areas of intervention to detect signs of erosion and transport of sediments to bodies of water; Implement appropriate corrective measures without delay.
- .11 Any use of natural materials removed from the bed or banks of water bodies is prohibited.
- .12 All work in the 10-meter riparian zone (calculated from the high water mark) is prohibited, except for the access site to the river chosen by the Contractor in the Park Sabourin.

- .13 Restore riparian strip damaged by the works (if applicable) as soon as the damage occurs, so as to reproduce the natural bank of the watercourse.

1.7 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and on adjacent properties. On site, limit tree-cutting to a minimum.
- .2 Preserve and protect newly planted trees along the shoreline in Sabourin Park, most of which are located within the 10-m wide protected riparian zone.
- .3 Protect trees and shrubs that will not be cut on the site and stockpiling areas and trucking lanes. Encase with a protective wood casing from grade level to a minimum height of 2 m.
- .4 Avoid unnecessary traffic, dumping and storage of materials over root zones of protected trees.
- .5 Removal of topsoil from Sabourin Park and MTMDET the lot is prohibited during their use as site and stockpiling areas.

1.8 WORK ADJACENT TO WATERWAYS

- .1 Materials placement works in the river shall be carried out outside the following restriction periods.
 - .1 Placement of materials in lotic waters (spawning zones V1 to V10); Restriction from March 15th to July 1st (annually).
 - .2 Placement of materials in lentic waters (spawning zones C1 to C4); Restriction from March 15th to September 15th (annually).
- .2 At the time of the works, the Contractor shall have previously installed the approved silt curtains in the Ottawa River at all locations likely to be affected by the works planned for a given period (Plan C-1002). Several curtain sections shall be joined together by Velcro strips or by any other effective means to maintain the integrity of the curtain over its entire length in order to obtain the desired length. The curtain should be made of a monofilament woven geotextile. The curtains must be made of a woven monofilament fabric geotextile. The silt curtain shall be equipped in its upper part with a hem in which a floatation log may be inserted along its length and in the lower part of a weighed ballast pocket with a ballast chain. The geotextile must have a flow rate of about 700 l/min/m² and have filter openings of about 180 µm.
 - .1 To protect the shallow water aquatic plants that may be used by the copper redhorse in the work area, containment curtains shall be deployed and secured at the locations defined on Plan C-1002. The curtains will be positioned so as not to give too much resistance to the current, but to deflect it and protect the aquatic plants. The curtains will also be positioned so as not to interfere with the free movement of fish (i.e. the curtains should not trap fish or prevent access to a section of the river). According to their position, the curtains vary from a length of 40 to 185 m. The height of the containment curtain will be sized according to the water levels at the time of the work period and its specific location.
 - .2 The Contractor may reuse the curtains after removing them from the river and cleaning them.
 - .3 The Contractor does not have to protect all aquatic plant beds at all times, but only to protect those likely to be affected by work in progress. This should be reflected and demonstrated in the description of his working method.
 - .4 During work in the upstream part of the project area, the two hornleaf riverweed colonies should be protected by silt curtains to avoid their siltation. This measure is necessary only

during the work that will be done upstream of these colonies. To this end, curtains will be deployed and secured at the six locations defined on Plan C-1002. The curtains will be positioned so as not to give too much resistance to the current, but to deflect it to protect the colonies. Depending on their position, the curtains vary in length from 15 to 60 m. The height of the containment curtain will be sized according to the water levels at the time of the work period and its specific location. The Contractor may reuse the curtains after removing them from the river and cleaning them. The removal of the curtains must always be done carefully so as not to unload the trapped sediments in the river.

- .3 As much as possible, strive to limit maximum concentrations of 25 mg/l TSS above natural concentrations, 100 m downstream of work location. In the event of an increase of 25 mg/l or more above natural concentrations, the Departmental Representative will convene a site meeting with the Contractor to discuss steps to be taken to correct the situation quickly.
- .4 All granular materials added to the aquatic environment shall be clean (sieved but not washed).
- .5 When depositing materials in the river, reduce the rate of descent and rise of the shovel and avoid dragging the shovel on the bottom of the river in order to smooth the surfaces to be worked.
- .6 Place materials directly on the river bed rather than emptying the contents of the bucket as it descends.
- .7 Whenever possible, develop the habitat zones from the upstream to the downstream to reduce the risk of fine sediment deposition on newly developed spawning grounds.
- .8 No temporary rockfill pier shall be permitted in the water.
- .9 No excavation or leveling of the river bed other than for habitat development shall be permitted.
- .10 The movement of land equipment (mechanical or other shovels) is prohibited in potentially exposed areas of work in the river or in shallow water depths.
- .11 Streams shall be kept free from waste or debris.
- .12 All machinery and equipment used in the river and within 20 m of the high water mark of a watercourse shall use biodegradable hydraulic oil.
 - .1 Biosourced content of at least 80%.
 - .2 Biodegradability certified according to OECD Standard B301 or equivalent ($\geq 60\%$ biodegradability in 28 days).
- .13 The Contractor shall take the necessary measures to fully drain the machinery before filling with the biodegradable oil; A maximum of 5% of residual oil will be tolerated.
- .14 Provide and maintain emergency kits for spills of hazardous materials (portable bag) in all equipment used on site. These kits should include minimal absorbents (towels, puddings, peat moss, etc.), recovery bags and obturators (carpet, epoxy paste, etc.). Place well-identified leak tight containers at the site to receive oil residues and waste in the event of a spill.
- .15 The Contractor must have an emergency petroleum product recovery kit (barrels) permanently at each site where work is being carried out on the site. The kit must include sufficient absorbent rollers to allow operation on the watercourse to contain petroleum products within the perimeter of the machinery involved by constructing a floating boom.
- .16 Take necessary measures to ensure that containers, portable tanks and movable tanks used comply with the manufacturing standards specified in the Petroleum Products Regulations (RSQ, c. P-29.1, r.2).

- .1 Have the petroleum equipment checked by an approved verifier at the time of installation, replacement or removal and, if necessary, rehabilitate the site. Also verify the petroleum equipment according to the frequency and the modalities indicated in the regulation mentioned above.
- .2 Provide the Departmental Representative with a certificate of verification by an approved auditor and the results of all audits conducted in accordance with the terms and conditions of the Petroleum Products Regulations.
- .17 Regularly inspect construction equipment for leaks in hydraulic and fuel systems.
- .18 In the event of a spill, immediately repair any leak or remove defective equipment and notify the Departmental Representative of the incident

1.9 POLLUTION CONTROL

- .1 Submit for approval by the Departmental Representative the location of material stockpiling locations, equipment refueling and maintenance area. The Contractor shall provide for general maintenance and fueling of the machinery at a distance greater than 30 m from a watercourse.
- .2 Store and handle hazardous materials and hazardous waste in accordance with federal, provincial and local laws, regulations, codes and guidelines.
- .3 Maintain temporary erosion and pollution control features installed under this Contract.
- .4 Control emissions from equipment and plant according to local authorities' emission requirements.
- .5 Prevent sandblasting and other foreign materials from contaminating air and waterways beyond application area.
- .6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .7 Throughout the work, clean streets used by vehicles and machinery to ensure cleanliness.
- .8 Use well-maintained and heavy machinery and equipment in good functioning order, in accordance with their operation characteristics by inspecting them before their entry to the Work site.
- .9 Use trucks with air-tight or standard buckets as needed, covered with a tarp, to reduce fine particle air dispersion.
- .10 Provide vehicles with a functional exhaust system.

1.10 HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 Special Conditions
 - .1 No excavation of soil is permitted under this project at Sabourin Park. At the MTMDET lot, localized small-scale excavation may be permitted during site rehabilitation at the completion of the work (such as for tree planting for example). Any excavation or other activity susceptible of interfering with potential archeological resources shall be subject to the approval of the Departmental Representative.
 - .2 Any work recognized as potentially interfering with existing vestiges may be monitored by an archaeologist if requested by the Departmental Representative. Following a preliminary study, the archaeological potential of the Sabourin Park and the MTMDET lot was deemed to

be high. Therefore, if discoveries are made during the execution of the works, the following measures must be respected.

- .2 Archaeological Discoveries
 - .1 The Contractor shall notify the Departmental Representative of any archaeological discoveries (remnants of construction or installations, objects and fragments of objects) on the premises and wait for his written instructions before continuing work at the place of discovery.
 - .2 Remnants, antiques and other items with some historical, archaeological or scientific interest (remains, object or object fragment) found on site remain the property of Canada. The Contractor shall protect and obtain instructions from the Departmental Representative in this regard.
 - .3 A plan showing the evolution of the built environment on the Sabourin Park will be made available to the Contractor after the award of the contract.

1.11 PROPAGATION OF INVASIVE EXOTIC SPECIES

- .1 In the event of machinery having to be used in aquatic or riparian locations of the project area where invasive plant species are present (common reed, common purple loosestrife, reed canarygrass listed at 5 locations), the Contractor shall clean all machinery that will be used in an environment that includes one of these species before working at another location so that it is free from mud, animal species or plant fragments. After the contract is awarded, a map showing the location of the detected invasive plant species will be provided to the Contractor. If other locations with invasive plant species are discovered during the work, the cleaning procedure for the machinery should be applied.
- .2 For the floating equipment, the Contractor shall demonstrate that they are free of invasive species.
 - .1 For equipment that has been cleaned and stored onshore just prior to the start of the river works, the Contractor shall only be required to provide, in writing to the Departmental Representative, a list of such equipment, place of storage and the proposed date for launching. The Departmental Representative must be able to verify that the equipment has been properly cleaned and stored on land prior to the start of the work.
 - .2 For equipment already in water, the Contractor must prove that his equipment has remained in the immediate area of the island of Montreal during the last 12 months or more, otherwise he must:
 - .1 Provide a written inspection report, immediately prior to mobilization of equipment to site, certifying that they are free of invasive species. The inspection report should be carried out by a biologist qualified in the identification of freshwater aquatic fauna. Sampling should be done by divers. The report shall contain, but is not limited to, the following information: the list of equipment inspected (tugboats, barges, etc.), date and place of inspection, summary of sampling protocols, identification, list of samples, a table of results and an attestation regarding the presence or absence of invasive species. The report must contain photographs and be signed by the competent biologist before being handed over to the project manager together with the other required contractual documents before mobilizing the equipment on the site of the works.
 - .2 In the event that the inspection report confirms the presence of invasive species, the Contractor shall be required to replace the equipment or to complete the cleaning of the equipment at his own expense. The description of the cleaning work carried out should be

included in the new inspection report (after cleaning) with all the relevant information mentioned above.

.3 The Departmental Representative reserves the right to seek a second opinion at any time.

- .3 In the event that invasive species are observed, the Contractor shall interrupt the work and carry out, at his own expense, the cleaning of the affected equipment and follow the procedure mentioned above.

1.12 TURTLE NESTING

- .1 Due to the potential presence of the Spiny Softshell Turtle and Geographic Turtle, any nesting indicator in site areas or stockpiling areas for the selected materials shall be reported to the Departmental Representative and measures will be taken to protect these species.

1.13 SOIL PROTECTION

- .1 In order to preserve the archaeological potential of the sites used as stockpiling and construction sites (Sabourin Park and MTMDET lot), it will be necessary to limit the deformation of the soil and to avoid the rutting caused by the frequent truck passages. The Contractor shall take the necessary measures to meet this constraint and present them in his method of work to be submitted after the award of the contract.
- .2 The proposed reinforcement method shall be developed in accordance with good engineering practice, such as, for example, in accordance with the MTMDET «Guide d'utilisation des géosynthétiques de séparation et de renforcement des chaussées», which aims to limit deformation in unpaved roads to 35 - 75 mm. The method must take into account the Sabourin Park and the MTMDET lot land use plan, including the location of stockpiles, truck lanes, and truck shore access road.
- .3 The designed reinforcement method must include a Type II geotextile separation between the foundation and the ground to protect the natural soil. At a minimum it must include a foundation of MTMDET classified crushed stone with a thickness of 315 mm.
- .4 A geotechnical survey was conducted at Sabourin Park in October 2016 to characterize the upper soil layers present. The results of this campaign are included in Section B of these specifications.
- .5 The proposed reinforcement method should be developed for the Sabourin Park based on the results of the geotechnical survey. The same method will be applied to the MTMDET lot.
- .6 The reinforcement method shall be maintained throughout the duration of the project works. For example lost aggregates should always be replaced such as to maintain the required thickness at all times.
- .7 If the method developed proves to be ineffective at Sabourin Park during the course of the project works, adjustments should be made. These adjustments would also be applied on the MTMDET lot as required.

1.14 AUTHORIZATIONS

- .1 The Contractor shall obtain the necessary authorizations and permits for all activities and work planned that are subject to one or more regulations of a public organization. The Contractor must provide a copy of these documents to the Departmental Representative prior to commencing work.

1.15 NOISE

- .1 Works will be conducted from Monday to Saturday, between 7:00 am and 7:00 pm.
- .2 The Departmental Representative shall establish a communication procedure to enable citizens to be informed about the site's noise management and to make complaints or comments where necessary.
- .3 Ambient noise levels shall be assessed prior to the commencement of the work by a specialized firm mandated by the Departmental Representative. In the event of complaints regarding noise levels, a site meeting will be held immediately and acoustic measurements will be taken during the work. The measurement protocol (frequency and location of measurements) will be established at the site meeting according to the problem encountered and the construction methods will be adjusted to reduce the sources of noise. If necessary, additional mitigation measures will have to be implemented to reduce noise levels.
- .4 The guidelines "Lignes directrices relativement au niveau sonore provenant d'un chantier de construction industriel" issued by the Ministry of Sustainable Development, Environment and Climate Change shall be applied:
 - .1 All reasonable and feasible measures shall be taken by the Contractor to ensure that the acoustic rating level (L_{Ar}, 12h)¹ from the construction site is equal to or less than the highest of the following noise levels: 55 dB or the level Of initial noise if it is greater than 55 dB. This limit applies to any reception point where the occupancy is residential or the equivalent (hospital, institution, school)
 - .2 It is agreed that there are situations where the constraints are such that the Contractor cannot perform the work while respecting these limits. If necessary, the Contractor is required to:
 - .1 Anticipate these situations as early as possible, identify and circumscribe them;
 - .2 Specify the nature of the work and the noise sources involved;
 - .3 Justify the construction methods used in comparison with possible alternatives;
 - .4 Demonstrate that all reasonable and feasible measures are taken to minimize the extent and duration of exceedance;
 - .5 Estimate magnitude and duration of expected exceedances;
 - .6 Plan follow-up actions to assess the actual impact of these situations and to take corrective action as necessary.
- .5 Use equipment that generate reduced noise levels. Ensure that the equipment used is equipped with a good quality muffler in working condition.
- .6 Place noisy equipment away from sensitive areas (residences) whenever possible.
- .7 Maintain well leveled access roads to reduce truck impact noise.
- .8 Set up variable intensity alarms for vehicles moving backward.
- .9 Avoid impact sound from rear panels of dump trucks and adopt methods of unloading materials to minimize impact noise.
- .10 Limit the use of engine brakes to emergency situations.
- .11 Turn off any electrical or mechanical equipment that is not in use

¹ The acoustic rating level L_{Ar}, T (where T is the duration of the reference interval) is an index of the noise exposure which contains the equivalent continuous sound pressure level LA_{eq}, T, to which is added if necessary one or several corrective terms for subjective assessments of the noise type.

1.16 NOTICE OF NON-COMPLIANCE

- .1 The Departmental Representative will notify the Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action with the approval of the Departmental Representative.
 - .1 Do not take action until after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2. Products

2.1 CLEANING

- .1 Cleaning during work: perform cleaning work in accordance with Section 01 74 11- Cleaning.
 - .1 Leave premises clean at the end of each working day.
- .2 No burial of waste and scrap materials on site permitted. Ensure that public watercourses and storm sewers remain free from disposed of waste and volatile materials.
- .3 Final cleaning: Dispose of surplus materials / materials, waste, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .4 Waste management: sort and dispose of waste off site.
 - .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environnemental Protection.
- .3 Section 01 51 00 – Temporary Utilities.
- .4 Section 01 52 00 – Construction Facilities.
- .5 Section 01 56 00 – Temporary Barriers and Enclosures.
- .6 Section 32 92 24 – Rehabilitation of premises.
- .7 Section 32 92 25 – Pelocation of Hornleaf Riverweed.
- .8 Section 35 31 24 – Materials Production.
- .9 Section 35 31 25 – Material placement in water.

1.2 INSPECTION: LAND WORK

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 The Departmental Representative will order part of the work to be examined if the work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, the Contractor shall correct such Work and pay cost of examination and correction.

1.3 INSPECTION: WORK IN WATER ENVIRONMENT

- .1 An overall bathymetry of the entire work area shall be carried out prior to any placement of materials in the river and shall form the basis of the quality control of the works for zones V1 to V10. At the locations of zones V1 to V10, the mesh size of the bathymetric readings should be sufficiently tight to provide an accurate representation of the bottom topography. The mesh size to be adopted must be approved by the Departmental Representative. Bathymetric readings shall be performed with an echo sounder with a minimum depth accuracy of ± 0.01 m coupled to a DGPS-RTK. The X-Y-Z coordinates will be geo-referenced and linked to the appropriate Canadian spatial reference system.
- .2 A final overall bathymetry of the entire work area will be carried out at the end of the river works to define the new topography of the bottom with the new habitats. The mesh size to be adopted must be approved by the Departmental Representative. This final bathymetry will allow as-built plans to be issued and transmitted to the appropriate authorities.
- .3 A minimum of ten (10) bathymetries corresponding to zones V1 to V10 in lotic waters shall be carried out. Each bathymetry must be completed within one day of the completion of the work in the corresponding zone, weather permitting. Otherwise, or as soon as possible afterwards.
- .4 The Contractor shall bear the cost of all bathymetries and provide the personnel and equipment required to do so. However, the bathymetries will be carried out in the presence of the

Departmental Representative and will thus be considered to be joint bathymetries on which both parties agree.

- .5 The Contractor shall be responsible for providing the Departmental Representative with the bathymetric results in digital format in AutoCAD. Raw data in Excel format will also be delivered to the Departmental Representative. All deliverables from bathymetric surveys must be signed by a licensed land surveyor.
- .6 Bathymetry of individual zones shall be used by the Departmental Representative for the quality control of materials placement in zones V1 to V10 and the Contractor's payment as described in Section 35 31 25-Materials placement in water. They must therefore have a tight mesh to provide a precise representation of the bottom topography (± 1 cm). The mesh size to be adopted must be approved by the Departmental Representative before each bathymetry and may vary from one area to another.
- .7 Inspections of the islands in lentic waters and placement of blocks in lotic waters shall be carried out by a diver (s). The Departmental Representative will bear the cost of the diver(s) and the required equipment.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Provide all equipment equipment's required for executing inspection and testing by appointed agencies except for inspection by diver(s).
- .3 Employment of inspection/testing agencies does not relax responsibility of the Contractor to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. The Contractor shall correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. This provision does not apply to river works whose quality control is done in accordance with the procedures described in Section 35 31 25 – Materials placement in water.

1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work site.
- .2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

- .1 Notify Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

1.8 REPORTS

- .1 Submit 2 copies of inspection and test reports to Departmental Representative.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.10 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. The requirements of this section apply to all sections of the specification in which samples are requested.
- .2 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .3 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.
- .5 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.
- .6 Mock-ups may remain as part of Work.
- .7 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 MILL TESTS

- .1 Submit mill test certificates as requested.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 29 00 - Payment.
- .2 Section 01 29 83 – Payment Procedures for testing laboratory services.
- .3 Section 01 33 00 – Submittal Procedures.
- .4 Section 01 52 00 – Construction Facilities.
- .5 Section 01 35 43 – Environmental Protection.
- .6 Section 01 77 00 – Closeout Procedures.
- .7 Section 01 78 00 – Closeout Submittals.

1.2 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.5 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.6 WATER SUPPLY

- .1 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .2 Pay for utility charges at prevailing rates.

1.7 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230volts.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

1.8 TEMPORARY COMMUNICATION FACILITIES

- .1 The Contractor shall provide and pay for temporary line[s], equipment necessary for own use and use of Departmental Representative; he must ensure the connection of these facilities to the main networks and bear the costs of all these services.
- .2 High-speed Internet access shall be provided to the offices of the Departmental Representative. This access must have an unlimited transfer capacity, as well as a minimum download speed of 200 Mbit/s and a minimum transmission speed of 30 Mbit/s.

1.9 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

Part 2. Execution

2.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways or the Ottawa river. These measures shall be in accordance with the sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures and repair as needed.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 29 00 – Payment.
- .2 Section 01 29 83 – Payment Procedures for testing laboratory services.
- .3 Section 01 33 00 – Submittal Procedures.
- .4 Section 01 35 00 06 – Special Procedures for Traffic Control.
- .5 Section 01 35 43 – Environnemental Protection.
- .6 Section 01 51 00 – Temporary Utilities.
- .7 Section 01 52 00 – Construction Facilities.
- .8 Section 01 56 00 – Temporary Barriers and Enclosures.
- .9 Section 01 74 11 – Cleaning.
- .10 Section 32 92 24 – Rehabilitation of premises.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-F, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-Z321-F96 (R2006) F09 (C2014), Signs and Symbols for the Occupational Environment.
 - .3 Ministère des Transports, de la Mobilité durable et de l'Électrification des transports du Québec - Collection Normes - Ouvrages routiers, Tome V - Signalisation routière, dernière édition.
- .2 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 INSTALLATION AND REMOVAL

- .1 Site areas include Sabourin Park and the MTMDET lot. Access to the river will be from the Sabourin park only. Nevertheless, the use of the MTMDET lot is optional. The Contractor may use only Sabourin Park for stockpiling materials and erecting site facilities or rent an additional lot at his own expense.
- .2 A topographic survey of the Sabourin Park will be provided to the Contractor after the award of the contract.

- .3 Prepare a layout plan of site areas indicating proposed location and size of area to be fenced and used by Contractor, number of trailers required, access to fenced area, trees to be felled and installation details of the fence. The plan must also include measures to protect existing facilities and infrastructure: power poles, billboards, etc., as well as those of the trees to be kept.
- .4 Provide details of soil reinforcement to prevent rutting and indicate areas where these measures would be applied. This condition applies to the Sabourin Park and the MTMDET lot.
- .5 Indicate any additional area or transit zone. If additional land will be used, provide its location and boundaries on a map.
- .6 If additional land is to be used, provide the Departmental Representative with a complete file including all administrative procedures and permits obtained to meet applicable regulations, including conditions of land use required by the appropriate authorities. The Ministry Representative will have the right to inspect the Contractor's use of the site for the sole purpose of ensuring compliance with the required conditions. However, the Contractor shall remain solely responsible towards the competent authorities for the use of the site in accordance with the regulatory requirements.
- .7 Provide construction facilities in order to execute work expeditiously.
- .8 Remove from site all such work after use.

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work or cause contamination of the stockpiled materials.
- .2 Provide and maintain adequate access to project site. Access to the Sabourin Park will be via Sabourin Avenue and access to the MTMDET lot will be via William and / or Robert Avenue.
- .3 A parking area shall be provided next to the site trailers.

1.6 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table. The office has to be located at Sabourin Park or the MTMDET lot. 1
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. The Contractor shall indicate the location of these offices.
- .4 Departmental Representative's Site office.
 - .1 Provide temporary office for Departmental Representative at the Sabourin park.
 - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4 50% opening windows and one lockable door.
 - .3 Insulate building and provide heating system to maintain 22 degrees C inside temperature.

- .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
- .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
- .6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
- .7 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .8 The site office must be operational before work begins, i.e., water, electricity, heating and telephone must be installed. These facilities must remain until the end of the project.
- .9 The Contractor shall also provide, throughout the construction period, a telephone device connected to an individual line with voice mail and fax in the mobile office described above.
- .10 The Contractor shall be responsible for the cost of the permits and the connection of temporary water and sewer services to the site office.
- .11 The Contractor shall provide, for the exclusive use of the Departmental Representative, from the commencement of the work and until the date of completion of the correction of deficiencies identified at the time of provisional acceptance, a functional fax machine, photocopy machine and high-speed Internet access.
- .12 Maintain in clean condition.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.
- .3 Equipment dismantled at the end of the first year of the works in the river, may be stored at Sabourin Park or MTMDET lot until the beginning of the second year of the works in the river or at any other time during the contract period. At all times, the Contractor is solely responsible for the safety and protection of his equipment.
- .4 Storage of materials required for habitat development.
 - .1 The Contractor shall determine which of the materials required for the development of the spawning grounds, namely the three categories of natural stone aggregates, the two cubic block sizes and the flat stones, to stockpile store on the sites and in what quantities.
 - .2 Stockpiling areas should be arranged to accommodate different types of materials in independent, well-separated piles.
 - .3 Fluid movement of trucks around each pile must be ensured.
 - .4 Piles must be of a safe height and have a stable slope at all times.
 - .5 Materials should not be washed away by rainfall runoff.
 - .6 The methods of unloading and loading materials on the site should avoid mixing the different categories of aggregates, blocks and stones stockpiled in independent piles, keeping the materials clean (free of sand, soil, organic matter , or other), and avoiding their pollution.
 - .7 The methods of unloading and loading materials on the site must prevent their segregation within the same pile and ensure the stability of the piles.

- .8 The movement of trucks on the piles of materials is prohibited at all times.
- .9 Materials may be stockpiled on the sites outside of authorized periods of works in the river. The Contractor is solely responsible for the safety of his materials and their preservation, including their integrity when exposed to the weather elements. The materials must at all times before they are placed in the water meet the requirements set out in Section 35 31 24- Production of materials.
- .10 When loading material from storage sites for river placement, precautions shall be taken to prevent the natural soil from being stripped. This precaution applies to the Sabourin Park and the MTMDET lot.

1.9 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Departmental Representative.

1.10 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by the Departmental Representative.
- .2 No other signs or advertisements, other than warning signs, are permitted on site.
- .3 Provide project identification site sign comprising foundation, framing, and one 1200 x 2400 mm signboard as detailed and as described below.
 - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
 - .2 Framework and battens: SPF, pressure treated minimum 89 x 140 mm.
 - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
 - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
 - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
 - .6 Vinyl sign face: printed project identification, self-adhesive, vinyl film overlay, supplied by Departmental Representative.
- .4 Locate project identification sign where indicated by Departmental Representative and construct as follows:
 - .1 Build concrete foundation, erect framework, and attach signboard to framing.
 - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
 - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .5 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.

- .6 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .7 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 The Contractor shall submit his traffic management plan for approval by the Departmental Representative following the award of the Contract. This traffic management plan should include minimizing traffic obstructions during peak hours, taking into account the restrictions imposed in these specifications, and accounting for other construction sites planned during the work period. This traffic management plan will be shared with the relevant authorities.
- .2 If it is determined that permits are required, the Contractor shall be responsible for obtaining such permits from the relevant authority.
- .3 Provide on-site access roads and truck waiting areas to maintain traffic.
- .4 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .5 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .6 Protect travelling public from damage to person and property.
- .7 Contractor's traffic on roads selected for hauling material to and from site shall interfere as little as possible with public traffic and must follow at all times the traffic plan submitted by the Contractor and approved by the Departmental Representative prior to the commencement of the works.
- .8 Verify adequacy of existing roads and allowable load limit on these roads. Ensure that all public roads are used in accordance with the uses authorized by the authorities responsible for them. The Contractor is responsible for repair of the Robert and William avenues and the sidewalks and bicycle lanes adjacent to the work site if damaged as a result of construction.
- .9 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .10 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .11 Dust control: adequate to ensure safe operation at all times.
- .12 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .13 Provide snow removal during period of Work.
- .14 Take the necessary steps to ensure that the shared use of Sabourin Avenue with residents of the Manoir des Îles is safe.
- .15 The Contractor shall coordinate with the City of Vaudreuil and its representatives the maneuvering plan necessary to ensure access to the waste containers located along Sabourin Avenue in accordance with the terms of the contract for waste collection of the city of Vaudreuil or of the MRC.

1.16 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.

Part 2. Execution

2.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways or towards the Ottawa river. These measures shall be in accordance with the sediment and erosion control plan, specific to site prepared by the Contractor in conformance with the most stringent of the requirements of EPA 832/R-92-005 and those of the authorities having jurisdiction. A sediment barrier should be installed at Sabourin Park along the riparian buffer strip and left in place at the end of the works to ensure that the bare soil does not generate runoff into the river.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 All Sections included in present Specifications.

1.2 REFERENCES

- .1 Ministry of Transportation, Sustainable Mobility and Transportation Electrification (MTSMTE)
 - .1 Guide d'utilisation des géosynthétiques de séparation et de renforcement des chaussées (Ministère des transports du Québec MTQ)
 - .2 Specifications and General Specifications (CCDG) - Road Infrastructure - Construction and Repair (Ministère des transports du Québec MTQ)
 - .3 Standards of Practice, Road Construction, Tom I "Road Design", latest edition.
 - .1 Standards, Road Works, Tome VII "Materials".
 - .2 Standard 2101 – Aggregates.
 - .3 Standard 2102 - Granular Materials for Foundation, Underlayment, Granular Tread and Shoulder.
 - .4 Standard 13101 - Geotextiles.
- .2 Bureau de normalisation du Québec (BNQ).
 - .1 BNQ 2501-170 : Sols - Détermination de la teneur en eau.
 - .2 BNQ 2501-255 : Sols - Détermination de la relation teneur en eau-masse volumique - Essai avec énergie de compactage modifiée (2 700 kNm/m³).
 - .3 BNQ 2560-114 : Travaux de génie civil - Granulats.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 FENCES

- .1 Prior to commencement of use of site and stockpiling areas, erect a temporary fence around Sabourin Park and the MTMDET lot consisting of a 100% metal fence 11.8m high, attached with metal wire to T-profiled columns. The grid will have a maximum opening such that a 100 mm diameter spherical object cannot pass through the meshes of this grid. Provide one (1) access barrier for trucks which can be locked. The approximate perimeter of the fence is as shown on plan D-1001. The exact location will be demarcated on site by the Departmental Representative at the start of the work. The constraints to be respected are as follows.
 - .1 At a 5 m distance from the highway edge along Harwood Boulevard on the MTMDET lot.
 - .2 At a distance of 5 m along Allen Avenue inside the MTMDET lot. If the land immediately east of Allen Avenue is deforested, the fence must reach the AMT parking lot and delineate it as shown in plan D-1001, if not it should reach the tree line.

- .3 Along Sabourin Avenue on the Sabourin Park side.
- .4 Along the sidewalk at Sabourin Park or parallel to the sidewalk but inside the Sabourin Park so as to have the electric poles outside the fence.
- .2 Provide protection barriers around trees and plants designated to remain in place. Protect from any damage that might be caused by equipment and some construction practices.

1.5 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

1.6 ACCESS TO SITE

- .1 Provide access to Sabourin Park (via Sabourin Avenue) and the MTMDET lot (via William Avenue and / or Robert Avenue).
- .2 Pavements for access roads, truck waiting areas and any other area where the ground could be deformed by truck traffic should be strengthened to avoid or minimize rutting to less than approximately 75 mm as specified in section 01 35 43 - Environmental protection. The reinforcement method shall include at the very least a Type II geotextile separation between the foundation and the ground to protect the natural soil and a foundation of crushed stone classified according to MTMDET with a thickness of 315 mm.
- .3 Items to be submitted by Contractor.
 - .1 Aggregates: Depending on the source of supply, the Contractor shall provide the results of test NQ 2501-255: Soils - Determination of water content-unit density relationship - Modified compaction energy test (2700 kNm/m³). Depending on the supply source, the Contractor shall provide the results of the tests (attestation of conformity) to demonstrate compliance of the proposed granular materials with the requirements.
 - .2 Geotextiles: according to Standard 13101 of Tome VII of the MTMDET Standards - Road Works series "Materials".

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public. Ensure the protection of pedestrians at all times when crossing the access roads at both sites.

1.8 ACCESS ROUTES FOR EMERGENCY VEHICLES

- .1 Provide access to the site by the emergency vehicle and ensure adequate height clearances.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF EXISTING INSTALLATIONS

- .1 All existing facilities and infrastructure on Sabourin Park and the MTMDET lot should be protected during construction so as to avoid any damage. These include but are not limited to: poles supporting electric power lines and the like; A metal barrier; an advertising sign; signaling signs; a fire hydrant, sidewalks and street curbs. Hydro Québec's power line at the entrance to Sabourin Avenue must be protected. The Contractor must plan to contact Hydro Québec and have the aerial line protected (protective system for working near a power line).
- .2 Trees newly planted at Sabourin Park and mostly located in the 10 m wide river bank protection strip must be preserved and protected.
- .3 Access to the existing advertising sign at Parc Sabourin must be guaranteed at all times during the duration of the work.
- .4 Damage to existing facilities should be repaired by the Contractor at his expense.
- .5 Sewer and other manholes may be covered with piles of material or the ground protective layer.
- .6 Deforestation is permitted at Sabourin Park and the MTMDET lot in accordance with the conditions specified in Section 01 14 00 Work restrictions. However, the Contractor should try to limit deforestation to a minimum.
- .7 The status of existing facilities will be assessed by the Departmental Representative in the presence of the Contractor following the award of the contract. The contractor will be responsible for delivering the facilities in the same condition.
- .8 In the event that the Contractor decides to lease additional land at his expense, the protection of existing facilities will be negotiated with the landowner. The Departmental Representative will not be allowed to oversee the use of this site except to ensure that all applicable regulations are respected.

Part 2. Products

2.1 GEOTEXTILE

- .1 The geotextiles used for the infrastructure shall be of Type II (for soil reinforcement and impermeable separation), in accordance with the requirements of the Ministry Standard 13101 "Geotextiles".

2.2 GRANULAR MATERIALS FOR FOUNDATIONS

- .1 The granular materials used for the foundations shall comply with the requirements of Standard 2101 of the ministry and shall be free of organic matter, snow and ice. They must be placed on a clean, unfrozen surface free of snow and ice.

END OF SECTION

Part 1. General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Clear snow and ice from access roads. Remove snow from site according to applicable regulation.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris and leave Work clean.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Remove any surplus materials used for the development of the habitats. Remove geotextiles and aggregates used for soil reinforcement.
- .7 Sweep and clean sidewalks along Sabourin Park and the MTMDET lot. At the exit of the site and stockpiling areas public roads must be kept free of mud, spoil or other waste from the construction site. In order to do this, clean the approaches to the exit at midday and at the end of the working day or as required to ensure the safety of public roads.
- .8 Remove snow and ice from access roads.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Protection.
- .2 Section 32 92 24 – Rehabilitation of premises
- .3 Section 32 92 25 – Relocation of the Hornleaf Riverweed.
- .4 Section 35 31 25 – Materials placement in water.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor shall conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative Inspection:
- .2 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies. Contractor to correct Work as directed.
 - .1 Completion of Tasks: submit written certificates in the official language of choice that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Detected defects and deficiencies corrected.
 - .3 Work: complete and ready for final inspection.
 - .2 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
 - .2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
 - .3 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and/or recycling.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 –Submittal Procedures.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Documents Submittal.
 - .1 Project file, samples and specifications.
 - .2 Workshop Drawings.
 - .3 Annotated drawings conforming to execution.
 - .4 Data sheets, materials, and related information.
 - .5 Replacement materials / equipment, special tools and spare parts.
- .2 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, 2 final copies of required documents in French.
- .4 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .5 Copies submitted will be returned after final inspection of the work, together with comments from the Departmental Representative.
- .6 If necessary, review documents content prior to resubmission.
- .7 Provide evidence, if requested, for type, source and quality of products supplied.
- .8 Contractor must provide PDF files of all documents to be submitted upon completion of work.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content in a logical order following operations sequence according to Section numbers of the specifications document and their order of appearance in the Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

- .9 Provide 1:1 scaled CAD files in dwg format on CD.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Laboratory records of materials used in habitat development.
 - .7 Field test records.
 - .8 Inspection certificates for works on land and in water.
 - .9 Manufacturer's certificates.
 - .10 All results of bathymetric surveys.
 - .11 A log of underwater camera movies, well-numbered and dated.
 - .12 Underwater camera movies.
 - .13 Data sheets of all planted trees.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of opaque drawings, and in copy of Project Manual.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

END OF SECTION

Partie 1 General

1.1 Reference Standards

- .1 Ministry of Transportation, Sustainable Mobility and Transportation Electrification.
 - .1 Collection Standards– Road Work, CCDG 2015 – Cahier des charges et devis généraux – Chapter 19.
 - .2 Tome IV – Abords de route : Chapter 1 - Architecture de paysage – Dessins normalisés – 2016.

1.2 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of work.
- .2 Section 01 29 00 –Payment.
- .3 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .4 Section 01 33 00 – Submittal Procedures.
- .5 Section 01 35 43 – Environmental Protection.
- .6 Section 01 45 00 – Quality Control.
- .7 Section 01 45 01 – Insurance of Quality.
- .8 Section 01 52 00 – Construction Facilities.
- .9 Section 01 56 00 – Temporary Barriers and Enclosures.
- .10 Section 01 74 11 – Cleaning.
- .11 Section 01 77 00 – Closeout Procedures.
- .12 Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- .1 The following information must be submitted to the Departmental Representative in accordance with the requirements of Section 01 33 00 Submittal Procedures.

1.4 SABOURIN PARK

- .1 The rehabilitation of Sabourin Park is not required under this contract.
- .2 The Sabourin Park will be transformed into a public park by the Departmental Representative after the end of this contract. It is therefore important that the Contractor tries to minimize the deterioration of the site during the work.
- .3 Fencing, protective measures for existing installations, crushed stone and geotextiles used for soil protection, and any other materials or installations on-site under this contract shall be removed from the site at the completion of work - unless otherwise specified by the Departmental Representative - in accordance with the requirements described in the use of the premises and facilities of Section 01 14 00 – Work Restrictions.
- .4 No development, reforestation or seeding will be required for this site upon completion of the work. However, the condition of the site will be subject to approval by the Departmental Representative who may require additional cleaning or other measures.

1.5 THE MTMDET LOT

- .1 Site utilization and remediation plan including conservation measures and replanting plan shall be submitted to MTMDET for approval.
- .2 A site survey will be conducted prior to the start of construction in the presence of the Departmental Representative to define existing conditions.
- .3 Reforestation and reclamation of the MTMDET lot shall comply with the clauses set out below.
 - .1 Fencing, protective measures for existing facilities, crushed stone and geotextiles used for soil protection, and any other material or facility on site under this contract shall be removed from the site at the completion of work - unless otherwise specified by the Departmental Representative - in accordance with the requirements described in the use of the premises and facilities of Section 01 14 00 – Work Restrictions.
 - .2 Rake, sweep, and remove sand, stones, papers, garbage, branches, leaves and other detritus on grass, path, sidewalk, and asphalt road using a mechanical sweeper.
 - .3 All debris, woody debris, garbage and other material collected must be disposed of at an authorized site.
 - .4 The Robert and William Avenues shall be restored to a condition similar to that prevailing prior to the start of the works.
 - .5 The entire site that was sodded upon taking over the lot shall be subject to preparatory work to aerate the surface, place topsoil and seed.
 - .1 Ventilation of Grass Area
 - .1 Ventilate with an aerator that has a hollow spade 50 mm in diameter. Push the spades into the ground to a depth varying between 150 mm and 300 mm.
 - .2 Provide appropriate number of passes on grass surface to obtain an average density of 320 holes at M².
 - .3 Level the ground surface by eliminating potholes and rough edges and giving it a slope that promotes good water flow.
 - .2 Topsoil
 - .1 Place 50 mm of topsoil uniformly on the surface to be seeded
 - .2 The topsoil must be compacted but not densified
 - .3 Seeding
 - .1 Proceed with hydraulic seeding of all originally grassed areas and areas where deforestation has been authorized by the Departmental Representative.
 - .2 Use a hydraulic seeder with a mixing tank, a recirculating agitation system that can be operated while the tank is being loaded.
 - .3 Seeding products to be provided in the tank in the presence of the Departmental Representative.
 - .1 Seed: H1 type composed of 50% Red Fescue Tracer, 30% Kentucky bluegrass, 10% Red Top common bentgrass and 1-0% Ray-Grass at a rate of 250 kg ha.
 - .2 Fertilizer: slow release synthetic compound with a ratio of 1: 3: 1, rate of 125kg ha.
 - .3 Mulch of wood fiber cellulose with 95% organic matter and a 90% water absorption capacity

- .4 All implementation, reference standards, and products shall conform to CCDG 2015 Article 19.3.6.5.
- .6 If the Contractor chooses to carry out deforestation work in the part of the lot authorized by the Departmental Representative, he shall compensate with reforestation. Reforestation must occur within a twenty (20) meter wide strip located east of Robert Avenue on the margins of the railway right-of-way as shown on Plan D-1001. Reforestation must comply with the following conditions.
 - .1 All planting material must be of the highest quality and conform to the production standard of BNQ NQ 0605-300-2001
 - .2 Plantation products are:
 - .1 Deciduous tree and coniferous tree grown in multi-cell, 310 cm³ clover, native or naturalized species with hardiness zone of 3b or 3a.
 - .2 Planting density of five (5) trees per m².
 - .3 Distribution of plantation is random, consisting of 70% deciduous and 30% conifer.
 - .4 Provide a 450 mm diameter biodegradable collar with plastic strap at the base of each planting.
 - .5 A reforestation plan specifying the species, distribution, planting schedule and maintenance measures up to the final date of completion of this contract shall be approved by the Departmental Representative.
 - .3 The area to be reforested shall be equal to the deforested area as long as the deforested area is less than or equal to about 1300 m² which represents the total surface area of the reforestation band.
 - .4 All execution work, reference standards, and products shall conform to CCDG 2015 and Volume IV, Chapter 1 of the MTMDET Standard Drawings.

1.6

OTHER LOT

- .1 In the event that the Contractor decides to lease an additional lot at his own expense, the lot rehabilitation will be negotiated with the landowner. The Departmental Representative will not be entitled to oversee the rehabilitation of this site, provided that all the regulations in place and the conditions required by the authorities for the use of the site are respected.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 14 00 – Work Restrictions.
- .3 Section 01 29 00 - Payment.
- .4 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .5 Section 01 33 00 – Submittal Procedures.
- .6 Section 01 35 43 – Environmental Protection.
- .7 Section 01 77 00 – Closeout Procedures.
- .8 Section 01 78 00 – Closeout Submittals.
- .9 Section 35 31 25 – Materials Placement in Water.

1.2 MEASUREMENTS FOR PAYMENT PURPOSES

- .1 The payment for the relocation of the hornleaf riverweed (*Podostemum ceratophyllum*) will be on the basis of a lump-sum amount.
 - .1 The sampling area (s) totaling 100 m² shall be selected by the Departmental Representative.
 - .2 The relocation area (s) totaling 100 m² shall be selected by the Departmental Representative.

1.3 REFERENCES

- .1 Natural Heritage Data Center of Quebec (CDPNQ). 2015. *Podostemum ceratophyllum* - Summary for all occurrences in Quebec. (2015-09-01).
- .2 Ministry of Sustainable Development and Parks (MDDEP) and FLORAQUEBECA 2009. Rare plants from southern Québec. Ed. The Publications du Québec. 402 p.

1.4 ADMINISTRATIVE

- .1 Work Schedule
 - .1 Establish a schedule for the relocation of the hornleaf riverweed during periods of low-waters (August or first two weeks of September).
 - .2 Establish a schedule so that relocation of the hornleaf riverweed occurs when plant is fully developed.
 - .3 Pre-Implementation Meeting: Hold a meeting where work requirements and implementation instructions in accordance with Section 01 31 19 - Project Meetings will be discussed.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Relocation equipment and procedures.

- .1 No later than thirty (30) days prior to removal, the Contractor shall submit his procedures for the removal and relocation of the hornleaf riverweed which shall include.
 - .1 A list of the equipment planned to be used.
 - .2 Name and qualifications of subcontractors, if applicable.
 - .3 Work schedule.

1.6 QUALITY ASSURANCE

- .1 Competencies
 - .1 The relocation of the hornleaf riverweed must be carried out by biologists and / or technicians specialized in the environmental field or in ecology.

1.7 TRANSPORT, STORAGE AND HANDLING

- .1 The relocation of the colonized stones must take place within one hour after removal, i.e. on the same day.
- .2 No storing will be permitted.
- .3 The relocation of the hornleaf riverweed must be done manually.

Part 2. Product

2.1 MATERIAL

- .1 Stone colonized by the hornleaf riverweed.

2.2 QUALITY CONTROL AT THE SOURCE

- .1 Monitoring of the relocation work on the hornleaf riverweed will be carried out by the Departmental Representative.

Part 3. Execution

3.1 PROFESSIONNALS

- .1 Use biologists and / or technicians specialized in the field of environment or ecology.

3.2 SITE CHARACTERIZATION

- .1 The sampling population is that which will be encircled by the V3 and V10 developed zones (Plan C-1002). This population totals 2,540 m².
- .2 The Departmental Representative shall select a location in the collection colony where the density of hornleaf riverweed is greater than 50%. Places where manual removal could be carried out under existing hydraulic conditions will be favored.
- .3 The Departmental Representative shall delimit an area of 100 m² or two (2) 50 m² areas within the sampling population site based on measurements of flows and depths of water; an identification of the substrate; and an evaluation of the density and healthiness of the riverweed population. The Departmental Representative will bear the cost of these measures.

- .4 The Departmental Representative shall delineate the contour of the sampling area (or two areas) using a DGPS with an accuracy of at least one meter.
- .5 The Departmental Representative will identify a relocation site within the project area (between Taschereau Bridge and Île aux Pins) where the hydraulic and depth conditions are similar to those at the sampling site. Places where manual placement could be carried out under existing hydraulic conditions would be favored.
- .6 The Departmental Representative shall delimit an area of 100 m² or two (2) 50 m² areas for the relocation within the relocation site based on measurements of flows and water depths, substrate identification, and an assessment of the density and healthiness of the riverweed population. Areas without or with very little (<5%) hornleaf riverweed will be prioritized. The cost of these measures will be borne by the Departmental Representative.
- .7 The Departmental Representative shall delineate the contour of the relocation area (or two areas) using a DGPS with at least one meter accuracy.
- .8 The relocation of the riverweed must be carried out during the optimal development period of the plant, which usually occurs in August or between early and mid-September.
- .9 The Contractor shall at all times be responsible for the transportation of the Departmental Representative's personnel on the water, during the periods of works in the water.

3.3 REMOVAL AND RELOCATION ACTIVITIES OF THE HORNLEAF RIVERWEED

- .1 Removal and relocation activities of the hornleaf riverweed must be done manually.
- .2 Within the delineated and characterized sampling area, manually remove all stones colonized by the hornleaf riverweed over the entire 100 m² surface area.
- .3 Carefully place colonized stones of riverweed in a tank of water.
- .4 Transport the colonized stones to the relocation site. Ensure that colonized stones of riverweed remain in the water at all times.
- .5 Dispose colonized stones one by one within the perimeter of the approved relocation site, respecting the sampling density. The removed stones will have to be redeposited over an equivalent area of 100 m² or within two (2) areas of 50 m² each. The surface of the stones where the plants are attached must be directed upwards when they are repositioned in the river.
- .6 The relocation of the colonized stones must take place within one hour of sampling, i.e. on the same day.
- .7 Removal and relocation of the hornleaf riverweed shall be subject to the approval of the Departmental Representative.
- .8 Areas where riverweed has been relocated must be protected by silt curtains if materials placement for habitat development is carried out upstream.

3.4 RECEIPT OF WORK

- .1 The relocation of the hornleaf riverweed shall be approved at every stage by the Departmental Representative.

END OF SECTION

Part 1. General**1.1 SCOPE**

- .1 This section deals with stone production, including the acceptance of stone sources by the Departmental Representative and the applicable quality control and quality assurance tasks. The Contractor is responsible for Quality Control (QC), while the Departmental Representative is responsible for the Quality Assurance (QA) process.

1.2 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 29 00 - Payment.
- .3 Section 01 33 00 – Submittal Procedures.
- .4 Section 01 45 00 – Quality Control.
- .5 Section 35 31 25 – Placement of materials in water.

1.3 REFERENCES

- .1 The latest editions of the standards listed below are included in these specifications within the limits stated herein.
 - .1 American Society for Testing and Materials (ASTM).
 - .2 ASTM C88-05: Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - .3 ASTM C127-07: Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
 - .4 ASTM C136-06: Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM D4992-07: Evaluation of Rock to be Used for Erosion Control.
 - .6 ASTM D6928-06: Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.
 - .7 ASTM D7012-07: Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures.

1.4 SUBMITTAL PROCEDURES

- .1 The following information must be submitted to the Departmental Representative in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Information on the source of the materials.
 - .1 The Contractor shall submit the following information within fifteen (15) working days of the award of the contract for all proposed materials sources.
 - .2 Name and location of quarry/source.
 - .3 Laboratory Test Results (see requirements in Table 1).

- .2 Materials and Staff Control Plan
 - .1 The Contractor shall submit a written materials control plan within ten (10) working days of the award of the contract. The plan must describe the means, methods and equipment to be used, as well as the inspections and follow-up that will be carried out during the handling, transport and placement of the stones in order to ensure a satisfactory quality of the work.
 - .2 The submittal of the control plan shall include the name and qualifications of the supervisor and a licensed professional geologist or geological engineer. The specific qualifications and functions required for these persons are described in paragraph 1.7 of this section.
- .3 Pre-production Stones
 - .1 The Contractor shall submit a set of pre-production stones within twenty (20) working days of the contract being awarded for evaluation by the Departmental Representative at the source. At least 25 pre-production stones must be provided for each category of stone size to be produced at each source (except flat stones). The specific requirements for pre-production stones are described in paragraph 1.8 of this section.
- .4 Revision of Materials and Personnel Control Plan
 - .1 If the Contractor decides to propose a revision or change to the stone control plan, he shall submit the proposed revision no later than five (5) days prior to the date on which he proposes to implement the revision and shall not implement it until it has been reviewed by the Departmental Representative. Proposed staff changes are also subject to a mandatory review. Revisions requested by the Departmental Representative for the Materials Control Plan and / or personnel shall follow the procedures prescribed elsewhere in this section.
- .5 Materials Control Plan Reports
 - .1 The Contractor shall maintain daily reports of all work performed as part of the approved Materials Control Plan. These reports must be available for review by the Departmental Representative upon request. Moreover, they must be compiled at the end of each week and submitted to the Departmental Representative on a weekly basis. Daily reports must be prepared by each inspector and must include the following information.
 - .1 Name of Inspector.
 - .2 Identification of stone handling equipment during all phases of work and names of equipment operators who prepared the stone for inspection.
 - .3 Date of the stone inspection.
 - .4 Meteorological conditions, including temperature.
 - .5 Location from which the stone has been removed.
 - .6 Colors and characteristics used by the inspector for aerosol paint marks and applicable code for stones that are sorted individually (and not mechanically) and for discarded stones.
 - .7 Breakdown of the approximate quantity, by category, of accepted and rejected stones that were handled for the project during the day.
 - .8 A summary of the causes of most stone discards during the day.
 - .9 Total quantity of each stone category shipped from the source as of the date of the report.

.6 Particle size testing

- .1 Submit for examination all particle size test results, including test data sheets, calculations and the graphic presentation of the results.

1.5 TERMINOLOGY

.1 The following terms are defined as follows.

- .1 Dimensional ratio (l/d) - The ratio between the length of the stone (l) and its thickness (d) measured on three mutually perpendicular axes. The length of the stone (l) is defined as the greatest distance between two points on the stone (ie, the diametrically opposite corners of a block). The thickness of the stone (d) is the distance between two parallel lines between which the rock can just pass.
- .2 The term "ton" refers to the metric ton ($1\text{ t} = 1,000\text{ kg}$).

1.6 QUALITY CONTROL

- .1 The materials control plan shall be incorporated into the Contractor's General Quality Control Program in accordance with Section 01 45 00 - Quality Control.

1.7 QUALITY CONTROL PERSONNEL

.1 General

- .1 The Contractor shall provide a designated supervisor for the entire stone inspection process, as well as competent inspectors at the sources and at the loading sites. In addition, the Contractor must retain the services of a licensed professional geologist or a geological engineer to assist the supervisor as required throughout the duration of the project. The staff must check that all the stone produced, delivered to the site and placed in the fittings complies with the requirements of the contract plans and the specifications.

.2 Supervisor qualifications and functions

- .1 The supervisor is responsible for the implementation of all components of the materials control plan. He must have at least two years of specialized experience in the inspection and evaluation of stone. If the main Contractor procures stones for this project from a subcontractor, the supervisor must not be an employee of this subcontractor. The supervisor shall assume responsibility for the implementation and execution of the materials control plan, including the management, the directing and the review of the work of all inspectors. He must have at all times qualified and appropriate inspection personnel and shall replace any person who does not perform his duties satisfactorily. The supervisor is responsible for the quality of all the materials to be placed in the river.

.3 Qualifications and duties of the geologist or the geological engineer

- .1 The geologist or geological engineer must be a licensed professional with at least one year of practical experience in the inspection and evaluation of stone. He should assist the supervisor during the selection of the stone sources, including visual and petrographic examinations (see Table 1), identification of acceptable and unacceptable stone at the source and selection of pre-production stones. In addition, the services of the geologist or geological engineer must be retained during the production of the stones if the permanent quality control (QC) and quality assurance (QA) activities indicate that the quality of the stone provided does not meet the requirements or is questionable, as directed by the Departmental Representative.

- .4 Inspectors qualifications and functions
 - .1 Inspectors shall be adequately trained and have a minimum of one year of appropriate experience to perform competently and independently the tasks outlined below under the general supervision of the supervisor.
 - .1 Participate in the selection of the pre-production stones and the evaluation of the stone placed in the stockpiling piles.
 - .2 Maintain a clear and readable daily log of activities and observations in a format to be approved by the Departmental Representative. Prepare daily inspection reports and submit them in a timely manner.
 - .3 Visually inspect the stone to ensure it meets the quality requirements of this section. The examination should focus on the quality of the stone, fractures, stone geology and other detrimental features that could cause the stone to disintegrate into small pieces after its placement.
 - .4 Identify stones that do not meet the acceptability criteria for size, quality and / or shape.
 - .5 Maintain separate piles of stones for each type of material.
 - .6 Ensure that rejected stones are placed in a "reject" pile or removed immediately from the site once identified. Rejected stones should never be mixed with accepted stones.
 - .7 Carry out particle size analyses and assessments of size, dimensional ratios and weight estimates for stones. Make the appropriate production modifications necessary to ensure that the grain size and shape requirements of this section are met.
 - .8 Ensure that the various categories of material are kept separate during transport.
 - .9 Conduct periodic checks to ensure that gauges and other weighing devices mounted on equipment accurately weight the stone for grain size and quality control testing.

1.8 PRE-PRODUCTION STONES

- .1 Preparation
 - .1 The Contractor shall supply a pre-production stone set within twenty (20) working days of the award of the contract. The supervisor must select the pre-production stones for evaluation by the Departmental Representative. These stones must be located at the source and placed in rows. At least twenty-five (25) pre-production stones must be provided for each block size category to be produced at each source. For flat stones, at least five (5) production stones must be provided. For aggregates, ten (10) samples shall be provided for each of the three gravel types. All materials must be representative of the quality of the stone to be supplied and the size range specified for their given category.
- .2 Visual Inspection of Pre-Production Stones
 - .1 The Supervisor and the Contractor's Inspectors shall accompany the Departmental Representative during the inspection of the stones. The Contractor shall make arrangements to ensure that the faces of the stones are not covered with dust or mud and that they may be turned as needed to facilitate inspection by the Departmental Representative. He will mark the unacceptable stones with an "X" in red on three mutually perpendicular sides (blocks of stone and flat stones). If twenty percent (20%) or more of the stones of a set of pre-production stones are found to be unacceptable, the Contractor shall replace the unacceptable stones for further inspection. If, after a total of two attempts, the Contractor is unable to provide a complete and adequate set of pre-production stones, the quarry / source will be rejected for this contract. He will then be asked to indicate a new source of stone for approval. The Contractor is

responsible for all costs associated with the replacement of stones for pre-production stone sets or the change of stone sources. No extension of the date of execution of the various activities imposed by this contract will be permitted due to the change of stone sources.

- .3 The Contractor shall provide the results of the laboratory tests on all classes of materials within twenty (20) working days of the award of the contract.
- .4 Preservation of pre-production stones as an example
 - .1 Acceptable pre-production stones and typical unacceptable ones, as established by the Departmental Representative, should remain exposed at the source as an example (of quality, size and shape requirements) throughout the shipment period of the stones from that source for the present contract.
 - .2 The Departmental Representative shall indicate to the Contractor which pre-production stones shall be exhibited at all times at Sabourin park as examples.

1.9 ACCEPTANCE DECISION FOR STONE SOURCES AND FOR THE CONTROL PLAN

- .1 The Departmental Representative reserves the right to undertake independent investigations and evaluations, including other stone quality tests indicated in Table 1, if necessary, to verify whether materials that meet the requirements of the present specifications can be produced from the proposed sources. Any additional tests will be carried out on samples of materials selected by the Departmental Representative and their costs will be borne by the Departmental Representative.
- .2 The Departmental Representative will decide on the acceptance of the materials sources proposed by the Contractor and the control plan, including personnel, based on the following information.
 - .1 Review of information on material sources and stones control plan submitted by the Contractor (see paragraphs 1.4.1 and 1.4.2).
 - .2 Visual inspection of pre-production stones (see paragraph 1.8).
 - .3 Assessment of information on prescribed material quality requirements (see paragraph 2.3 and Table 1), grain size and shape of blocks and flat stones (see paragraph 2.4).
 - .4 Review of other laboratory test results as required (see paragraph 1.9.1).
- .3 The Departmental Representative shall decide on the acceptance or rejection of the materials sources, stone control plan and personnel proposed by the Contractor within ten (10) working days of the date of inspection by the Departmental Representative of pre-production stones or receipt of other laboratory test results, whichever occurs last.
 - .1 If the stone source, control plan and personnel are deemed acceptable, the Contractor may continue to supply the materials provided that they correspond to the pre-production stones accepted.
 - .2 If the control plan is rejected, the Contractor is responsible for preparing a new plan, which may include new personnel, all to the satisfaction of the Departmental Representative, before proceeding to the production of materials for the project. No additional payment for the work will be made until an appropriate plan has been submitted for review by the Departmental Representative. The Contractor is responsible for all costs related to the preparation of a new plan. In addition, no extension of the execution date required by this contract will be permitted if a new plan is required.
 - .3 If the material sources are rejected, the Contractor is responsible for finding new sources and undertaking sampling and testing required for approval of the new source by the Departmental Representative. All costs for the change of stone sources shall be borne by the Contractor. In

addition, no extension of the date of execution of the various activities required by this contract will be permitted due to the change of stone sources.

- .4 No extension of milestones and contract delivery dates will be granted for the time required by the Departmental Representative to decide on the acceptance or rejection of the proposed sources.

1.10 QUALITY ASSURANCE

.1 General

- .1 Quality Assurance (QA) activities will be conducted by the Departmental Representative. These activities are intended to provide independent observations on compliance with the requirements of this section prior to the shipment of the materials to the work site and in no way relieve the Contractor of his responsibilities.
- .2 The Contractor shall provide the equipment and operators to turn and handle potentially problematic stones for further evaluation by the Departmental Representative.
- .3 In the event that the QA activities indicate a non-compliance with the requirements of this section, the Departmental Representative will reject the non-conforming materials. Materials rejected at the source must be immediately separated and removed from the stockpiling area. Also, materials rejected on the project site must be promptly removed from the project site. The removal of the rejected stones is the responsibility of the Contractor.
- .4 If during his QA activities, the Departmental Representative finds that the quality of the supplied materials does not meet the requirements or is questionable, further sampling and laboratory testing may be required. The selection of the samples and the testing of the required materials must be in accordance with the instructions of the Departmental Representative. The Contractor shall pay all costs for the required additional sampling and laboratory testing of the materials.
- .5 Continued non-compliance shall be considered as justification for the rejection of the materials control plan as described in Section 1.9.3.2 and / or the rejection of materials sources as described in Section 1.9 .3.3.

.2 Particle size analysis

- .1 The Departmental Representative may carry out particle size analyses in addition to those required from the Contractor for quality assurance (QA) purposes at the materials source or at the project site. QA particle size analyses will be carried out at intervals selected by the Departmental Representative. He will select a random sample of stones to be tested. If the results of the QA particle size analyses or stone observations indicate that the stones do not meet the specifications, production procedures must be modified and additional particle size analysis (QA and QC) will be required to validate the corrective measures.
- .2 The Contractor shall make available to the Departmental Representative all loading equipment, certified scales, equipment operators and labor as required to collect samples, measure (or weigh) the individual stones and weigh the total sample.

Part 2. Product

2.1 GENERAL

- .1 Every material must meet all requirements prescribed in this section of the specifications. The Departmental Representative may, at any time during the contract, reject materials at the source or

at the project site if they do not meet the prescribed requirements. Materials that have been delivered to the project site and that are rejected must be removed at the Contractor's expense.

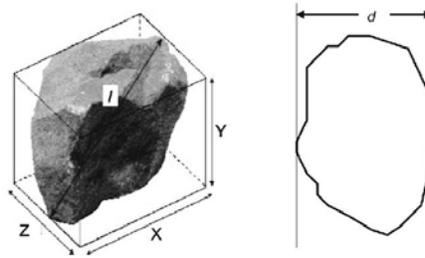
- .2 The control plan and QC/QA activities should be systematically applied throughout the operations of the present project.

2.2 MATERIAL SOURCES

- .1 The Contractor is solely responsible for ensuring that the selected sources meet the delivery schedule and produce materials of the quality and quantity required for the project.
- .2 If the Contractor is unable to obtain a sufficient quantity of acceptable materials from the original source during the contract, the Contractor may request permission to use another source. All costs resulting from the change of material source, including sampling and testing, shall be borne by the Contractor. In addition, no extension of the execution date of any activity included in this contract will be permitted.

2.3 REQUIREMENTS CONCERNING THE QUALITY OF STONES

- .1 General (all materials)
 - .1 All stones shall be extremely resistant to bad weather, deterioration and disintegration under frost and thaw conditions, and exposure to water and shall be of a quality that ensures the longevity of the development under the conditions in which it is to be used. The stone of Gravels N^o. 1, 2, and 3 must be natural and smooth. All blocks and stones used shall be durable, strong and free of cracks, joints and other defects which tend to increase deterioration due to natural causes or which could cause fracture during handling and / or placement. Inclusions of dirt, sand, clay, shale, quartz or mica, pegmatite, oil or stones impregnated with oil and stone dust or any other organic or deleterious material shall not be permitted, nor the veins or nodules of iron sulfides. All materials must be clean.
- .2 Stone
 - .1 Crushed stone will not be acceptable for Gravel N^o.1 and No. 2 of this project, regardless of whether they meet the other acceptance criteria. Crushed stones will not be acceptable for Gravel N^o. 3 except under the conditions listed in article 2.3.2.3.6 of this section. Artificial stones will not be acceptable for any of the project's stone categories, regardless of whether they meet the other acceptance criteria.
 - .2 Definitions
 - .1 The size of the stone is measured as the sum of the three dimensions X, Y, and Z of the rock divided by 3.
 - .2 The largest dimension is the length (l).
 - .3 Thickness (d) is the distance separating two parallel lines between which the rock can just pass.



- .3 The categories to be produced are as follows.
- .1 Gravel N^o. 1: formed entirely of a round smooth natural stone, clean (sieved but not washed), with a diameter of 6 mm to 50 mm (1/4 " - 2").
 - .2 Cubic blocks from quarries between 500 mm and 700 mm in size. The ratio l / d must be less than 2.
 - .3 Flat stones from quarries 800 to 1000 mm in size. The ratio l / d must be greater than 4.
 - .4 Gravel N^o. 2: consisting exclusively of a round smooth natural stone, clean (sieved but not washed), having the following particle size: $D_{50} = 150$ mm; $D_{100} = 300$ mm; and $D_0 = 60$ mm, i.e. 50% between 60 mm and 150 mm and 50% between 150 mm and 300 mm
 - .5 Cubic blocks from quarries between 800 mm and 1000 mm in size. The ratio l / d must be less than 2.
 - .6 Gravel N^o. 3: formed of natural round smooth stone, clean (sieved but not washed), having the following particle size: $D_{50} = 200$ mm; $D_{95\text{min}} = 400$ mm; and $D_0 = 80$ mm, i.e. 50% between 80 mm - 200 mm; 45% to 50% between 200 mm - 400 mm; and 0% to 5% greater than 400 mm. In the exceptional case where natural stone with the required characteristics cannot be found in sufficient quantities at a reasonable distance from the project site, "Gravel N^o. 3" could consist of a mixture of crushed stone (blasted) and of natural stones where crushed stones would be of a larger size than natural stones. In that case, the proportion of crushed stones to natural stones should be less than 40% in the mixture. The crushed stones should be integrated uniformly into the granular mixture. This alternative will require the prior approval of the Departmental Representative and will be approved only if it is determined that the Contractor has expended sufficient efforts to locate natural stone with the required gradation of "Gravel N^o. 3".
- .4 Stone Sampling and Testing Methods.
- .1 References for test methods are listed in Section 1.3 - References.
 - .2 Material samples used for laboratory testing shall be representative of each category of material proposed to be used in this contract.
 - .3 All categories of materials (gravel, cubic blocks and flat stones) shall meet the requirements of Table 1.

Table 1 – Required Quality Tests – Acceptation Methods and Criteria for all categories of materials

Test Name	Test Method	Acceptation Criteria
Test on site / Visual Observation / Evaluation		
On site assessment ¹	ASTM D4992-14e1	Without deleterious materials; Good to excellent quality for the intended use
Petrographic assessment ²	ASTM C295-12	Without deleterious materials; Good to excellent quality for the intended use
Resistance to alteration	Visual	Fresh rock unaltered; or Slightly altered rock (spots on the main surfaces of discontinuity)
Laboratory test		
Solid Density, ρ_s	ASTM C127-15	$\geq 2600 \text{ Kg/m}^3$
Water absorption ³	ASTM C127-15	$\leq 1.5\%$
Resistance to abrasion- Los Angeles ⁴ (LA)	ASTM C131-14	≤ 35
Resistance to abrasion - Micro-Deval ⁵	ASTM D6928-06	≤ 15
Micro-Deval + Los Angeles (MD + LA)		≤ 40
Petrographic Number	BNQ2560-900	≤ 200

Notes :

- 1 The on-site assessment must comprise the preparation of a report that will include a summary of the source, sandpit or quarry and propose a development plan for it in accordance with ASTM D4992-07.
- 2 The petrographic test shall be summarized in a written report which includes the geological name of the rock, the condition of the alteration, major constituents, texture, anisotropy and porosity. In addition, the report must indicate the presence of constituents, the presence of micro-fractures and / or signs of induced stresses which may be a source of problem for the proposed use and discuss it.
- 3 The water absorption test shall be repeated on five (5) separate pieces of rock.
- 4 The Los Angeles abrasion test shall be repeated on two (2) separate pieces of rock.
- 5 The micro-Deval wear resistance test shall be repeated on two (2) separate pieces of rock.

2.4 PARTICLE SIZE AND FORM OF STONES

- .1 Methods of production, transportation and placement shall be adjusted as necessary to ensure that materials placed in the river are in the prescribed size ranges. The stone must therefore be the subject of particle size analyses and must show no discontinuity or gaps in any individual size ranges within the prescribed gradation.
 - .1 To carry out particle size analyses on aggregates, a random sample of the aggregate shall be selected. The weight of this sample shall be equal to at least twenty (20) times the average weight of the D_{50} of the material category.
 - .2 In each category of aggregate, adequate spreading over the entire size range is required.
 - .3 Stone blocks shall be cubic or oblong-short with a maximum dimensional ratio (l / d) of 2/1.
 - .4 The ratio (l / d) shall be greater than 4 for the flat stones used for the placement of islands in lentic waters.
 - .5 The Contractor shall carry out and submit the results of the particle size analyses for the pre-production and production stones as shown in Table 2.

2.5 FREQUENCY OF TESTING AND INSPECTION OF STONES

- .1 Minimum frequency of stone quality testing, visual inspection and grain size sampling required under the Contractor's Materials Control Plan is shown in Table 2.

Table 2 – Quality test of stones, visual inspection and particle size test

Quality of Materials Test	Visual Inspection	Particle Size Analysis
Pre-Production testing for each source and each geological change in quarry/sandpit (see table 1)	Continuously	Sample each 3,000 tons for each category (see paragraph 1.8)

Part 3. Execution

3.1 CONTROL OF QUALITY DURING PRODUCTION

- .1 The Contractor shall perform quality control activities throughout the production and placement of the materials in accordance with Section 01 45 00 - Quality Control.

3.2 TRANSPORT, STORAGE AND HANDLING

- .1 Contractor shall be responsible for the transport and stockpiling of materials such as to ensure that the piles are not contaminated with dirt and other materials and to limit the segregation by size within each type of aggregate.
- .2 Stockpiling of stones following shipment from the source and prior to permanent placement in the river shall be subject to the approval of the Departmental Representative. The stockpiling of stones under water is not permitted.

3.3 MATERIAL PLACEMENT

- .1 Refer to Section 35 31 25- Material placement in water for placement requirements.

END OF SECTION

Part 1. General

1.1 EXTENT

- .1 The work covered in this section includes all operations related to the material placement in the river which is required within the framework of the fish habitat development.

1.2 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 14 00 – Work Restrictions.
- .3 Section 01 29 00 – Payment
- .4 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .5 Section 01 33 00 – Submittal Procedures.
- .6 Section 01 35 43 – Environmental procedures.
- .7 Section 01 45 00 – Quality Control.
- .8 Section 01 77 00 – Closeout Procedures.
- .9 Section 01 78 00 – Closeout Submittals.
- .10 Section 35 31 24 – Materials Production.

1.3 DOCUMENTS AND SAMPLES TO BE SUBMITTED

- .1 The following information shall be submitted to the Departmental Representative in conformance with the requirements of Section 01 33 00 – Submittal procedures.
 - .1 Equipment and construction procedures.
 - .1 The Contractor shall submit his construction procedures at the latest 10 working days following the contract award. These procedures should include.
 - .1 A list of all the equipment and machinery that he intends to use.
 - .2 The detailed methods to be used for placing each type of material, as well as the sequence that will be adopted for their placement.
 - .3 A sample of the daily report for material placement.
 - .2 Inspection techniques and bathymetric surveys.
 - .1 At least 10 days before the beginning of material placement in water, the Contractor shall provide the following information to the Departmental Representative for review.
 - .1 Inspection techniques and evaluation criteria for material placement.
 - .2 Details for the work method that will ensure a precise material placement for all types of materials, including gravels, cubic blocks, and flat stones.
 - .2 After review by the Departmental Representative, this submittal shall be incorporated in the quality control plan of the Contractor (QCP).
 - .3 Bathymetric data for existing conditions and work verification.

- .1 A copy of each bathymetric verification survey, including that for the initial existing conditions, shall be submitted to the Departmental Representative within the working day following the survey. The submittal shall be in paper and digital formats.
- .4 Material placement reports
 - .1 The Contractor shall submit daily material placement reports. These reports shall include at least the following information: an estimate of the total volume of material placed; the coordinates of the locations where materials have been placed; and the total time of the placement operation. The Contractor shall also keep follow-up plans of the work progress which include the date and locations of the placement areas for each type of material. These shall be made available at all times for review by the Departmental Representative.

Part 2. Products

2.1 STONES

- .1 All materials used in this project shall meet the requirements of Section 35 31 24 – Stone production.

Part 3. Execution

3.1 DESCRIPTION OF SPAWNING SITES

- .1 Habitats in lentic waters
 - .1 The habitats to be created in lentic waters are zones C1, C2, C3, and C4 as shown on plan C-1002, with a total surface area of 28,279 m². They consist of a number of individual spawning sites (called islands) each having a surface area of 8 m² approximately and located at about 10 m regular intervals within the delineated zones.

Table 1 - Habitats in lentic waters

Zone	Surface area to be developed (m²)	Approximate number of islands
C1	9,688	97
C2	7,444	74
C3	819	8
C4	10,328	103
TOTAL	28,279	282

- .2 The individual spawning sites are constituted of rocky islands with three components as shown on plan D-1003.
- .3 Natural round clean (sieved but not-washed) stone (Gravel N° 1) deposited directly on the river bed, without any embedment. The thickness of the deposited layer is 300 mm and its surface area about 8 m².

- .4 Five cubic (5) angular blocks measuring about 500 mm to 700 mm deposited directly on the gravel in a layout having a «V» shape (the V corner pointing upstream). The blocks should touch each other or be very close to one another such as to form a whole. The Contractor shall endeavor to have the spacing between two adjacent blocks not exceed 20 cm.
 - .5 Two flat stones measuring about 800 mm to 1000 mm deposited on top of the cubic blocks in an inclined configuration such as to form shelters (gaps between the blocks) about 10 to 20 cm in diameter.
- .2 Habitats in lotic waters.
- .1 The habitats to be created in lotic waters are zones V1, V2, V3, V4, V5, and V6 as shown on plan C-1002, with a total surface area of 57,937 m².

Table 2 – Habitats in lotic waters

Zone	Surface area to be developed (m²)	Total Volume of gravel (m³)
V1	5,356	2,678
V2	5,437	2,719
V3	29,587	14,794
V4	10,414	5,207
V5	6,413	3,207
V6	730	365
Sub-Total	57 937	28 970

- .2 The habitats are constituted of 3 components as shown on plan D – 1004.
 - .1 Natural round clean (sieved but not-washed) stone (Gravel N° 2) deposited directly on the river bed, without any embedment. The thickness of the deposited layer is 500 mm on the entire zone area.
 - .2 Rocky islands made of three cubic angular blocks distributed at regular intervals of 7 m within the habitats. The blocks are 800 mm to 1000 mm in size. Within an island, the three blocks are placed in a V configuration (triangular layout with the corner pointing upstream) at a 800 to 1000 mm distance from each other. The direction of the V is inversed downstream as shown on plan D – 1004. The blocks are deposited on the natural river bed without any embedment and extend about 300 mm to 500 mm above the thickness of the gravel pad.
 - .3 The habitats are encircled by a line of blocks 800 mm to 1000 mm in size, placed along the perimeter of each zone. The blocks encircling the zones are embedded between 100 mm and 200 mm within the natural riverbed and extend about 100 mm to 200 mm above the gravel pad. Excavation of the riverbed is not allowed. Embedment of the blocks is carried out by pushing them into the ground or by scraping the river bottom to create a cavity for each block. The cavity shall be just large enough to embed the block with special care taken to minimize as much as possible disturbance of the riverbed. In Zone V6 which is too narrow to be encircled, blocks shall be placed on the downstream perimeter only. Some parts of the perimeters in zones V1, V2, and V5 are reinforced with

two rows of blocks as shown on plan C-1002. The Contractor shall endeavor to have the spacing between two adjacent blocks on the perimeter not exceed 40 cm.

- .3 Habitats in lotic waters with 20-year flood water velocities.
 - .1 The habitats in lotic waters with 20-year flood water velocities are zones V7, V8, V9, and V10 as shown on plan C-1002, with a total surface area of 18,569 m².

Table 3 - Habitats in lotic waters with 20-year flood water velocities

Zone	Surface area to be developed (m²)	Total Volume of gravel (m³)
V7	427	214
V8	2223	1112
V9	12,589	6295
V10	3330	1665
Total	18,569	9286

- .2 The habitats are constituted of 4 components as shown on plan D – 1005.
 - .1 Natural round clean (sieved but not-washed) stone (Gravel No 3) deposited directly on the river bed, without any embedment. The thickness of the deposited layer is 500 mm on the entire zone area. In the exceptional case whereby natural stone meeting the requirements of Gravel N^o.3 cannot be found in sufficient quantities for the development of the habitats, Gravel N^o.3 can be composed of a mixture of crushed (blasted) stones and natural stones whereby the crushed stone is larger in size than the natural stone. The proportion of crushed stone cannot exceed 40 % of the total in the mix (on a volumetric basis). The crushed stones have to be integrated uniformly in the granular mix. This alternative is subject to prior approval by the Departmental Representative and will not be approved except when the Contractor is deemed to have expended enough effort to locate natural stone having the gradation and intrinsic properties to meet the requirements for Gravel N^o.3.
 - .2 Rocky islands made of three cubic angular blocks distributed at regular intervals of 7 m within the habitats. The blocks are 800 mm to 1000 mm in size. Within an island, the three blocks are placed in a V configuration (triangular layout with the corner pointing upstream) at a 800 to 1000 mm distance from each other. The direction of the V is inversed downstream as shown on plan D – 1005. The blocks are deposited on the natural river bed without any embedment and extend about 300 mm to 500 mm above the thickness of the gravel pad.
 - .3 The habitats are encircled by a line of blocks 800 mm to 1000 mm in size, placed along the perimeter of each zone. The blocks encircling the zones are embedded between 100 mm and 200 mm within the natural riverbed and extend about 100 mm to 200 mm above the gravel pad. Excavation of the riverbed is not allowed. Embedment of the blocks is carried out by pushing them into the ground or by scraping the river bottom to create a cavity for each block. The cavity shall be just large enough to embed the block with special care taken to minimize as much as possible disturbance of the riverbed. As some zones are too narrow to be totally encircled, the following adjustments shall be made: zone V7 will not be encircled; and zone V8 shall be encircled along its outside

perimeter only (along the navigation channel, on the east side of the zone). Some parts of the perimeters of zones V8, V9, and V10 are reinforced with two rows of blocks as shown on plans C-1002 and D-1005. The Contractor shall endeavor to have the spacing between two adjacent blocks on the perimeter not exceed 40 cm.

- .4 Rows of blocks 800 mm to 1000 mm in size are disposed along lines parallel and perpendicular to the water flow in order to create cells inside the zones. The distance separating the block rows is equal to 21 m perpendicular to the water flow direction and 28 m parallel to the water flow direction. This layout, illustrated in plan D-1005, is mostly applicable in zone V9. The other zones are too small to accommodate cells and hence block rows shall be disposed in one or the other direction according to the dimension of the zone (perpendicular to the water flow direction in V7 and V8, and parallel to the flow direction in zone V10). All blocks inside the habitats are placed on the riverbed without any embedment and extend about 300 mm to 500 mm above the gravel pad. The Contractor shall endeavor to have the spacing between two adjacent blocks not exceed 40 cm.

3.2 HYDRAULIC CONDITIONS ANTICIPATED IN THE RIVER WITHIN THE WORK ZONE

- .1 The water body where the habitats will be created contains shallow areas where the river bottom can emerge out of the water during periods of low-water levels. This can be seen on satellite images of the site available in the public domain.
- .2 The hydraulic conditions anticipated during the works are those prevailing for the water flows transiting through the Vaudreuil canal during the corresponding period.
- .3 All calculation and hydraulic modeling results providing the flow rate, the water velocity, the water level, or the water depth, are given for information purposes only. The Contractor is responsible for modeling and evaluating the site conditions and their impact on the duration and scheduling of the works, as well as on the work method to be adopted. Under no circumstance can the information on the hydraulic conditions provided in these specifications be used to justify to any extent a delay or difficulties encountered during the course of this project execution.
- .4 The estimated flow rates were calculated based on the following hydrometric stations located close to the site: Sainte-Anne-de-Bellevue station (02OA013) and Terrasse-Vaudreuil station (02OA107) located upstream of the site; and Pointe-des-Cascades station (02MC005) located downstream of the site. An overview of the bathymetry of the project zone which was used for the numerical modelling is included in plan C-1006.
- .5 The estimated flow rates in Vaudreuil canal are listed in Table 4 which provides average values for each month, as well as flows classified based on the frequency of exceedance.

Tableau 4 – Estimated flow rates in the Vaudreuil canal

	Average flow (m ³ /s)	Flow rate m ³ /s						
		Exceeded 1 on 10	Exceeded 1 on 5	Exceeded 1 on 3	Exceeded 1 on 2	Exceeded 2 on 3	Exceeded 4 on 5	Exceeded 9 on 10
January	392	569	499	439	384	331	299	253
February	388	524	473	432	379	335	304	270
March	425	745	551	467	384	325	280	246
April	788	1335	1175	1010	799	601	467	330
May	615	1282	1045	823	585	425	277	194
June	342	646	518	423	330	247	194	145
July	221	419	335	256	206	163	138	102
August	167	320	260	203	148	124	99	74
September	143	260	211	174	134	105	86	65
October	202	390	320	236	178	145	117	87
November	302	544	461	373	294	223	168	117
December	363	571	467	402	351	309	256	205
Year	340	737	518	407	314	229	159	114

- .6 Results of the 2D hydraulic simulations for the site in its as-is condition before the habitats : the low-water flow with a 2-year recurrence (Q_{2,7}) which is 105 m³/s; an average monthly flow of 140 m³/s; an average monthly flow of 300 m³/s; and the flow of the summer-fall flood with a 20-year recurrence which is 970 m³/s, are included in plans C-1007, C-1008, and C-1009 which illustrate the water depths and plans C-1010 and C-1011 which illustrate water velocities.

3.3 MATERIALS PLACEMENT

.1 General

- .1 The materials placement in the water environment will take place over two (2) periods called herein the work periods: the first in 2017 and the second in 2018. The work during the two periods shall abide by the time restrictions defined in Section 01 14 00.
- .2 A bathymetry of the entire water plan of the project area shall be carried out by the Contractor in the presence of the Departmental Representative before the start of the works. This bathymetry will be the basis of the quality control of the Contractor's work. The mesh of the bathymetric survey at the location of zones V1 to V10 shall be narrow enough to allow for very precise contours to be drawn. The technical details shall be coordinated beforehand with the Departmental Representative. The mesh of the bathymetric survey shall be approved by the Departmental Representative.
- .3 The equipment used for the materials placement should be capable of depositing the stones without releasing them from a height exceeding 0.2 m above their final position. The equipment should also be capable of picking up and displacing a block of stone in order to reposition it if necessary.
- .4 The method and equipment to be used shall be adapted as needed so that the stones are not fractured during their placement.
- .5 The materials placement should be made with the help of an underwater camera having the required precision to allow the observation of the equipment operations underwater despite the

turbid conditions usually present at the project site. The camera must film the placement work in continuous with a reference to the precise corresponding location. The films shall be made available for consultation at all times by the Departmental Representative who might require to do so within the framework of the quality control. The films must be clearly labelled by zone.

- .6 The approval of the placement and/or of the verification survey for a given gravel layer or a sub-zone does not constitute a final acceptance. The placement operation shall be considered final only after the Departmental Representative has approved the placement, the bathymetric verification survey, and the required correction for the entire zone.
- .7 Prior to final acceptance, any damage to gravel layers already placed due to the Contractor's operations or his sub-contractor's operations should be repaired by the Contractor at his own expense.
- .8 At the end of each workday the Contractor shall provide a written summary of the materials placement to the Departmental Representative. The specific format of the materials placement summary shall be set and accepted by the Departmental Representative and the Contractor before the start of the materials placement operations. This summary shall include, without being limited to, the following information: an estimate of the volume of each placed material; the location of the sites where the stones were placed; and the total duration of the placement operation for each type of stone.
- .9 The stones must be placed with care to prevent damage to already placed habitats. All repair costs and/or replacement of the habitats that were damaged because the proper precautions were not taken shall be borne by the Contractor.
- .10 A placement method prone to causing segregation within a given gravel category is not allowed. Placement of the gravel by releasing from a certain height or by displacement or dragging on the river bottom is not allowed.
- .11 In certain locations, the zones or sub-zones to be developed have an irregular shape whereby the required intervals between islands in lentic waters, between stabilizing blocks in lotic waters, or the distance between these blocks and the blocks forming the perimeter of the zones or the cells cannot fit. In these cases, these distances have to be adjusted accordingly.
- .12 The Contractor shall do his best to respect the specified distances between the blocks in the stabilizing islands or along the perimeters of the zones and the cells, as well as the block embedment depth.
- .13 The materials manipulation and placement methods shall minimize their segregation, provide a well distributed material in terms of size, and ensure the required gradation is actually placed at every given location.
- .14 It is the Contractor's responsibility to replace any stone damaged or degraded during the works to such an extent that it does not meet the requirements of the present specifications.
- .15 During works in the zones adjacent to the navigation canal (V2, V8, and V9), extra precautions have to be taken to make sure that materials do not make their way to the canal. The blocks of the zone perimeters have to be placed before the placement of the gravel pad.
- .16 A final bathymetric survey of the entire project zone shall be carried out by the Contractor in the presence of the Departmental Representative at the end of the works in the river.
- .17 The Contractor shall be responsible for the transportation of the Ministerial personnel on water at all times during the work periods in the river.
- .18 All the costs of the bathymetric surveys shall be borne by the Contractor.

.2 Work zones

- .1 After contract award, the zones will be divided by the Departmental Representative in sub-zones of 21 m x 21 m for zones V1 to V10 and of 30 m x 30 m for zones C1 to C4. The sub-zones will be delineated on a map and their coordinates defined. A table summarizing the approximate characteristics of each sub-zone will be provided to the Contractor (surface area of the sub-zone, gravel volume, number of blocks for reinforcement, length of single-block perimeter, length of doubled perimeter, etc.) and will be the reference basis for the payment of the Contractor as described in Section 012900 Payment.
- .2 .2All quantities provided in the said table will be calculated theoretically and can differ from quantities that will actually be placed by the Contractor. Moreover, these quantities do not take into account material losses that can occur during the various phases of the work before and during the placement operations.
- .3 .3Once placement of all materials in a sub-zone is completed under the supervision of the Departmental Representative, the Contractor can submit a request for payment for this sub-zone.

.3 Contractor's payment

- .1 Bidders must include three (3) costs for the placement of materials in their proposal, i.e., a cost for each of the areas in lentic waters, lotic waters, and lotic waters in 20-year flood water velocities. The Contractor shall base his overall cost for each type of zone on his own estimate of the quantities to be placed based on the information provided in these specifications on the layout of the habitats, the spacing of the reinforcement blocks and of the rows of reinforcing blocks forming the cells, the total area of the zones, as well as any other relevant information.
- .2 Subsequent to the award of the contract, the Departmental Representative will distribute the costs per sub-zone based on the overall costs per type of zone submitted by the Contractor in his proposal and on the area of the sub- zone (and without taking into account the precise characteristics of the sub-zone). The Departmental Representative and the Contractor must agree on such distribution prior to the commencement of the work.
- .3 The Contractor's request for payment for a sub-zone shall claim the amount allocated to that sub-zone in the distribution previously made by the Departmental Representative and approved by the Contractor. No measure of volume or tonnage of material or number of stones currently placed in a river will be made by the Departmental Representative.
- .4 The approval of the Departmental Representative, who is responsible for the supervision of the work on-site, for a sub-zone entitles the Contractor to claiming 90% of the cost attributed to that sub-zone. Claiming the remaining 10% is subject to the quality control of the placement, which is carried out by the Departmental Representative.
- .5 The cumulative second payment of 10% of the amount allocated to each sub-zone is eligible for a payment request when the correction work required by the Departmental Representative is completed for the entire developed zone (which includes the sub-zones in question). If during the first year of works the correction work for a given zone is delayed until the following year, the contractor's claim for the corresponding second payment will also be delayed to the following year.

3.4 QUALITY CONTROL OF THE MATERIALS INSTALLATION AND CONTRACTOR'S PAYMENT

- .1 General
 - .1 The Contractor is responsible for the quality control and shall establish and maintain a quality control program (QCP) as required in Sections 01 45 00 - Quality Control and 35 21 24 – Stone Production
 - .2 The Contractor shall maintain records of all quality control tests, surveys, inspections and corrective actions and submit copies to the Departmental Representative.
 - .3 The Contractor shall provide mileposts, marker buoys, templates, and / or any other guidance and control means necessary to lay the stone layers within the required tolerances.
- .2 Verification surveys
 - .1 For each verification survey performed, the Contractor shall transmit a survey record containing the following information to the Departmental Representative.
 - .1 Location of verification survey.
 - .2 Date and time of survey.
 - .3 Weather conditions.
 - .4 Name of participants.
 - .5 Site notes.
 - .6 Layout.
 - .7 Technical details of survey.
 - .2 The exact format of the verification survey should be accepted by the Departmental Representative.
 - .3 As soon as the work in one of zones V1 to V10 is completed, a bathymetric survey of the zone will be carried out by the Contractor. These verification surveys shall be carried out in the presence of the Departmental Representative (unless he waives his right to be present) on the working day following the completion of work in the zone, weather permitting. Otherwise, the survey shall be carried as soon as on-site conditions will allow it.
 - .4 The mesh of the bathymetric survey of each zone must be narrow in order to produce very precise contours. The mesh size to be adopted must be approved by the Departmental Representative before each bathymetric survey and may vary from one zone to another.
 - .5 Even if shoals within one of the developed zones are outside the water at the time of the bathymetric survey, their elevations shall be measured.
 - .6 Contours representing the difference between the original bathymetry made before commencement of work and the new bathymetry of the zone in question shall be drawn by the Contractor and validated by the Departmental Representative. The Contractor is responsible for providing bathymetric survey results to the Departmental Representative in the form of plans and raw data
 - .7 Three (3) classes of contours shall be delimited by the Departmental Representative:
 - .1 ≤ 300 mm
 - .2 > 300 mm et < 500 mm
 - .3 > 700 mm
 - .8 Where a zone is partially developed in the first year and its completion is to be carried over to the following year due to conditions outside the Contractor's control, a partial bathymetry of the

- zone (without any additional budget) could be allowed to define the as-is conditions of the completed part.
- .9 The Contractor is free to make partial bathymetries of the zones subject to the approval of the Departmental Representative. He will have to present his request to the Departmental Representative with an explanation of the reasons that lead to this approach. The Contractor shall be responsible for integrating the results of the partial bathymetries to present a complete bathymetry of the entire zone. The cost of all bathymetric surveys shall be borne by the Contractor.
 - .10 As soon as work in one of the 14 project zones is completed, the Departmental Representative will send, at his own expense, a diver (s) equipped with a GPS and a camera to verify that the blocks of the perimeter and those that dot the habitats in zones V1 to V10 as well as the rocky islands in zones C1 to C4 have been well placed. Any substantial divergence is photographed and recorded. For V1 to V10, the emphasis is mainly on the lack of blocks in a given location, while for C1 to C4 the emphasis is on the overall configuration of the island and on the lack of islands. These verifications will be carried out as soon as possible after completion of work in the zone, weather permitting. Otherwise they shall be carried out as soon as field conditions are adequate. The Contractor must notify the Departmental Representative at least 3 working days in advance of the anticipated completion of work in a zone to allow for the planning of the diver's activities.
 - .11 In the event that the completion of a given zone is deferred to the following year due to conditions beyond the control of the Contractor, the Departmental Representative will perform one additional verification by a diver (s) which will take place at the end of the first year of the river works and will cover all the zones on which work has already started but not completed during this work period.
- .3 Equipment
- .1 Bathymetric surveys shall be performed with an echo sounder having a precision of one centimeter (± 1 cm) coupled to a DGPS-RTK or any other method that meets the requirements of the present section, subject to the approval of the Departmental Representative.
 - .2 The Contractor shall provide vessels, personnel and all equipment necessary for the safe and timely completion of the bathymetric surveys.
- .4 Corrections to substrate thickness (V1 à V10)
- .1 The Departmental Representative shall delineate the locations to be corrected and communicate their details to the Contractor within 3 working days of the bathymetric survey.
 - .2 Locations to be corrected shall be those where the substrate is ≤ 300 mm and > 700 mm.
 - .3 The Departmental Representative can, at his discretion, ignore small deficit areas (which have a substrate thickness of ≤ 300 mm) if they are deemed to be difficult to access or of insignificant size.
 - .4 The Departmental Representative can, at his discretion, ignore surplus surfaces (with a substrate thickness > 700 mm) of any size if the impact of a thicker than required substrate is considered to be negligible.
 - .5 The Departmental Representative makes an estimate of the cumulative surface area having a substrate with a thickness > 300 mm but < 500 mm within the given zone.
 - .6 If the cumulative surface area having a substrate with a thickness > 300 mm but < 500 mm is $\leq 15\%$ of the total surface area of the developed zone, the Departmental Representative shall

transmit to the Owner the final acceptance of the given zone. This acceptance will be the basis for the payment of the retention for the given zone.

- .7 Where the cumulative surface area having a substrate > 300 mm but <500 mm is > 15% of the total surface area of the developed zone, the Departmental Representative shall delimit all or some of these areas and ask the Contractor to correct them. The Departmental Representative shall have the discretion to specify the correction of all or parts of the non-conforming areas as long as the non-conforming surfaces do not exceed 15% of the total surface area of the given zone. In his selection, he will take into account several factors including the accessibility, size, and location of areas within the zone, but also, to the extent possible, the causes of their non-conformance.
 - .8 The Departmental Representative shall calculate the quantities of gravel to be added or subtracted in each delineated location and shall communicate these quantities to the Contractor within 3 working days of the bathymetric survey.
 - .9 Correction of surplus areas will be by excavation without the possibility of reuse of excavated material in deficit areas.
 - .10 The deficit areas will have to be filled by a new supply of materials.
 - .11 The Contractor has the discretion to make the corrections right away or at a later time during the current work season or during the next season (in the case of the first year of river works).
- .5 Corrections to blocks and islands (all the zones).
- .1 Following the diving inspection, the Departmental Representative will identify the locations to be corrected and communicate their coordinates to the Contractor within 3 working days of the inspection.
 - .2 Locations to be corrected will consist of places where blocks or islands are missing (all zones) and where the configuration of islands in C1 to C4 is such that they lose their functionality.
 - .3 The Departmental Representative has the discretion to ignore non-conformities if found to be insignificant or difficult to access.
 - .4 The Departmental Representative will detail the corrections to be made (number of blocks or stones to be added, amount of aggregates in islands in lentic waters, adjustment of layout of blocks and stones) at each location and will relay the information to the Contractor within 3 working days of the inspection.
 - .5 The Contractor has the discretion to make the corrections right away or at a later time within the current work season or the next season (in the case of the first year of works). All remedial work must be done before the end of the second year of the water works in the river.
- .6 Contractor's payment
- .1 The second payment corresponding to 10% of each individual zone can be claimed by the contractor after completion of the required corrections to that zone to the satisfaction of the Departmental Representative. If during the first year of works the correction for a given zone is postponed to the second year, the corresponding second payment for that zone will only be eligible for a payment request after the corrections for that zone have been completed during the second year.
 - .2 All remedial work must be done before the end of the second year of works in the river. The Contractor shall not be entitled to claim the entire payment corresponding to the placement of materials in the river until all zones have been completed to the satisfaction of the Departmental Representative.

3.5 CONTROL OF TOTAL SUSPENDED SOLIDS (TSS)

- .1 The Contractor shall control the materials placement so as to minimize total suspended solids (TSS). The Contractor's operations shall comply with the requirements of Sections 01 35 43 - Environmental procedures and 01 14 00 – Work restrictions of these specifications. The measures that will be taken during the work to meet this requirement must be detailed in the work method that the Contractor will submit for approval after the award of the contract.
- .2 Where possible, spawning grounds should be developed from upstream to downstream to reduce the risk of deposition of fine sediment on newly developed spawning grounds.
- .3 All granular material placed in the aquatic environment shall be clean (sieved but not washed).
- .4 To the extent possible, the Contractor shall comply with a maximum TSS concentration increase of 25 mg/l compared with baseline values, 100 meters downstream of the given works location.
- .5 During the works, measurements of TSS concentrations will be carried out by the Departmental Representative at the frequency of his choice and without necessarily a prior notice. Samples will be taken at distances of 100 m, 300 m and 500 m downstream from the work site. These concentrations will be compared to baseline concentrations measured on samples taken upstream from the work area. All sampling and measurement of TSS concentrations will be at the expense of the Departmental Representative.
- .6 In the event that an increase in TSS concentrations of 25 mg/l above baseline concentrations is recorded 100 meters downstream of the given work location, the Departmental Representative will convene a site meeting with the Contractor to discuss measures that should be taken to rectify the situation as soon as possible.
- .7 Silt curtains shall be installed at the locations shown on the map (Plan C-1002) to protect existing aquatic grass beds (including hornleaf riverweed colonies and copper redhorse feeding habitats) from silting. The curtains must be made of a woven monofilament fabric geotextile of the floating type, previously approved by the Departmental Representative. The silt curtain shall be equipped in its upper part with a hem in which a floatation log may be inserted along its length and in the lower part of a weighed ballast pocket with a ballast chain.
- .8 Geotextiles shall also be installed at other locations as deemed necessary by the Contractor to minimize the impact of work on existing aquatic grass beds and to maintain TSS concentration within the required limits.
- .9 The geotextile must have a water flow rate of about 700 l/min/m² and apparent opening size of about 180 µm. The sections must be joined together by velcro strips or any other suitable method.
- .10 The geotextile must be strong enough to withstand the normal hydrodynamic forces exerted by the currents during the construction seasons.
- .11 The floatation system shall support the weight of the curtain continuously and provide a floatation distance of 100 mm above the water. The color of the top pocket of the floatation device must be bright yellow.
- .12 Curtains shall be anchored at close intervals to prevent their displacement or dislocation.
- .13 The ballast chain shall be made of galvanized steel with a minimum diameter of 8 mm.
- .14 Mooring lines shall be made of nylon with a minimum diameter of 13 mm.
- .15 The work method to be submitted by the Contractor for approval after the award of the contract shall include.

- .1 Plans detailing curtain locations.
- .2 Description of the installation method.
- .3 Manufacturer's name
- .4 The full name of the product.
- .5 Sample of each element that is included.
- .6 Final layout configuration.
- .16 Curtains do not necessarily have to be installed all at once as long as the aquatic grass beds that may be affected by the work in progress are protected. In the event that the Contractor decides not to have all curtains continuously installed during the construction period, the installation sequence should be included in the work method to be submitted for approval after the contract is awarded.
- .17 Curtains must be maintained in good condition throughout their deployment in the water. Damaged curtains must be replaced.
- .18 Curtains must be removed from the water at the end of the first year and the end of the second year of river works.
- .19 The curtains may be reused provided they are in good condition and they are cleaned before being reinstalled in the water.

END OF SECTION

Section B
Factual Geotechnical Investigation and
Environmental Soil Characterization
(GHD Consultants, November 2016)
Sabourin Park



Factual Geotechnical Investigation and Environmental Soil Characterization

Compensation for Loss of Fish Habitat

Rapides de Vaudreuil

Sabourin Park

Vaudreuil-Dorion, Québec

AECOM

GHD | 4600, boul. de la Côte-Vertu, Montréal, Québec H4S 1C7

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AECOM

85, Sainte-Catherine West Street
Montréal, Québec
H2X 3P4

Factual Geotechnical Investigation and Environmental Soil Characterization

Compensation for Loss of Fish Habitat
Rapides de Vaudreuil
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O/Ref.: 1128193-A1 (1)

November 25, 2016

Prepared by:

Vincent Jolin Thériault, Eng.

Revised by:

Alexander Fiorilli, Eng.

VJT/AF/mm

Distribution: AECOM – Ms. Diane Zreik, Ph.D., M.Sc., B.ing. PMP
(Copy by email: Diane.Zreik@aecom.com)



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Appendix B Borehole Reports
Appendix C Laboratory Test Reports
Appendix D Certificates of Chemical Analyses (*Maxxam Analytique Inc.*)



1. Introduction

The technical Services of **GHD** were retained by AECOM, represented by Ms. Diane Zreik, to carry out a Factual Geotechnical Investigation and Environmental Characterization for future projects, located at the Sabourin Park in Vaudreuil-Dorion, Québec.

The investigation was carried out in accordance with GHD's Offer of Professional Services, dated October 12th, 2016, and addressed to Ms. Zreik.

The purpose of the Factual Geotechnical Investigation was to evaluate the subsoil conditions at the location of the Sabourin Park located at the end of the Sabourin Avenue in Vaudreuil-Dorion, Québec.

In addition, environmental sampling and chemical analyses were also carried out on selected soil samples for the disposal of excavated soils. The tests were carried out with respect to the Québec *ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques* (MDDELCC), generic criteria for soil contamination.

This report presents the complete description and findings of our Geotechnical Investigation and provides detailed recommendations and comments regarding the project above.

This report includes four (4) appendices which included:

- Appendix A Location Plan (*Plan No. 11128193-A1-1*)
- Appendix B Borehole Reports
- Appendix C Laboratory Test Reports
- Appendix D Certificates of Chemical Analyses (*Maxxam Analytique Inc.*)

This report is subject to a number of restrictive conditions resulting from the inherent nature of the geological, geotechnical and hydrological conditions of any site that is investigation by means of soundings. The scope of the investigation completed and the limitations that apply are discussed in the final section of this report. These limiting conditions are an integral part of this report and the reader should become acquainted with them in order to facilitate their understanding, interpretation and use of this document.

2. Site Location and Description

The investigated site is located at the Sabourin Park at the end of the Sabourin Avenue in Vaudreuil-Dorion, Québec.

The Site is located to the south of the Highway 20, within the boundaries of a residential building to the west and Ottawa River both to the south and east. The Site is covered by a grass area crossed by a gravel road. In terms of topography, the site is slopes toward the river.



Site Location Drawing No. 11128193-A1-1, included as an enclosure in Appendix A of this report, illustrates the investigated area.

3. Methods of Investigation

3.1 Field Testing

All of the fieldwork was carried out between October 20th and October 26th, 2016 under the constant supervision of a member of GHD's technical staff who logged the subsurface conditions encountered.

The site work consisted in the drilling of six (6) boreholes, identified as BH-01 to BH-06.

The boreholes were drilled using a truck-mounted auger drill-rig equipped for soil and rock sampling. Sampling procedures were conducted in accordance with American Society for Testing and Materials (ASTM) Standard D-1586, which requires soil samples to be secured at regular intervals with 50-millimeter (mm) diameter standard split-spoon sampler (SS) and provided the penetration resistance ("N-Value") of the soils. The value can be related to soil density. Bedrock samples were also recovered using an NQ-caliber core barrel in the boreholes.

The boreholes were drilled to depths ranging from 4.16 m and 4.88 m below site grade.

3.2 Implantation of Boreholes

Prior to the field investigation, a plan with the locations of the boreholes was provided by the Client. This information was used by GHD personnel to locate the boreholes across the investigated site.

The borehole No BH-01 was moved slightly from its original location due to the presence of underground services.

The locations of the soundings are shown on drawing No. 11128193-A1-1 located in Appendix A.

3.3 Surveying

The locations and elevations of the proposed sounding completed on the Site were determined by our technical personnel using a portable LEICA Global Positioning System (GPS) receiver unit, which uses satellite positioning. Therefore, all ground elevations at the sounding locations are geodetic-referenced. The GPS apparatus has an accuracy of one (1) centimeter.

3.4 Geotechnical Laboratory Testing

All of the recovered geotechnical soil samples were transported to our laboratory where they were logged and visually identified for presentation purposes in this report.

Following the field work, geotechnical laboratory testing was conducted on representative soil samples collected during the field works. The laboratory testing program consisted of:

- Twelve (12) Grain-Size Analysis (standard LC 21-040);



- Fourteen (14) Water Content Determinations (standard NQ 2501-170);
- Two (2) Sedimentation Analysis (standard NQ 2501-025);
- Four (4) Atterberg Limit Tests (standard NQ 2501-092).

The purpose of these laboratory tests was to determine the geotechnical engineering properties of the subsurface soil for use in analysis.

The detailed results of the geotechnical laboratory tests are presented in Appendix C and are described in Section 4 of this report.

4. Subsoil Conditions

The detailed subsoil conditions encountered at the locations of the Borehole are presented on the borehole reports located in Appendix B of this report. Table No. 4.1 presents an overview of the depth and elevation of each subsoil stratum encountered at the borehole locations.

Table 4.1 Stratigraphic Summary in Meters (m)

Borehole No.	Borehole Elevation (m)	Stratigraphic Units					
		Topsoil Thickness (m)	Granular Foundation Thickness (m)	Fill Thickness (m)	Clay and Silt Deposit Depth (m)	Till Deposit Depth (m)	End of Borehole Depth (m)
BH-01	25.19	--	0.49	--	0.49	4.22	4.88
BH-02	25.11	--	0.15	2.26	--	2.41	4.44
BH-03	23.91	0.09	--	0.61	--	0.70	4.88
BH-04	25.42	0.05	--	1.73	--	1.78	4.16
BH-05	23.19	0.11	--	1.11	--	1.22	4.29
BH-06	23.75	0.08	--	3.01	3.09	4.22	4.67

--: lithology not encountered

Each of these soil units is briefly described in the following paragraphs.

4.1 Topsoil and Base Layer

A 50 mm to 110-mm thick topsoil layer was encountered at the surface of the site in Borehole Nos. BH-03 to BH-06.

At the location of Boreholes Nos BH-01 and BH-02, a Base Layer composed of a 20-0 mm crushed stone was encountered at the surface with respective thicknesses of 490 mm and 150 mm.

Table 4.2 presents the grain-size analyse of completed on representative granular fill sample collected during the field work investigation.



Table 4.2 Grain Size Analyse Result on the granular foundation

Borehole No.	Sample No.	Depth (m)	Water Content (%)	Grain Size Distribution (%)		
				Gravel	Sand	Silt and Clay
				> 4.75 mm	4.75 mm – 0.075 mm	< 0.075 mm
BH-01	SS-1	0.00-0.49	4	21	61	18

4.2 Fill

Below the previously mentioned topsoil and base layer within Boreholes Nos BH-02 to BH-06, a 0.61 m to 3.01 m fill layer was encountered under the previous material mentioned above. The fill consists of a mix of gravel, sand, silt and clay.

Table 4.3 presents the grain-size analyses of completed on representative fill sample collected during the field work investigation.

Table 4.3 Grain Size Analyses Results on the Fill Material

Borehole No.	Sample No.	Depth (m)	Water Content (%)	Grain Size Distribution (%)			
				Gravel	Sand	Silt	Clay
				> 4.75 mm	4.75 mm – 0.075 mm	0.075 mm – 0.002 mm	< 0.002 mm
BH-02	SS-2	0.61-1.22	32	0	4	33	63
BH-03	SS-1	0.09-0.61	18	4	56		40
BH-04	SS-2	0.61-1.22	24	0	8		93
BH-05	SS-1B	0.11-0.61	9	44	35		21
BH-06	SS-1	0.08-0.61	10	13	68		19
BH-06	SS-3	1.22-1.83	25	9	37		54

4.3 Native Silty Clay Deposit

A clay and silt deposit was encountered in Boreholes Nos BH-01 and BH-06 directly below the previously mentioned material. The deposit was encountered at a respective depth of 0.49 m and 3.09 m.

The clay and silt deposit is generally moist and has a stiff to very stiff consistency.

Table 4.4 presents the hydrometer analyses of completed on representative clay and silt samples collected during the field work investigation.



Table 4.4 Sedimentation Analyses Results on the clay and silt material

Borehole No.	Sample No.	Depth (m)	Grain Size Distribution (%)			
			Gravel	Sand	Silt	Clay
			> 4.75 mm	4.75 mm – 0.075 mm	0.075 mm – 0.002 mm	< 0.002 mm
BH-01	SS-3	1.22-1.83	0	2	38	60
BH-01	SS-7	3.66-4.27		0	52	48
BH-06	SS-6	3.05-3.66		0	35	65

Two (2) representative samples of the clay and silt deposit were also subjected to Atterberg Limits tests for classification purposes. The results, as presented in Table No. 4.5 below.

Table 4.5 Geotechnical Laboratory Test Results on Clay Deposit

BH No.	Sample No.	Depth (m)	Water Content (%)	Atterberg Limits			Classification (USCS)
				Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	
BH-01	SS-6	3.05-3.66	47	68	27	41	CH
BH-06	SS-7	3.66-4.27	40	46	21	25	CL

4.4 Glacial Till Deposit

A glacial till deposit was encountered below the mentioned above materials in all soundings at depths ranging between 0.70 m and 4.22 m. The till deposit is composed predominantly of a silty and gravelly sand. In addition, the presence of cobbles and boulders was also observed within this deposit.

Table 4.6 presents the grain-size analyses of completed on representative till soil samples collected during the field work investigation.

Table 4.6 Grain Size Analyses Results of the Till Deposit

Borehole No.	Sample No.	Depth (m)	Water Content (%)	Grain Size Distribution (%)		
				Gravel	Sand	Silt and Clay
				> 4,75 mm	4,75 mm – 0,075 mm	< 0,075 mm
BH-02	SS-5	2.41-2.82	12	22	30	48
BH-03	SS-4	1.83-2.44	13	11	48	41
BH-04	SS-4	1.83-2.18	6	29	45	26
BH-05	SS-3 + SS-4	1.22-2.47	7	39	44	17

Based on the Standard Penetration "N" Values varying between 14 and 43 throughout this deposit, the till deposit can be characterized as compact to dense.



Boreholes Nos. BH-01 to BH-06 were terminated within the till deposit at depths ranging from 4.46 m and 4.88 m.

5. Groundwater Conditions

Groundwater levels were measured in the open standpipes installed in Borehole Nos. BH-01, BH-03 and BH-04 during the current investigation. These measured values are presented in Table No. 5.1.

Table 5.1 Depth and Elevation to Groundwater

Borehole No.	November 8 th , 2016 Depth (m) (Elevation)
BH-01	3.43 (21.76)
BH-03	2.13 (21.78)
BH-04	3.64 (21.78)

It should be noted however that water levels may vary seasonally or after periods of heavy precipitation.

6. Environmental Characterization

6.1 Analytical Program

In total, twelve (12) soil samples were selected and submitted for chemical analysis of petroleum hydrocarbons (C₁₀ to C₅₀), polycyclic aromatic hydrocarbons (PAHs), and fifteen (15) metals.

The choice of samples to be analysed is based on the potential environmental risk identified in each sampling location, such as the presence of hydrocarbon odours, visual evidence of contamination or presence of debris noted during sampling, and/or stratigraphic position.

6.2 Chemical Laboratory

All chemical analyses were performed by Maxxam Analytique Inc. (Maxxam), a recognized, MDDELCC-certified chemical laboratory. The analyses were performed in accordance with the “Guide des méthodes de conservation et d’analyses des échantillons d’eau et de sol”, published by the MDDELCC. The Certificates of Chemical Analysis issued by Maxxam for the samples submitted are enclosed in Appendix D.

Maxxam maintains a strict protocol for internal quality control to ensure that the analytical methods and results are reliable. The protocol includes the use of internal duplicate tests, sample blanks, matrix spikes and surrogates, which are presented in the Certificates of Chemical Analysis provided in Appendix D of this report.



6.3 Interpretation Criteria

The analytical results of the soil samples submitted for chemical analysis were interpreted using the “Grille des critères génériques pour les sols” from the “Politique de protection des sols et des réhabilitation des terrains contaminés” (Politique) (MDDELCC).

For the management of excavated soils, analytical results of the soil samples submitted for chemical analysis were also interpreted using the limit values defined in the “Règlement sur l’enfouissement des sols contaminés” (Règlement) (RESC) (MDDELCC).

6.4 Chemical Analysis of Soils

The following Table No. 6.1 presents, for the parameters analysed, the environmental classification of the soil samples when compared to the generic criteria of the MDDELCC.

Table 6.1 Environmental Soil Classification

Borehole No.	Sample Depth (m)	Parameters Analysed		
		C ₁₀ à C ₅₀	PAHs	Metals
BH-01 SSE-2	0.61-1.22	<A	<A	A
BH-01 SSE-3	1.22-1.83	<A	<A	<A
BH-02 SSE-2	0.61-1.22	<A	<A	A-B
BH-02 SSE-3	1.22-1.83	<A	<A	<A
BH-03 SSE-1	0.09-0.61	<A	A-B	A-B
BH-03 SSE-2	0.70-1.22	<A	<A	<A
BH-04 SSE-1	0.05-0.61	<A	A	A-B
BH-04 SSE-2	0.61-1.22	<A	<A	A
BH-05 SSE-1B	0.11-0.61	<A	<A	<A
BH-05 SSE-3	1.22-1.30	<A	<A	<A
BH-06 SSE-1	0.08-0.61	A-B	A-B	A
BH-06 SSE-3	1.22-1.83	<A	<A	A-B

It is important to note that generic criterion “A” is considered to be the threshold value above which restrictions could be applied to off-Site disposal in the event that soils are excavated. It should be noted that if soils are excavated, soils classified within the “A-B” ranges will have to be managed in accordance with the guidelines in the “Grille de gestion des sols excavés” published by the MDDELCC (see Appendix D).

6.5 Quality Control

In addition to Maxxam’s internal quality control procedures, GHD performed the following verifications in order to ensure validity of the Maxxam results.

- It was initially ensured that the analytical methods to be used by Maxxam were all recognised and recommended by the MDDELCC.
- The numbered samples submitted and related depths corresponded to our request.



- The analysed parameters were those requested.
- The methods used to analyse the duplicate samples were the same as those used on the initial samples.
- The detection limits are compatible with the mandate's objective.
- The analytical results obtained for duplicate(s) carried out by internal duplicate(s) issued by the laboratory correspond to their original counterparts; and
- The analysis blanks performed internally by Maxxam did not result in any anomalies.

No anomalies were detected over the course of the above mentioned verifications. The chemical analysis results for the soils are considered to be valid with respect to the requirements of this study.

7. Limitations of the Investigation

7.1 Geotechnical Investigation

This report is intended solely for AECOM, and is prohibited for use by others without GHD's prior written consent. This report is considered GHD's professional work product and shall remain the sole property of GHD. Any unauthorized reuse, redistribution of, or reliance on the report shall be at the Client and recipient's sole risk, without liability to GHD. The Client shall defend, indemnify and hold GHD harmless from any liability arising from, or related to, the Client's unauthorized distribution of the report. No portion of this report may be used as a separate entity; it is to be read in its entirety and shall include all supporting drawings and appendices.

The recommendations made in this report are in accordance with our present understanding of the project, the current Site use, ground surface elevations and conditions, and are based on the work scope approved by the Client and described in the report. The services were performed in a manner consistent with that level of care and skill ordinarily exercised by members of geotechnical engineering professions currently practicing under similar conditions in the same locality.

No other representations, and no warranties or representations of any kind, either expressed or implied, are made. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

All details of design and construction are rarely known at the time of completion of a geotechnical study. The recommendations and comments made in this report are based on our subsurface investigation and resulting understanding of the project, as defined at the time of the study. We should be retained to review our recommendations when the drawings and specifications are complete.

Without this review, GHD will not be liable for any misunderstanding of our recommendations of *their application* and adaptation into the final design.



By issuing this report, GHD is the geotechnical engineer of record. It is recommended that GHD be retained during construction of all foundations and during earth-work operations to confirm the conditions of the subsoil are actually similar to those observed during our study. The intent of this requirement is to verify that conditions encountered during construction are consistent with the findings in the report and that inherent knowledge developed as part of our study is correctly carried forward to the construction phases.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments included in this report are based on the results obtained at the test locations only. The subsurface conditions confirmed at the test locations may vary at other locations. The subsurface conditions can also be significantly modified by the construction activities on Site (ex., excavation, dewatering and drainage, blasting, pile driving, etc.). These conditions can also be modified by exposure of soils or bedrock to humidity, dry periods or frost.

Soil and groundwater conditions between and beyond the test locations may differ both horizontally and vertically from those encountered at the test locations and conditions may become apparent during construction which could not be detected or anticipated at the time of our investigation. Should any conditions at the Site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations.

If changed conditions are identified during construction, no matter how minor, the recommendations in this report shall be considered invalid until sufficient review and written assessment of said conditions by GHD is completed.

7.2 Environmental Characterisation

The environmental component of this report is intended solely for the Client, for whom it was prepared. Its contents reflect GHD's best judgement in light of the information available to GHD at the time of preparation. This report must be considered in its entirety only. No portion of this report may be used as a separate entity. Any use made of this report, or decisions made based on its contents, by any other party is/are the responsibility of such other parties.

The environmental interpretation of the analytical results presented in this report and the ensuing conclusions are based on data collected during the work carried out within the scope of the present mandate. The interpretations and conclusions in this report refer to environmental standards, policies and regulations that were applicable and in effect at the time of the study.

The contamination levels were determined according to the chemical analysis results for a limited number of samples. The nature and extent of contamination between the sampling points can vary in terms of the conditions encountered at the locations where the analysed samples were taken.

The selection of parameters analysed is based on GHD's understanding of the Site history and the contaminants suspected to be present. This selection also considers budgetary constraints and turnaround times. The decision to not analyse for a certain parameter does not rule out the possibility that this parameter exists at a concentration above naturally occurring levels or detection limits.

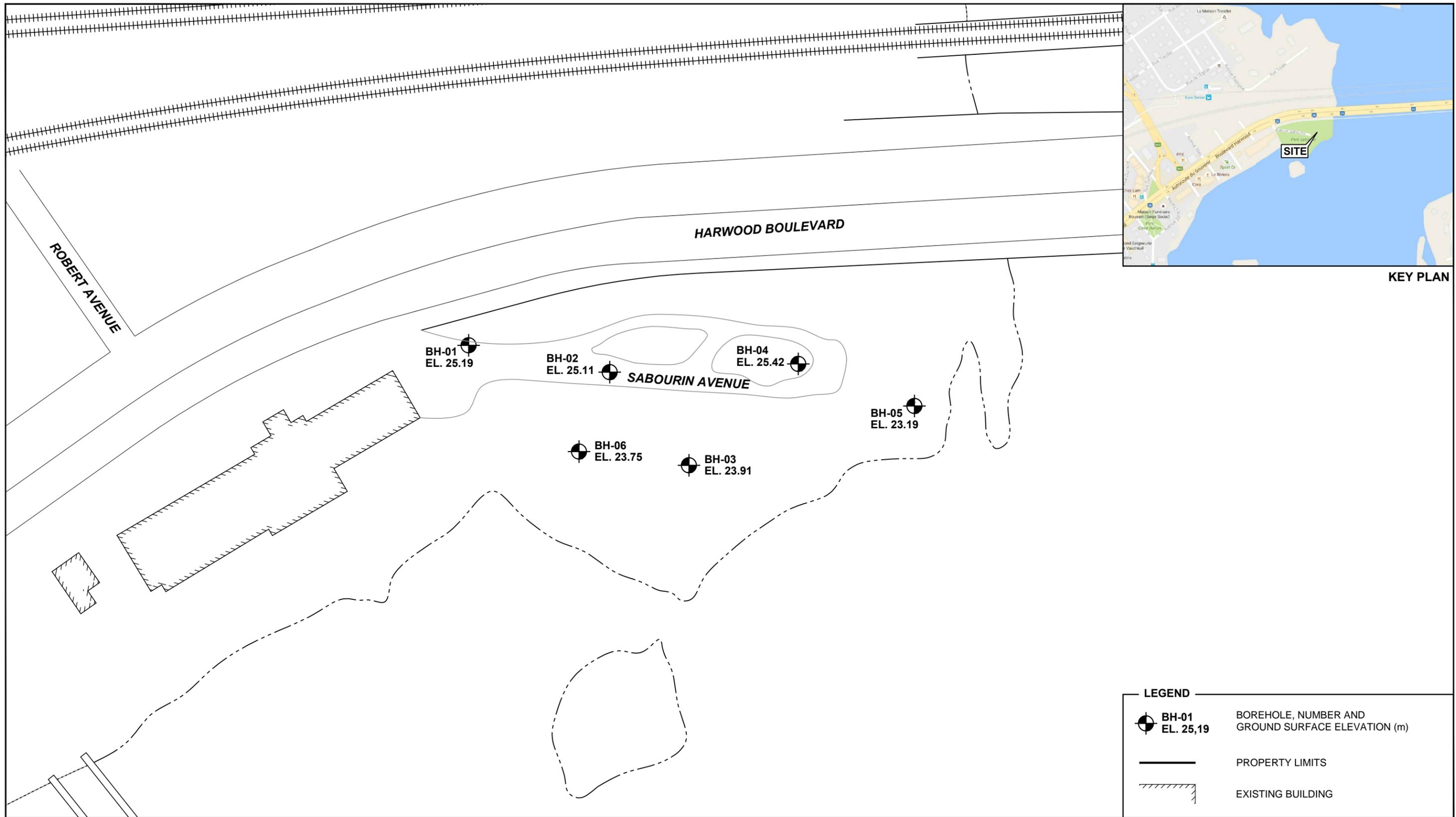


Considering the heterogeneous nature of environmental contamination phenomena, the conclusions given in this study should only refer to the locations investigated. The general conclusions regarding the entire Site are for information purposes and are probability-based. They do not indicate in any way the absence or presence of contaminant concentrations in locations other than those investigated.

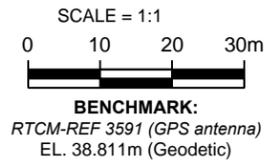
The contamination levels described in this report should only be considered valid at the time of sampling, as these levels may vary due to activities that subsequently occur on the Site under study or adjoining properties.

Appendices

Appendix A
Location Plan
(Plan No. 11128193-A1-1)



Source: Map data © 2015 Google or Image © 2015 Google, DigitalGlobe.



AECOM
RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC
COMPENSATION FOR LOSS OF FISH HABITAT
FACTUAL GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL SOIL CHARACTERISATION
BOREHOLE LOCATIONS

11128193-A1
25/11/2016
11128193-A1-1

Appendix B

Borehole Reports



A- Soil Sampling

Soil samples are normally recovered with a split-spoon sampler or a thin-walled Shelby tube. The split spoon is dynamically driven into the ground and takes a remoulded sample of the soil found at depth. A standard penetration test is thereby obtained, and is described in the following paragraph. The Shelby tube is pushed into the ground to obtain undisturbed samples of clay or clayey soils. Rock samples are obtained by drilling a core barrel into the rock formation; the diameter of the recovered sample varies with the size of the drilling bit used.

B- Standard Penetration Test (SPT)

A standard penetration test consists of driving a standard split-spoon sampler into the soil by dropping a 140 lb. weight (63.5 kg) from a height of 30 inches (76 cm). The sampler is driven 18 inches (45 cm) into the soil and the number of blows of the drop weight is recorded for every 6 inches (15 cm) of penetration. The total number of blows for the last 12 inches (30 cm) of penetration is the standard penetration index ("N" value). This value obtained at regular intervals provides vital information from which the density, compressibility and bearing capacity of the various soil horizons can be estimated. The test is however seldom used in clayey soils.

C- Dynamic Penetration Test

A dynamic penetration test (or cone penetration test) is similar to a standard penetration test with the difference that the split-spoon sampler is replaced by a conical point 10 cm² in area. The number of blows is recorded continuously for every foot of penetration (30 cm) thus obtaining a systematic indication of the relative density of the materials encountered at depth. This test also helps in determining the depth to a dense soil horizon or bedrock.

Note: The presence of large gravel, cobbles or boulders in the subsoil may distort the results of both the standard penetration test and the dynamic penetration test by giving abnormally high resistance values. When it becomes impossible to drive the cone deeper a refusal ("R") is then recorded.

D- Shear Test

An undrained shear test may be carried out by pushing into the undisturbed soil a vane shear apparatus consisting of a four-bladed vane connected to a rod and by measuring the torque value required to shear the clay. This test may be repeated at regular intervals and the torque values calculated to obtain the undrained shear strength of the clay at each test level. The shear strength profiles permit the calculation of the allowable bearing capacity of the clay. The apparatus used is the "Nilcon" of Scandinavian origin.

E- Permeability Test (Lefranc)

This test consists of determining the coefficient of permeability K of the soil around a permeable lens of known dimensions and which has been formed below the driving shoe. The procedure used is the falling head method. Tests of the Lefranc type are carried out in soils with average granulometry and average permeability.

F- Packer Test

This test is conducted in bedrock by sealing off a section of the borehole with one or two inflatable rubber packers and then pumping water into the isolated section of the hole. The permeability of the rock adjacent to the isolated section of the borehole is measured as a function of the pumping head (pressure) and rate of water loss (absorption) from the sealed-off section over a fixed period of time.

G- Menard Pressuremeter Test

The pressuremeter test developed by Menard (1956) consists of laterally loading the sidewalls of a borehole by dilating a cylindrical probe. The test permits the determination of the modulus E_M and the limit pressure p_l , which are a measure of the strength of the soil, and enables the calculation of the bearing capacity and settlements for foundations.



Notes on Borehole and Test Pit Reports

Soil description :

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey soils is measured by the value of undrained shear strength (Cu).

Classification (Unified system)			
Clay	< 0.002 mm		
Silt	0.002 to 0.075 mm		
Sand	0.075 to 4.75 mm	fine	0.075 to 4.25 mm
		medium	0.425 to 2.0 mm
		coarse	2.0 to 4.75 mm
Gravel	4.75 to 75 mm	fine	4.75 to 19 mm
		coarse	19 to 75 mm
Cobbles	75 to 300 mm		
Boulders	>300 mm		

Terminology	
"trace"	1-10%
"some"	10-20%
adjective (silty, sandy)	20-35%
"and"	35-50%

Relative density of granular soils	Standard penetration index "N" value (BLOWS/ft – 300 mm)
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Consistency of cohesive soils	Undrained shear strength (Cu)	
	(P.S.F)	(kPa)
Very soft	<250	<12
Soft	250-500	12-25
Firm	500-1000	25-50
Stiff	1000-2000	50-100
Very stiff	2000-4000	100-200
Hard	>4000	>200

Rock quality designation	
"RQD" (%) Value	Quality
<25	Very poor
25-50	Poor
50-75	Fair
75-90	Good
>90	Excellent

STRATIGRAPHIC LEGEND			
Sand	Gravel	Cobbles & boulders	Bedrock
Silt	Clay	Organic soil	Fill

Samples:

Type and Number

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon

ST: Shelby tube

AG: Auger

SSE, GSE, AGE: Environmental sampling

PS: Piston sample (Osterberg)

RC: Rock core

GS: Grab sample

Recovery

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil

RQD

The "Rock Quality Designation" or "RQD" value, expressed as percentage, is the ratio of the total length of all core fragments of 4 inches (10 cm) or more to the total length of the run.

IN-SITU TESTS:

N: Standard penetration index

N_c: Dynamic cone penetration index

k: Permeability

R: Refusal to penetration

Cu: Undrained shear strength

ABS: Absorption (Packer test)

Pr: Pressure meter

LABORATORY TESTS:

I_p: Plasticity index

H: Hydrometer analysis

A: Atterberg limits

C: Consolidation

O.V.: Organic vapor

W_l: Liquid limit

GSA: Grain size analysis

w: Water content

CS: Swedish fall cone

W_p: Plastic limit

y: Unit weight

CHEM: Chemical analysis



BOREHOLE REPORT

Borehole No.

BH-01

CLIENT: AECOM	GEODETIC COORDINATES (MTM, NAD-83) (m)	▼ - WATER LEVEL Date : 2016-11-08 Depth (m) : 3.43
PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT	X : 265190.8 Y : 5027423.0 Z : 25.19	
LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC	DESCRIBED BY: F. ARGUIN	VERIFIED BY: V. JOLIN-T.
Borehole type : Auger 200mm	SAMPLE TYPE SS(E) - Split Spoon (Environment) RC(E) - Rock diamond core AU(E) - Auger TEE - Sampling Tube Environment ST - Shelby tube GS(E) - Grab sample	SAMPLE STATE ☒ Remoulded ▨ Intact ◻ Diamond drilling ■ Lost
Core bit size : B		
Hammer type : Automatic		
Energy ratio :		
Date (start) : 2016-10-26		
Date (finish) : 2016-10-26		

STRATIGRAPHY				SAMPLE				TESTS RESULTS			
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	Water level
0.00	25.19		Ground surface								
0.5	24.70		Base layer: Compact, grey crushed stone (20-0mm), moist	☒	SS-1 SSE-1	88	GSA w		18 50/10cm	R ○	
1.0	23.36		Native soil: Very stiff, grey clay and silt, traces of sand, moist	☒	SS-2 SSE-2	92	CA		3-4-5-7	9 ●	
1.5				☒	SS-3 SSE-3	100	CA SD w		5-5-6-7	11 ● ○	
2.0			becoming with traces of gravel	☒	SS-4 SSE-4	100			5-5-6-5	11 ●	
2.5				☒	SS-5 SSE-5	100			3-3-3-4	6 ●	
3.0	22.14		becoming stiff	☒	SS-6 SSE-6	100	A w		2-2-2-2	4 ● ○	
3.5				☒	SS-7 SSE-7	100	SD		1-1-1-7	2 ●	
4.0	21.29		becoming saturated	☒	SS-8 SSE-8	36			18-21 22-28	43 ●	
4.5	20.97		Dense, grey silty and gravelly sand, saturated	☒							
5.0	20.31		End of borehole								

See the attached explicative note for the complete list of symbols and abbreviations



BOREHOLE REPORT

Borehole No.

BH-02

CLIENT: AECOM PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC DESCRIBED BY: F. ARGUIN VERIFIED BY: V. JOLIN-T.	GEODETIC COORDINATES (MTM, NAD-83) (m) X : 265230.1 Y : 5027415.5 Z : 25.11	- WATER LEVEL Date : Depth (m) : Location plan : 11128193-A1-1
Borehole type : Auger 200mm Core bit size : B+NQ Hammer type : Manual Energy ratio : Date (start) : 2016-10-20 Date (finish) : 2016-10-20	SAMPLE TYPE SS(E) - Split Spoon (Environment) RC(E) - Rock diamond core AU(E) - Auger TEE - Sampling Tube Environment ST - Shelby tube GS(E) - Grab sample	SAMPLE STATE <input checked="" type="checkbox"/> Remoulded <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Diamond drilling <input type="checkbox"/> Lost
TEST SYMBOL GSA: grain size analysis CA: chemical analysis W _L : liquid limit W _p : plastic limit w : water content C _u : undrained shear strength S _r : sensitivity Dup: duplicate sample		

STRATIGRAPHY				SAMPLE					TESTS RESULTS					
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	○ Water content (%) △ C _u (Field, kPa) □ Atterberg limits (%) □ C _u (Lab, kPa) ● "N" Standard penetration test value ▲ "N _c " Dynamic penetration test value			
0.00	25.11		Ground surface								10 20 30 40 50 60 70 80 90			
0.15	24.96		Base layer: Dense, grey crushed stone (20-0mm)		SS-1A SSE-1A SS-1B SSE-1B	75			22-18 19-24	37				
0.5			Fill: Very stiff, brown silt and clay, traces of sand, moist. Presence of debris (wood, brick, concrete)		SS-2 SSE-2	64	CA SD w	2-7 11-12	18					
1.0			Native soil: Dense, brown sandy and gravelly silt, moist		SS-3 SSE-3	85	CA	9-11 9-13	20					
1.5			Native soil: Dense, brown sandy and gravelly silt, moist		SS-4 SSE-4	89		4-5-8-12	13					
2.0			Native soil: Dense, brown sandy and gravelly silt, moist		SS-5 SSE-5	60	GSA w	22 50/5cm	R					
2.41	22.70		Native soil: Dense, brown sandy and gravelly silt, moist		RC-6	80								
2.82	22.29		becoming with presence of cobbles and blocks of pink sandstone		RC-7	62								
4.5	4.44	20.67	End of borehole											

See the attached explicative note for the complete list of symbols and abbreviations



BOREHOLE REPORT

Borehole No.

BH-03

CLIENT: AECOM	GEODETIC COORDINATES (MTM, NAD-83) (m)	▼ - WATER LEVEL Date : 2016-11-08 Depth (m) : 2.13
PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT	X : 265252.2 Y : 5027389.6 Z : 23.91	
LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC		Location plan : 11128193-A1-1
DESCRIBED BY: F. ARGUIN	VERIFIED BY: V. JOLIN-T.	

Borehole type : Auger 200mm	SAMPLE TYPE	SS(E) - Split Spoon (Environment)	SAMPLE STATE	<input checked="" type="checkbox"/> Remoulded	TEST SYMBOL	GSA: grain size analysis
Core bit size : B		RC(E) - Rock diamond core		<input checked="" type="checkbox"/> Intact		CA: chemical analysis
Hammer type : Automatic		AU(E) - Auger		<input type="checkbox"/> Diamond drilling		W _L : liquid limit
Energy ratio :		TEE - Sampling Tube Environment		<input type="checkbox"/> Lost		W _p : plastic limit
Date (start) : 2016-10-26		ST - Shelby tube				w : water content
Date (finish) : 2016-10-26		GS(E) - Grab sample				C _u : undrained shear strength
						S _r : sensitivity
						Dup: duplicate sample

STRATIGRAPHY				SAMPLE				TESTS RESULTS					
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	<input type="checkbox"/> Water content (%) <input type="checkbox"/> C _u (Field, kPa) <input type="checkbox"/> Atterberg limits (%) <input type="checkbox"/> C _u (Lab, kPa) <input type="checkbox"/> "N" Standard penetration test value <input type="checkbox"/> "N _c " Dynamic penetration test value	Water level	
0.00	23.91		Ground surface								10 20 30 40 50 60 70 80 90	2.13 m	
0.09	23.82		Loose, brown topsoil		SS-1 SSE-1	89	CA GSA w		2-2-2-3	4			
0.5			Fill: Very loose, dark brown sand and silt, traces of gravel, moist. Presence of topsoil										
0.70	23.21		Native soil: Loose, brown sand and silt, some gravel, moist		SS-2 SSE-2	72	CA		3-4-5-8	9			
1.22	22.69		becoming dense to very dense		SS-3 SSE-3	52			8-30 50/3cm	R			
1.5													
2.0					SS-4 SSE-4	92	GSA w		18-15 20-13	35			
2.44	21.47		becoming compact, very moist		SS-5 SSE-5	23			7-9-8-8	17			
3.0	20.90		becoming compact, grey, saturated		SS-6 SSE-6	74			6-8-9-11	17			
3.5													
4.0					SS-7 SSE-7	56			8-9-7-11	16			
4.27	19.64		becoming gravelly		SS-8 SSE-8	44			10-8-6-6	14			
4.5													
5.0	19.03		End of borehole										
5.5													

See the attached explicative note for the complete list of symbols and abbreviations



BOREHOLE REPORT

Borehole No. **BH-04**

CLIENT: AECOM	GEODETTIC COORDINATES (MTM, NAD-83) (m) X : 265282.6 Y : 5027417.8 Z : 25.42	▼ - WATER LEVEL Date : 2016-11-08 Depth (m) : 3.64
PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT		
LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC		Location plan : 11128193-A1-1
DESCRIBED BY: F. ARGUIN VERIFIED BY: V. JOLIN-T.		

Borehole type : Auger 200mm	SAMPLE TYPE SS(E) - Split Spoon (Environment) RC(E) - Rock diamond core AU(E) - Auger TEE - Sampling Tube Environment ST - Shelby tube GS(E) - Grab sample	SAMPLE STATE <input checked="" type="checkbox"/> Remoulded <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Diamond drilling <input type="checkbox"/> Lost	TEST SYMBOL GSA: grain size analysis CA: chemical analysis W _L : liquid limit W _p : plastic limit w : water content C _u : undrained shear strength S _r : sensitivity Dup: duplicate sample
Core bit size : B+NQ			
Hammer type : Automatic			
Energy ratio :			
Date (start) : 2016-10-26			
Date (finish) : 2016-10-26			

STRATIGRAPHY				SAMPLE						TESTS RESULTS										
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	○ Water content (%) △ C _u (Field, kPa) W _p W _L Atterberg limits (%) □ C _u (Lab, kPa) ● "N" Standard penetration test value ▲ "N _c " Dynamic penetration test value									
0.00	25.42		Ground surface								10 20 30 40 50 60 70 80 90									
0.05	25.37		Loose, brown topsoil		SS-1 SSE-1	70	CA		3-4-6-6	10										
0.5			Fill: Compact, brown silt, some clay, traces of sand, moist. Presence of debris (asphalt, brick)		SS-2 SSE-2	79	CA GSA w		4-5-6-6	11										
1.0					SS-3 SSE-3	72			20 50/10cm	R										
1.5					SS-4 SSE-4	63	GSA w		18-34 50/5cm	R										
1.78	23.64		Native soil: Very dense, brown gravelly and silty sand, moist. Presence of cobbles and boulders		SS-5 SSE-5	80			23 50/5cm	R										
2.0																				
2.5					RC-6	42														
2.74	22.68		Sandstone blocks																	
3.0	22.49		Dense, brown gravelly sand, moist																	
3.5																				
4.0																				
4.05	21.37		Sandstone blocks																	
4.16	21.26		End of borehole																	
4.5																				
5.0																				
5.5																				

See the attached explicative note for the complete list of symbols and abbreviations



BOREHOLE REPORT

Borehole No.

BH-05

<p>CLIENT: AECOM PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC DESCRIBED BY: F. ARGUIN VERIFIED BY: V. JOLIN-T.</p>	<p>GEODETIC COORDINATES (MTM, NAD-83) (m) X : 265314.9 Y : 5027406.1 Z : 23.19</p>	<p>▼ - WATER LEVEL Date : Depth (m) : Location plan : 11128193-A1-1</p>
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<p>Borehole type : Auger 200mm Core bit size : B+NQ Hammer type : Automatic Energy ratio : Date (start) : 2016-10-26 Date (finish) : 2016-10-26</p>	<p>SAMPLE TYPE</p>	<p>SS(E) - Split Spoon (Environment) RC(E) - Rock diamond core AU(E) - Auger TEE - Sampling Tube Environment ST - Shelby tube GS(E) - Grab sample</p>	<p>SAMPLE STATE</p>	<p><input checked="" type="checkbox"/> Remoulded <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Diamond drilling <input checked="" type="checkbox"/> Lost</p>	<p>TEST SYMBOL</p>	<p>GSA: grain size analysis CA: chemical analysis W_L: liquid limit W_p: plastic limit w: water content C_u: undrained shear strength S_r: sensitivity Dup: duplicate sample</p>
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STRATIGRAPHY				SAMPLE					TESTS RESULTS					
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	○ Water content (%) Δ C _u (Field, kPa) □ Atterberg limits (%) □ C _u (Lab, kPa) ● "N" Standard penetration test value ▲ "N _c " Dynamic penetration test value			
0.00	23.19		Ground surface								10 20 30 40 50 60 70 80 90 Water level			
0.11	23.08		Loose, brown topsoil		SS-1A SSE-1A				6-8-7-9	15				
0.5			Fill: Compact to very dense, brown sandy and silty gravel, moist		SS-1B SSE-1B	62	CA GSA w		7 50/8cm	R				
1.0					SSE-2	55								
1.22	21.97		Native soil: Very dense to dense, brown sand and gravel, some silt, moist. Presence of cobbles and boulders		SS-3 SSE-3	100	CA GSA w		8 50/3cm	R				
2.0					SS-4 SSE-4				8-16-23 50/6cm	39				
2.47	20.72		Block of pink sandstone		SSE-5	100			50/3cm	R				
2.90	20.29		Very dense, brown gravelly sand, moist											
3.0					RC-6	67								
4.04	19.15		Block of pink sandstone											
4.29	18.90		End of borehole											

See the attached explicative note for the complete list of symbols and abbreviations



BOREHOLE REPORT

Borehole No.

BH-06

CLIENT: AECOM	GEODETIC COORDINATES (MTM, NAD-83) (m)	▼ - WATER LEVEL Date : Depth (m) :
PROJECT: COMPENSATION FOR LOSS OF FISH HABITAT	X : 265221.6 Y : 5027393.4 Z : 23.75	
LOCATION: RAPIDES DE VAUDREUIL - SABOURIN PARK, VAUDREUIL-DORION, QUEBEC	DESCRIBED BY: F. ARGUIN	VERIFIED BY: V. JOLIN-T.

Borehole type : Auger 200mm	SAMPLE TYPE	SS(E) - Split Spoon (Environment)	SAMPLE STATE	<input checked="" type="checkbox"/> Remoulded	TEST SYMBOL	GSA: grain size analysis
Core bit size : B		RC(E) - Rock diamond core		<input checked="" type="checkbox"/> Intact		CA: chemical analysis
Hammer type : Automatic		AU(E) - Auger		<input type="checkbox"/> Diamond drilling		W _L : liquid limit
Energy ratio :		TEE - Sampling Tube Environment		<input type="checkbox"/> Lost		W _p : plastic limit
Date (start) : 2016-10-26		ST - Shelby tube				w : water content
Date (finish) : 2016-10-26		GS(E) - Grab sample				C _u : undrained shear strength
						S _r : sensitivity
						Dup: duplicate sample

STRATIGRAPHY				SAMPLE				TESTS RESULTS								
Depth (m)	Elevation (m)	Symbol	Description	State	Type and Number	Recovery %	Other tests	PID (ppm)	6 in / 15 cm Blow counts (sampler size)	N, N _c or RQD	○ Water content (%) △ C _u (Field, kPa) □ Atterberg limits (%) □ C _u (Lab, kPa) ● "N" Standard penetration test value ▲ "N _c " Dynamic penetration test value					
0.00	23.75		Ground surface								10 20 30 40 50 60 70 80 90					
0.08	23.67		Loose, brown topsoil													
0.5			Fill: Loose, dark brown sand, some silt and gravel, moist		SS-1 SSE-1	80	CA GSA w		2-3-3-3	6						
0.61	23.14		becoming brown with presence of debris (mortar)		SS-2 SSE-2	80			4-4-4-5	8						
1.22	22.53		Loose, brown to grey silt and sand, traces of gravel, moist. Presence of debris (wood, concrete)		SS-3 SSE-3	75	CA GSA w		2-3-3-3	6						
1.5					SS-4 SSE-4	62			2-3-3-7	6						
2.44	21.31		becoming very moist with presence of debris (wood, brick)		SS-5 SSE-5	89			3-4-3-3	7						
3.09	20.66		Native soil: Stiff, grey silty clay, moist. Presence of bedding of sand		SS-6 SSE-6	100	SD		2-2-2-3	4						
4.0					SS-7 SSE-7	100	A w		1-1-1-3	2						
4.22	19.53		Very dense, grey silty and gravelly sand, saturated		SS-8 SSE-8	55			10-11 50/10cm	R						
4.67	19.08		End of borehole on probable blocks													

See the attached explicative note for the complete list of symbols and abbreviations

Appendix C

Laboratory Test Reports

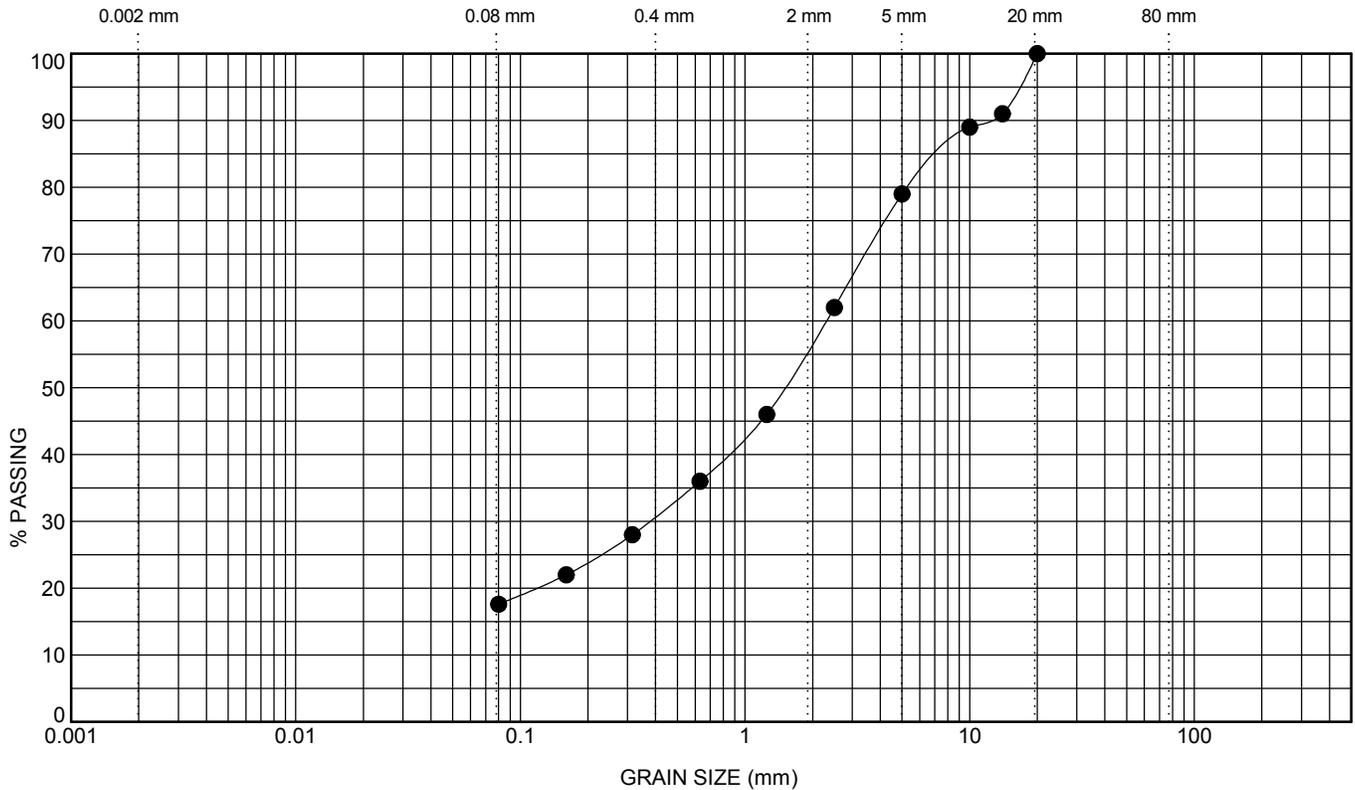


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
 RAPIDES DE VAUDREUIL - SABOURIN
LOCATION : PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-01
SAMPLE No. : SS-1
DEPTH : 0 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Crush stone 20-0mm	4			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
21	61	18								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

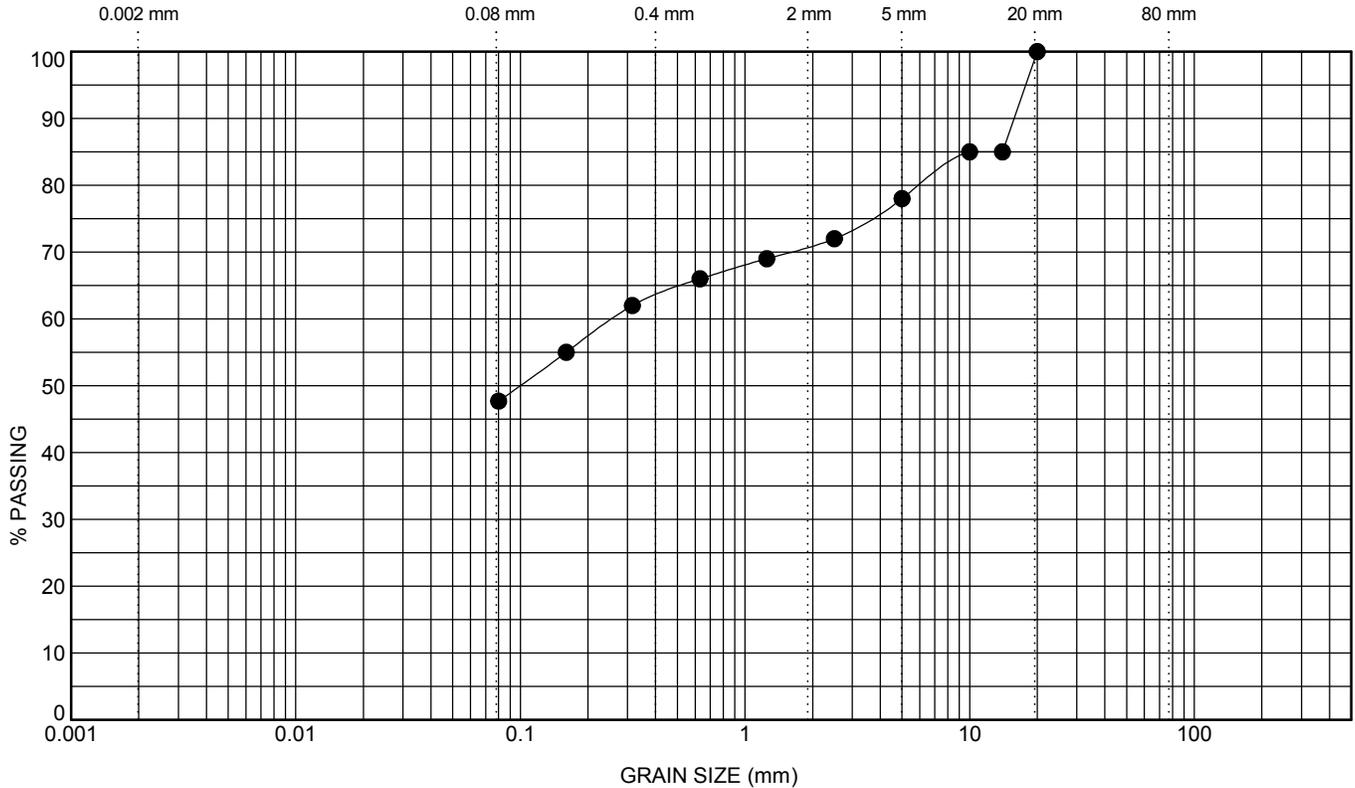


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-02
SAMPLE No. : SS-5
DEPTH : 2.44 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sandy and gravelly silt	12			ML

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
22	30	48								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

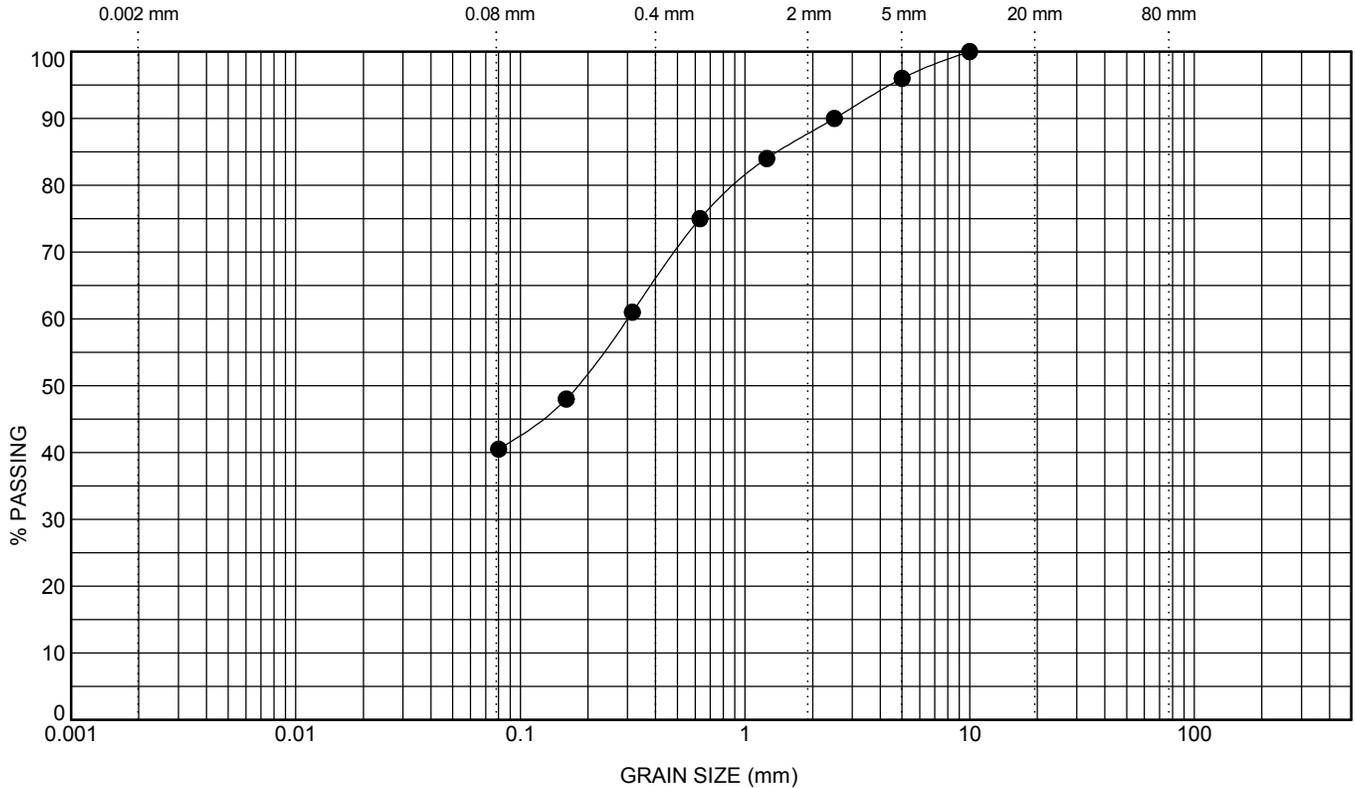


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-03
SAMPLE No. : SS-1
DEPTH : 0 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sand and silt, traces of gravel	18			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
4	56	40								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

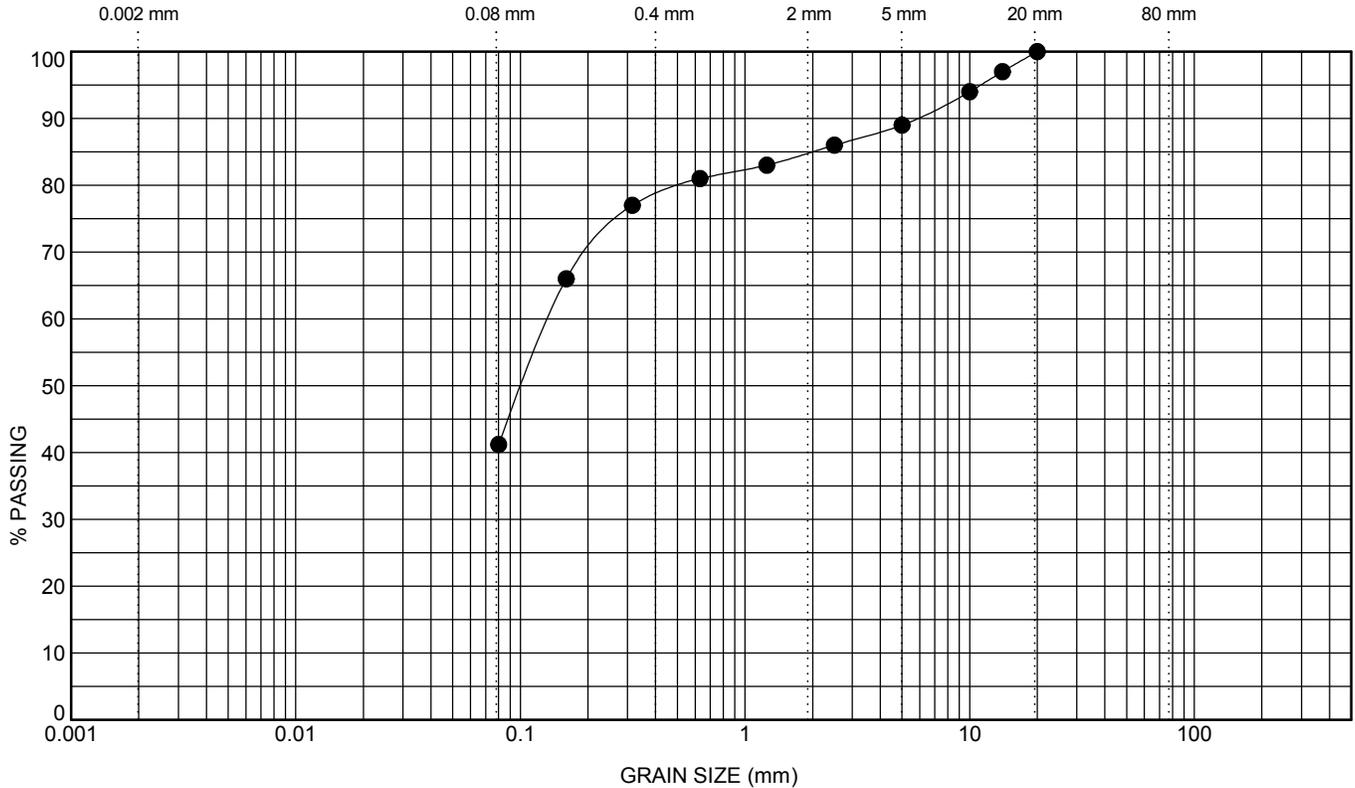


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-03
SAMPLE No. : SS-4
DEPTH : 1.83 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sand and silt, some gravel	13			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
11	48	41								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

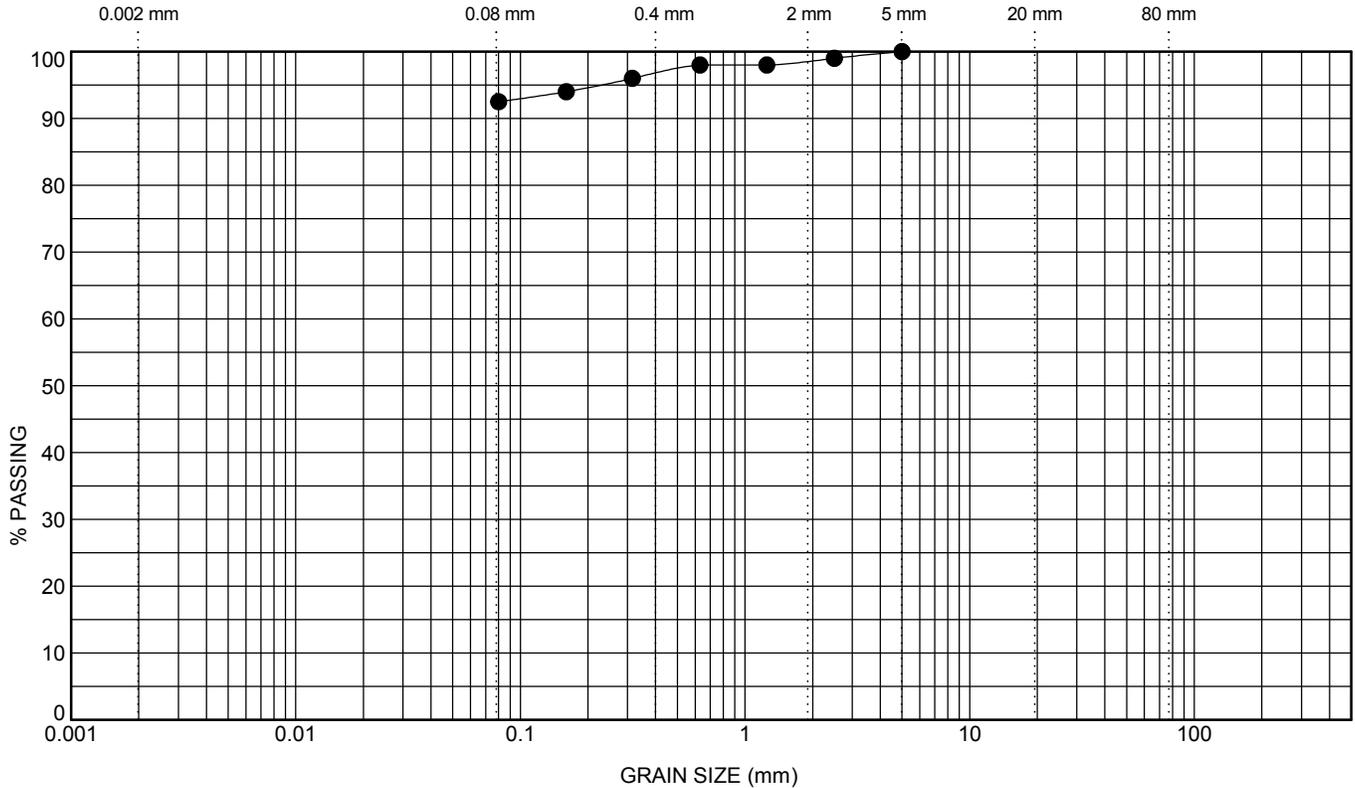


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-04
SAMPLE No. : SS-2
DEPTH : 0.61 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Silt, some clay, trace of sand	24			ML

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
0	8	93								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

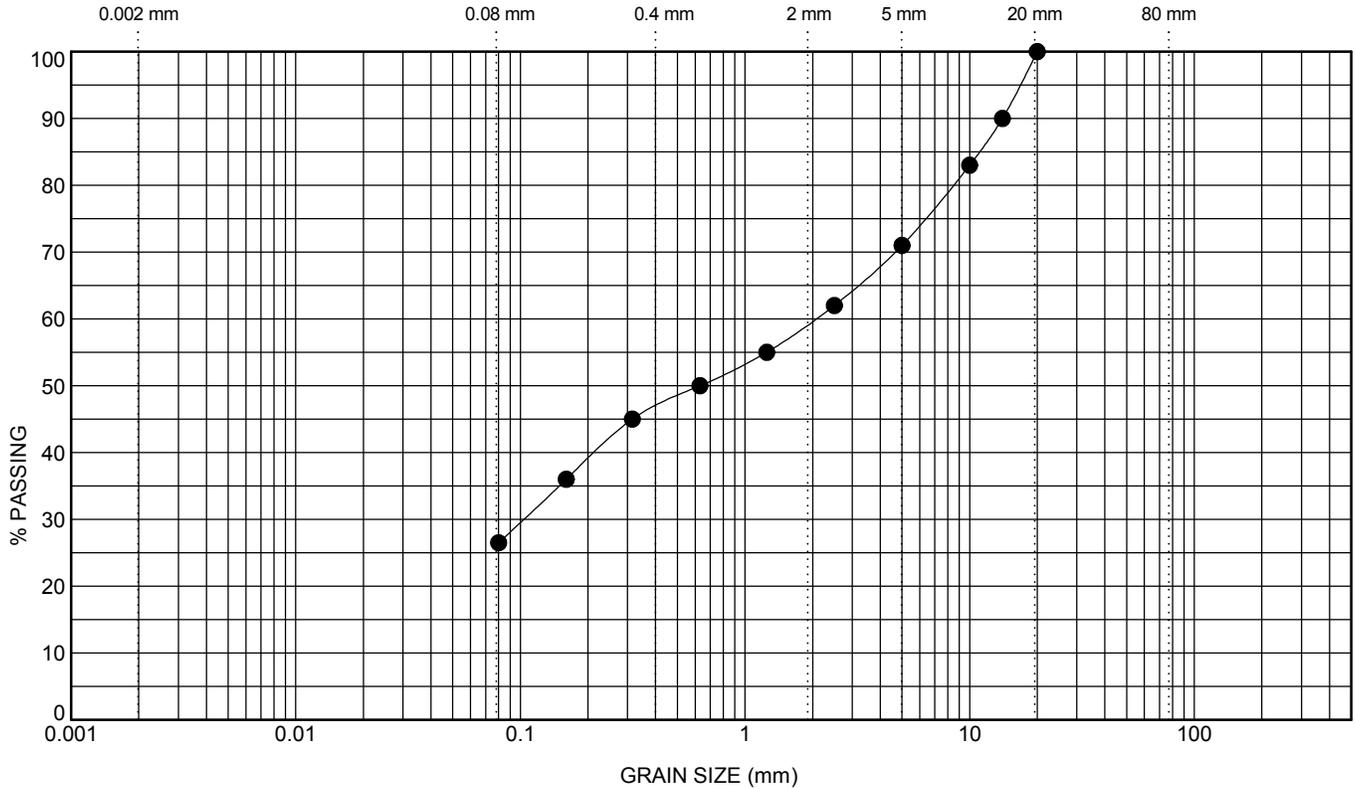


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-04
SAMPLE No. : SS-4
DEPTH : 1.83 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Gravelly and silty sand	6			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
29	45	26								

Remarks :

Prepared by : Lynne Geoffré Verified by : Benoit Cyr, B.Sc. Geology

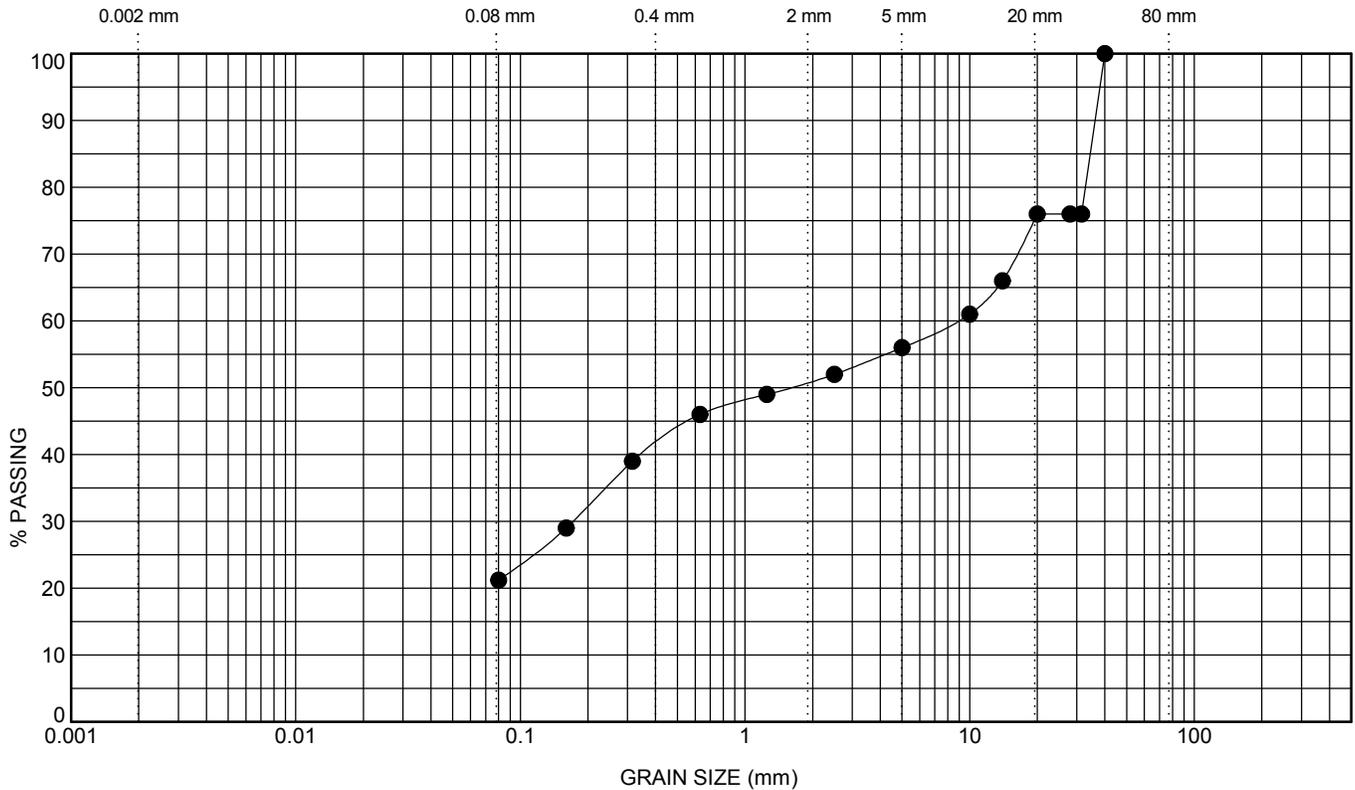


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-05
SAMPLE No. : SS-1B
DEPTH : 0.11 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sandy and silty gravel	9			GM-GC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
44	35	21								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

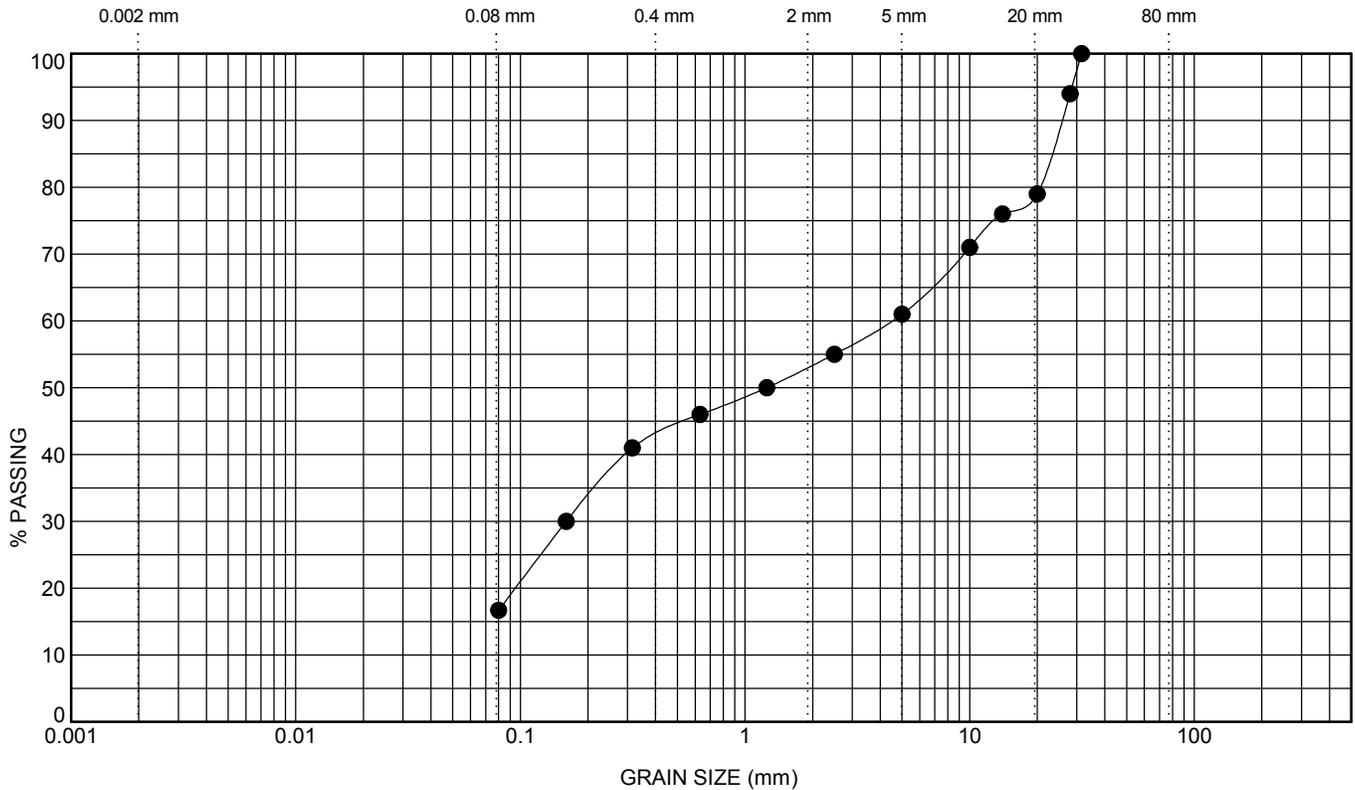


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-05
SAMPLE No. : SS-3
DEPTH : 1.22 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sand and gravel, some silt	7			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
39	44	17								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

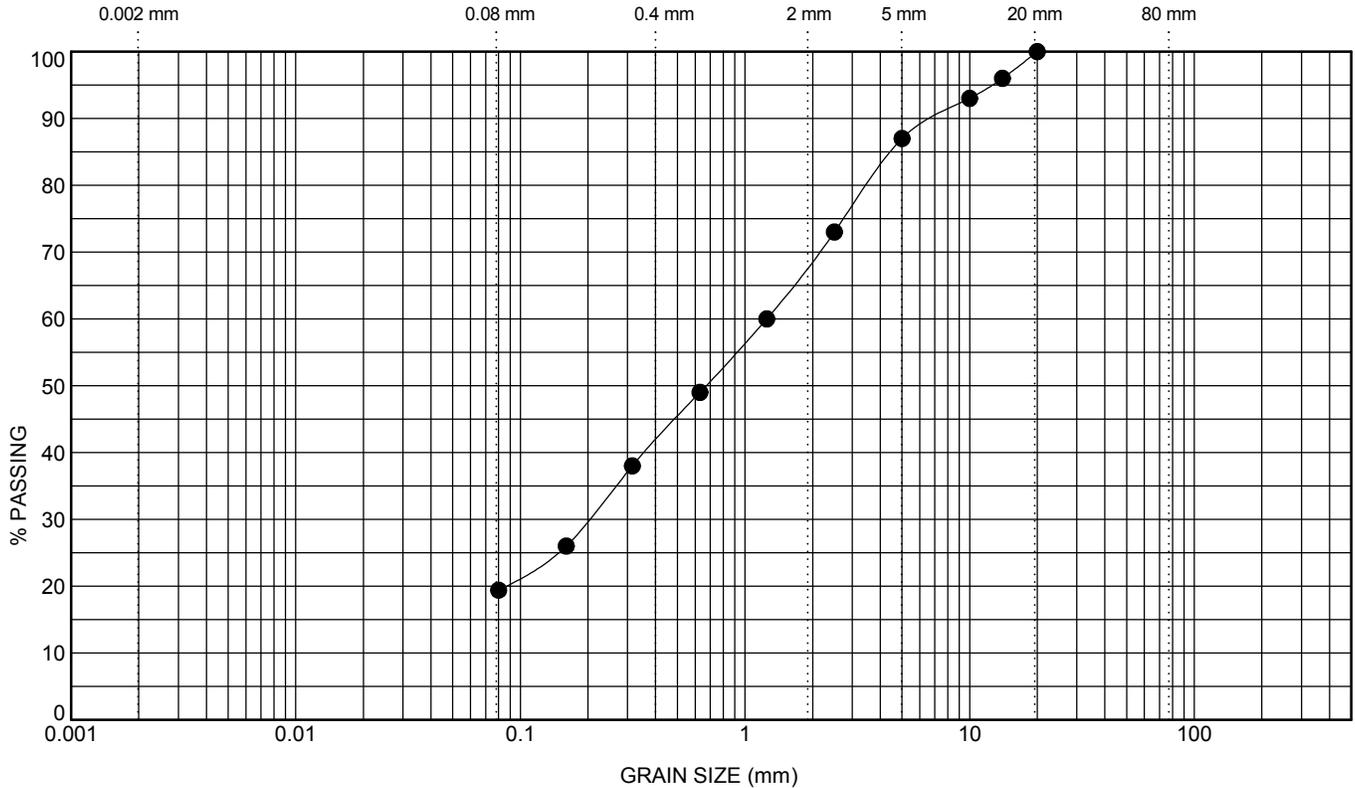


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-06
SAMPLE No. : SS-1
DEPTH : 0 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Sand, some silt and gravel	10			SM-SC

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
13	68	19								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

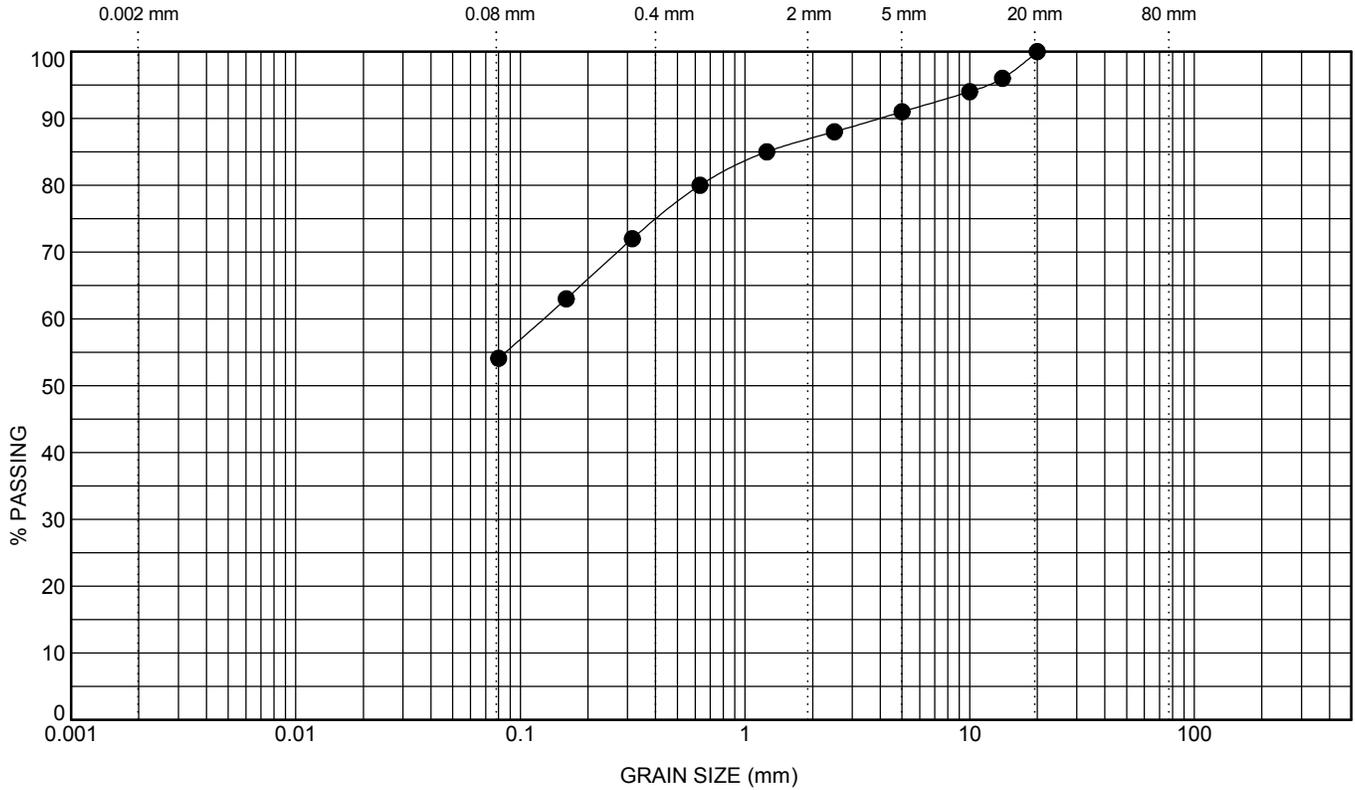


GRAIN SIZE ANALYSIS REPORT

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-06
SAMPLE No. : SS-3
DEPTH : 1.22 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Silt and sand, traces of gravel	25			ML

(1) USCS

% Gravel	% Sand	% Silt and % Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
9	37	54								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

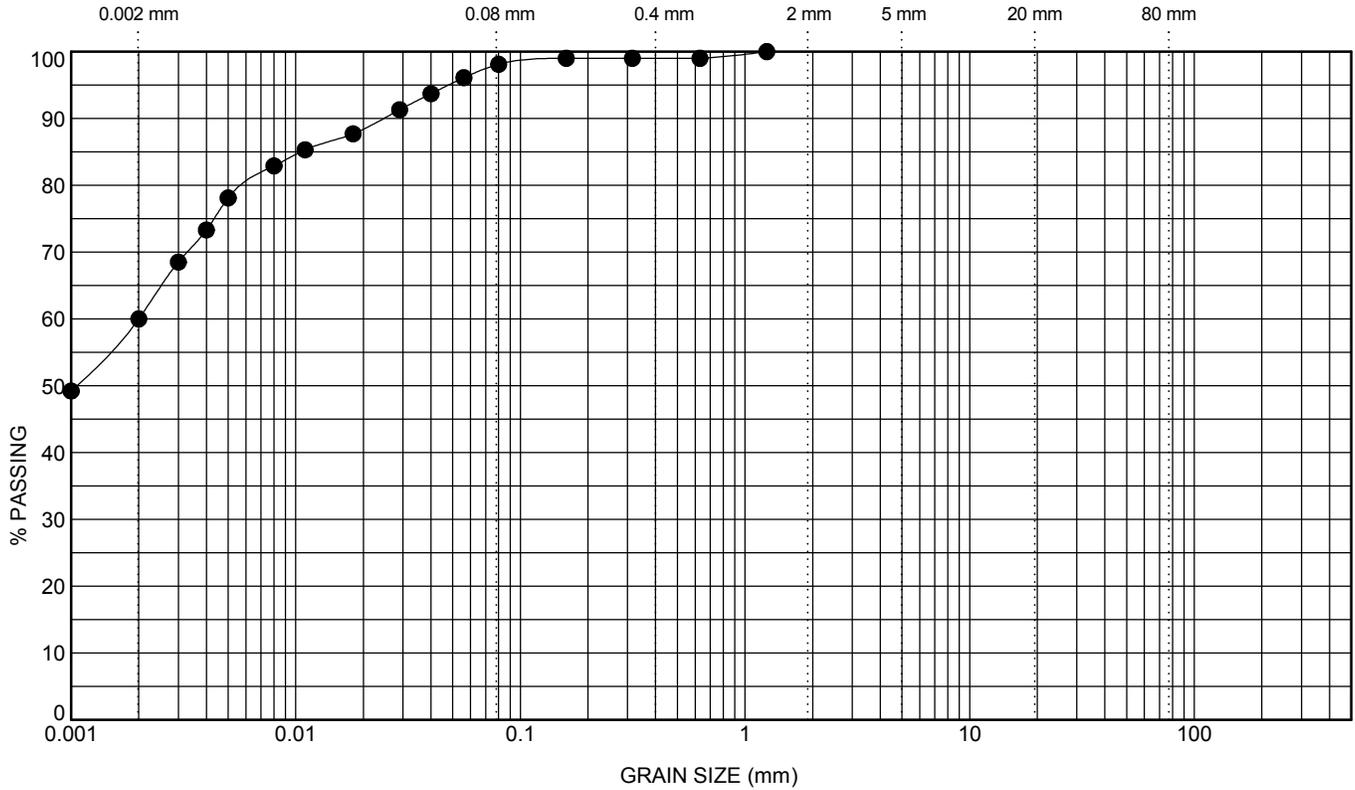


GRAIN SIZE ANALYSIS REPORT (WITH SEDIMENTATION)

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
 RAPIDES DE VAUDREUIL - SABOURIN
LOCATION : PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-01
SAMPLE No. : SS-3
DEPTH : 1.22 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Clay and silt, traces of sand	29			

(1) USCS

% Gravel	% Sand	% Silt	% Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
0	2	38	60								

Remarks :

Prepared by : Lynne Geoffré Verified by : Benoit Cyr, B.Sc. Geology



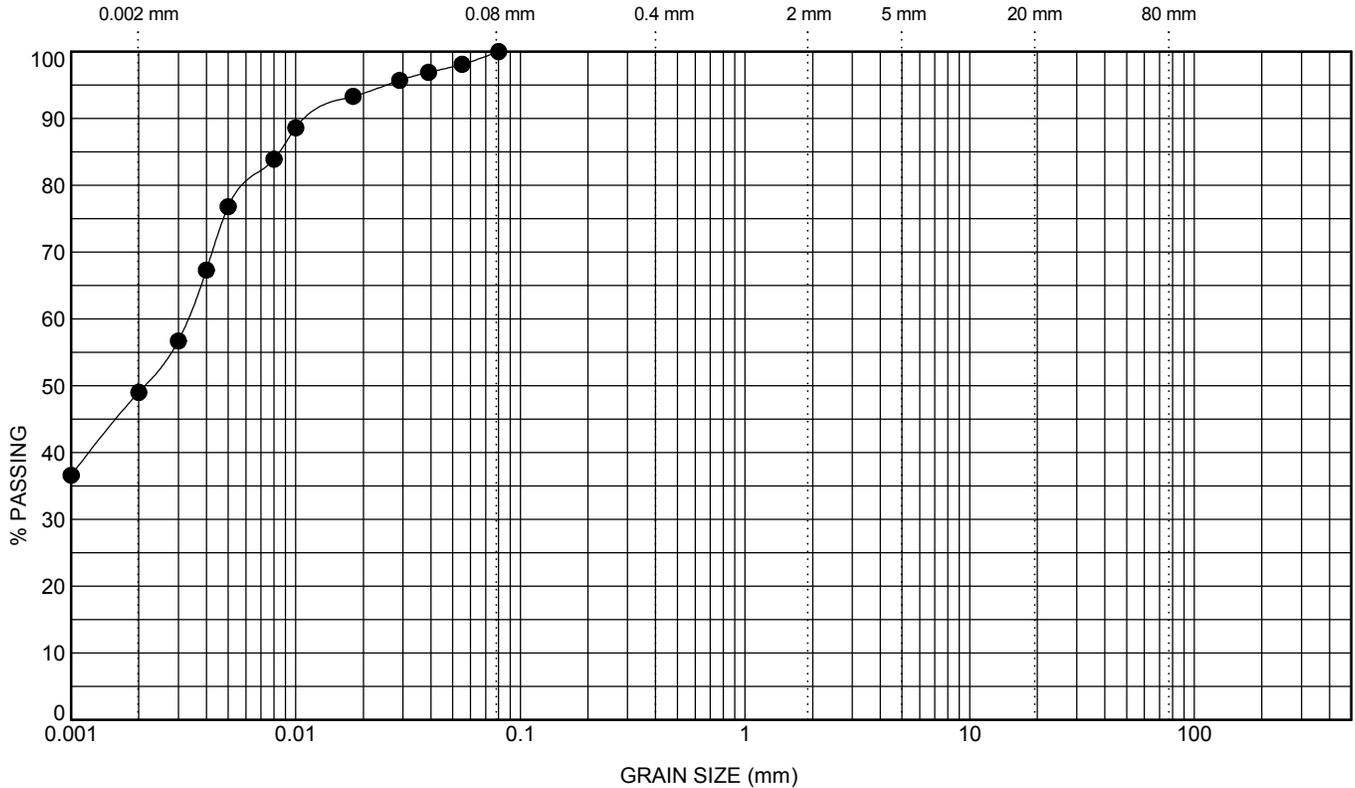
GRAIN SIZE ANALYSIS REPORT

(WITH SEDIMENTATION)

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-01
SAMPLE No. : SS-7
DEPTH : 3.66 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Silt and clay				

(1) USCS

% Gravel	% Sand	% Silt	% Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
0	0	52	48								

Remarks :

Prepared by : Lynne Geoffré Verified by : Benoit Cyr, B.Sc. Geology

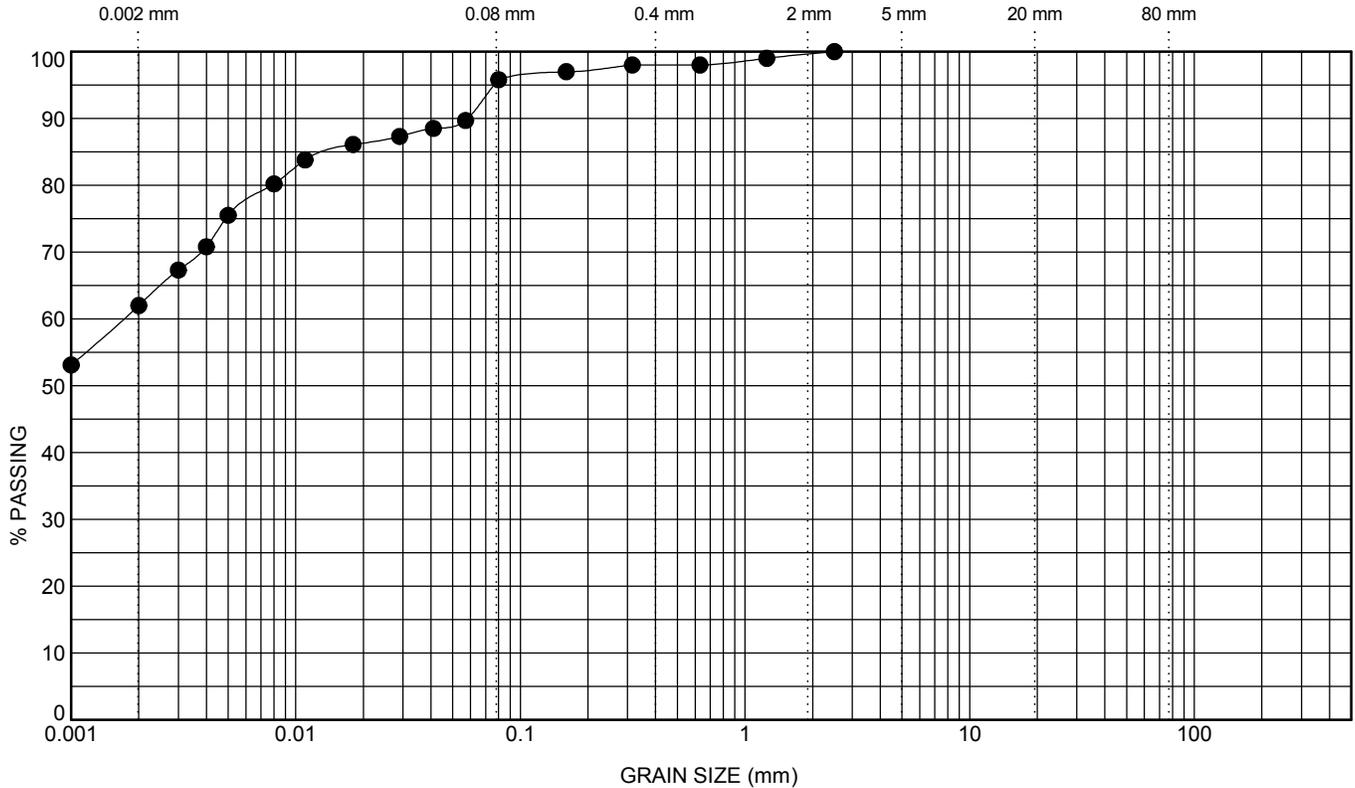


GRAIN SIZE ANALYSIS REPORT (WITH SEDIMENTATION)

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-02
SAMPLE No. : SS-2
DEPTH : 0.61 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Silty clay, traces of sand	32			

(1) USCS

% Gravel	% Sand	% Silt	% Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
0	4	33	63								

Remarks :

Prepared by : Lynne Geoffré Verified by : Benoit Cyr, B.Sc. Geology



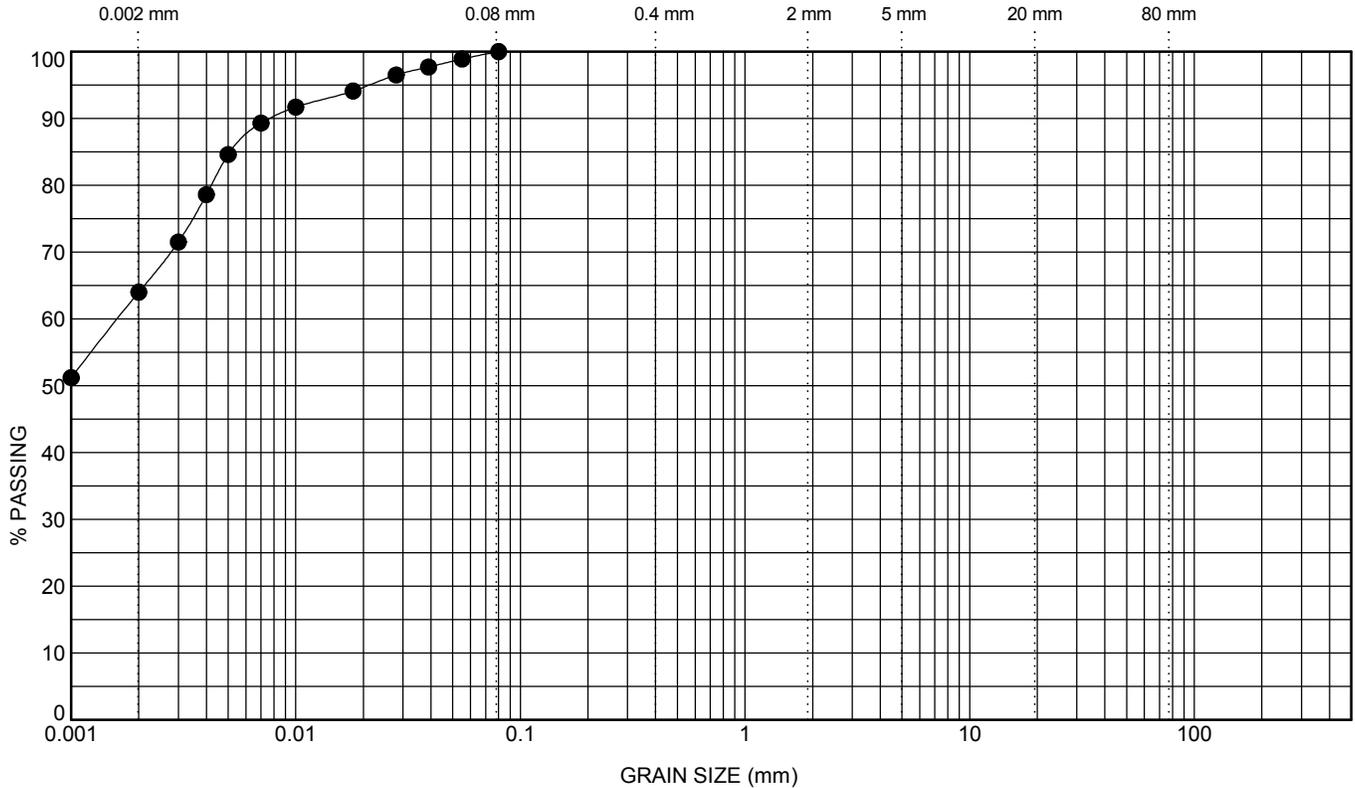
GRAIN SIZE ANALYSIS REPORT

(WITH SEDIMENTATION)

CLIENT: AECOM
PROJECT : COMPENSATION FOR LOSS OF FISH HABITAT
LOCATION : RAPIDS OF VAUDREUIL - SABOURIN
 PARK, VAUDREUIL-DORION, QUEBEC

REFERENCE No. : 11128193-A1
BORING No. : BH-06
SAMPLE No. : SS-6
DEPTH : 3.05 m **DATE :** 11/7/2016

UNIFIED SOIL CLASSIFICATION (BASED ON THE STANDARD LC 21-040)



CLAY	SILT	SAND			GRAVEL		COBBLES AND BOULDERS
		fine	medium	coarse	fine	coarse	

Description	w (%)	W _L (%)	I _p (%)	Classification (1)
Silty clay				CL

(1) USCS

% Gravel	% Sand	% Silt	% Clay	c _u	c _c	D85	D60	D50	D30	D15	D10
0	0	35	65								

Remarks :

Prepared by : Lynne Geoffré

Verified by : Benoit Cyr, B.Sc. Geology

Appendix D
Certificates of Chemical Analyses
(Maxxam Analytique Inc.)



Grille de gestion des sols excavés (juillet 2016)

du Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques

Niveau de contamination	Options de gestion
≤ critère A ¹	1. Utilisation sans restriction sur tout terrain
< critère B (valeurs limites de l'annexe I du RPRT)	<ol style="list-style-type: none"> 1. Ailleurs que sur le terrain d'origine, les sols ne peuvent être déposés que sur des sols dont la concentration en contaminants est égale ou supérieure à celle des sols remblayés (article 4 du RSCTSC) et s'ils n'émettent pas d'odeurs d'hydrocarbures perceptibles. 2. Aux mêmes conditions, déposés sur ou dans des terrains destinés à l'habitation s'ils sont utilisés comme matériau de remblayage dans le cadre de travaux de réhabilitation de terrains faits conformément à la LQE.
≤ critère B (valeurs limites de l'annexe I du RPRT)	<ol style="list-style-type: none"> 1. Valorisés sur le terrain d'origine ou sur le terrain à partir duquel a eu lieu l'activité à l'origine de la contamination. 2. Valorisés comme matériau de recouvrement journalier ou final dans un lieu d'enfouissement technique (LET) ou comme matériau de recouvrement hebdomadaire ou final dans un lieu d'enfouissement en tranchée ou comme recouvrement mensuel ou final dans un lieu d'enfouissement de débris de construction ou de démolition, conformément au REIMR aux conditions des articles 42, 50, 90, 91, 105 ou 106. 3. Valorisés comme recouvrement final dans un lieu d'enfouissement de sols contaminés (LESC) aux conditions décrites à l'article 38 du RESC ou valorisés dans un système de captage des gaz prévu à l'article 13 du RESC. 4. Valorisés comme recouvrement final d'un lieu de dépôt définitif de matières dangereuses aux conditions de l'article 101 du RMD. 5. Valorisés comme matériau de recouvrement final dans un système de gestion qui comporte le dépôt définitif par enfouissement de déchets de fabriques de pâtes et papiers, aux conditions de l'article 116 du Règlement sur les fabriques de pâtes et papiers (RFPP). 6. Valorisés sur un lieu d'élimination nécessitant un recouvrement, aux conditions prévues au certificat d'autorisation en vertu de l'article 22 de la LQE. 7. Valorisés avec ou sans MRF, comme matériau apte à la végétation dans des projets de restauration d'aires d'accumulation de résidus miniers² ou dans la couverture de lieux visés par le RFPP, le RESC ou le RMD. Ne doit dégager aucune odeur d'hydrocarbures perceptible. Dans le cas d'ajout de MRF, le projet doit être autorisé et respecter le <i>Guide sur l'utilisation de matières résiduelles fertilisantes pour la restauration de la couverture végétale de lieux dégradés</i>³. 8. Valorisés comme couche de protection d'une géomembrane utilisée dans un système multicouche lors de la restauration d'une aire d'accumulation de résidus miniers générateurs d'acide.² 9. Éliminés dans un lieu d'enfouissement visé par le RESC. 10. Éliminés dans un LET, un lieu d'enfouissement en tranchée, un lieu d'enfouissement en milieu nordique, un lieu d'enfouissement de débris de construction ou de démolition ou un lieu d'enfouissement en territoire isolé, conformément à l'article 4 du REIMR.
≥ critère B et ≤ critère C	<ol style="list-style-type: none"> 1. Utilisés sur le terrain d'origine comme matériau de remblayage à la condition que les concentrations mesurées respectent les critères ou valeurs limites réglementaires applicables aux sols selon l'usage et le zonage. 2. Valorisés comme matériau de recouvrement dans un LET ou comme matériau de recouvrement hebdomadaire dans un lieu d'enfouissement en tranchée, aux conditions des articles 42, 50 ou 90 du REIMR. Ces conditions incluent notamment que les concentrations de composés organiques volatils soient égales ou inférieures aux critères B. 3. Traités sur place ou dans un lieu de traitement autorisé. 4. Éliminés dans un lieu d'enfouissement visé par le RESC.
< annexe I du RESC	<ol style="list-style-type: none"> 1. Utilisés pour remplir des dépressions naturelles ou des excavations sur le terrain d'origine lors de travaux de réhabilitation aux conditions prévues dans le plan de réhabilitation approuvé dans le cadre d'une analyse de risques (dossiers GTE), à la condition que les C₁₀-C₅₀ et les COV respectent les critères d'usage. 2. Traités sur place ou dans un lieu de traitement autorisé. 3. Éliminés dans un lieu d'enfouissement visé par le RESC.
≥ annexe I du RESC	<ol style="list-style-type: none"> 1. Décontaminés sur place ou dans un lieu de traitement autorisé et gestion selon le résultat obtenu. Si cela est impossible, éliminés dans un lieu d'enfouissement visé par le RESC pour les exceptions mentionnées à l'article 4.1^o a, b ou c.



**Grille de gestion des sols excavés
(juillet 2016)**

**du Ministère du Développement durable, de l'Environnement
et de la Lutte contre les changements climatiques**

Niveau de contamination	Options de gestion
Cas particuliers	<ol style="list-style-type: none">1. Des sols contaminés peuvent être utilisés, à condition de ne dégager aucune odeur d'hydrocarbures perceptible, pour la construction d'un écran visuel ou antibruit dont l'utilité est démontrée :<ol style="list-style-type: none">a. Sur un terrain résidentiel avec des sols du terrain d'origine :<ol style="list-style-type: none">i. dont les concentrations sont $\leq B$;ii. dont les concentrations sont $\leq C$, lors de travaux de réhabilitation sur le terrain réalisés conformément au plan de réhabilitation approuvé dans le cadre d'une analyse de risque (dossiers GTE), sous les mesures de confinement, à condition que les sols contiennent des concentrations $\leq B$ en C_{10}-C_{50} et en composés organiques volatils (COV)⁴;iii. dont les concentrations sont $<$ annexe I du RESC, lors de travaux de réhabilitation sur le terrain réalisés conformément au plan de réhabilitation approuvé dans le cadre d'une analyse de risque (dossiers GTE), sous les mesures de confinement, à condition que les sols en place soient de niveau $> C$ et que les sols déposés contiennent des concentrations $\leq B$ en C_{10}-C_{50} et en COV⁴;b. Sur un terrain commercial/industriel avec des sols du terrain d'origine :<ol style="list-style-type: none">i. dont les concentrations sont $\leq C$;ii. dont les concentrations sont $\leq C$, lors de travaux de réhabilitation sur le terrain réalisés conformément au plan de réhabilitation approuvé dans le cadre d'une analyse de risque (dossiers GTE), sous les mesures de confinement;iii. dont les concentrations sont $<$ annexe I du RESC, lors de travaux de réhabilitation sur le terrain réalisés conformément au plan de réhabilitation approuvé dans le cadre d'une analyse de risque (dossiers GTE), sous les mesures de confinement, à condition que les sols en place soient $> C$, et que les sols déposés contiennent des concentrations $\leq C$ en C_{10}-C_{50} et en COV⁴.2. La valorisation de sols contaminés dans un procédé en remplacement d'une matière vierge est possible aux conditions de l'autorisation.3. Les sols $\geq B$ peuvent être acheminés sur les aires de résidus miniers, s'ils sont contaminés exclusivement par des métaux ou métalloïdes résultant des activités minières de l'entreprise responsable de l'aire, aux conditions de l'autorisation délivrée par le Ministère (article 6 du RSCTSC).4. Les sols $\geq B$ peuvent être acheminés dans un lieu de dépôt définitif de matières dangereuses aux conditions du certificat d'autorisation détenu par ce lieu pour recevoir des sols.

Note : S'il y a présence de matières résiduelles dans les sols, se référer à la figure 12 de la section 7.7.2.

¹ S'il est établi que la concentration naturelle dans le sol importé est supérieure au critère A et à la concentration du sol récepteur, il est recommandé au propriétaire du terrain récepteur de garder une trace du remblayage (localisation, niveau de contamination, provenance des sols importés), de façon à ce qu'il puisse, le cas échéant, démontrer qu'il ne s'agit pas d'une contamination anthropique. Faute de l'existence d'une telle trace, le Ministère considérera que les sols ont été contaminés par l'activité humaine et ils devront donc être gérés comme tels. Advenant le cas où les concentrations naturelles excèdent largement les critères génériques recommandés pour l'usage qui est fait du terrain récepteur, un avis sur les possibles risques à la santé et l'à-propos du remblayage avec de tels sols pourra être demandé à la direction de santé publique.

² Ne s'applique pas aux sols contaminés = B, à moins que ces sols n'aient d'abord transité par un lieu visé à l'article 6 du Règlement sur le stockage et les centres de transfert de sols contaminés. Les sols excavés $\geq B$ ne peuvent en effet être acheminés directement que dans des lieux légalement autorisés à les recevoir et listés à l'article 6 du RSCTSC.

³ Il faudra toutefois s'assurer que la valorisation de sols A-B, auxquels on aura ajouté des matières fertilisantes ou non, entraîne un effet bénéfique, par exemple, sur la croissance de la végétation, et que ces sols répondent à un besoin réel, l'ajout de sols n'étant pas essentiel dans tous les cas de restauration minière. Il sera possible de s'assurer du bien-fondé du projet de valorisation et de son contrôle dans le cadre du certificat d'autorisation délivré préalablement à sa réalisation.

⁴ L'écran visuel ou antibruit doit être recouvert de 1 m de sols $\leq A$ ou de 40 cm $\leq A$ aux endroits recouverts d'une structure permanente (asphalte ou béton). Il est possible d'utiliser des MRF dans la couche apte à la végétation selon les orientations du *Guide sur l'utilisation des matières résiduelles fertilisantes pour la restauration de la couverture végétale des lieux dégradés* si la résultante est $\leq A$.

Your P.O. #: 76204856
Your Project #: 11128193-A1
Site Location: PARC SALOURIN
Your C.O.C. #: E-921569, E-921570

Attention: Vincent JolinTherault

GHD Consultants Ltée
MONTRÉAL
4600 COTE VERTU
SUITE 200
VILLE ST-LAURENT, QC
H4S 1C7

Report Date: 2016/11/11
Report #: R2216188
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B675459

Received: 2016/10/27, 13:45

Sample Matrix: SOIL
Samples Received: 12

Analyses	Quantity	Date	Date	Laboratory Method	Primary Reference
		Extracted	Analyzed		
Petroleum Hydrocarbons (C10-C50)*	12	2016/11/02	2016/11/03	STL SOP-00172	MA.400–HYD. 1.1 R3 m
Total Extractable Metals by ICP (1)*	12	2016/11/02	2016/11/02	QUE SOP-00132	MA 200-Met 1.2 R5 m
Polycyclic Aromatic Hydrocarbons*	12	2016/11/02	2016/11/03	STL SOP-00178	MA400-HAP 1.1 R5 m

Remarks:

Les laboratoires Maxxam sont accrédités ISO/IEC 17025:2005. Sauf indication contraire, les méthodes d’analyses utilisées par Maxxam s’inspirent des méthodes de référence d’organismes provinciaux, fédéraux et américains, tel que le CCME, le MDDELCC, l’EPA et l’APHA.

Toutes les analyses présentées ont été réalisées conformément aux procédures et aux pratiques relatives à la méthodologie, à l’assurance qualité et au contrôle de la qualité généralement appliquées par les employés de Maxxam (sauf s’il en a été convenu autrement par écrit entre le client et Maxxam). Toutes les données de laboratoire rencontrent les contrôles statistiques et respectent tous les critères du CQ et les critères de performance des méthodes, sauf s’il en a été signalé autrement. Tous les blancs de méthode sont rapportés, toutefois, les données des échantillons correspondants ne sont pas corrigées pour la valeur du blanc, sauf indication contraire.

Les responsabilités de Maxxam sont restreintes au coût réel de l’analyse, sauf s’il en a été convenu autrement par écrit. Il n’existe aucune autre garantie, explicite ou implicite. Le client a fait appel à Maxxam pour l’analyse de ses échantillons conformément aux méthodes de référence mentionnées dans ce rapport. L’interprétation et l’utilisation des résultats sont sous l’entière responsabilité du client et ne font pas partie des services offerts par Maxxam, sauf si convenu autrement par écrit.

Les résultats des échantillons solides, sauf les biotes, sont rapportés en fonction de la masse sèche, sauf indication contraire. Les analyses organiques ne sont pas corrigées en fonction de la récupération, sauf pour les méthodes de dilution isotopique.

Les résultats s’appliquent seulement aux échantillons analysés.

Le présent rapport ne doit pas être reproduit, sinon dans son intégralité, sans le consentement écrit du laboratoire.

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

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

(1) This test was performed by Maxxam - Québec

* Maxxam is accredited as per the MDDELCC program.

Your P.O. #: 76204856
Your Project #: 11128193-A1
Site Location: PARC SALOURIN
Your C.O.C. #: E-921569, E-921570

Attention: Vincent JolinTherault

GHD Consultants Ltée
MONTRÉAL
4600 COTE VERTU
SUITE 200
VILLE ST-LAURENT, QC
H4S 1C7

Report Date: 2016/11/11
Report #: R2216188
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B675459
Received: 2016/10/27, 13:45

Encryption Key  Karima Dlimi
11 Nov 2016 10:28:34 -05:00

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

Karima Dlimi, B.Sc., Chemist, Project Manager

Email: KDlimi@maxxam.ca

Phone# (514)448-9001 Ext:6270

=====

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

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0595		DF0596		DF0597		DF0598			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-01 CFE-2	CR	F-01 CFE-3	CR	F-02 CFE-2	CR	F-02 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	23		18		26		24		N/A	N/A
PAH														
Acenaphthene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Acenaphthylene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Anthracene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(a)anthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(a)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(b)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(j)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(k)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(b+j+k)fluoranthene	mg/kg	-	-	-	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(c)phenanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(ghi)perylene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Chrysene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
7,12-Dimethylbenzanthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Fluoranthene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Fluorene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
3-Methylcholanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Naphthalene	mg/kg	0.1	5	50	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Phenanthrene	mg/kg	0.1	5	50	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Pyrene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
2-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1,3-Dimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
2,3,5-Trimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Surrogate Recovery (%)														
D10-Anthracene	%	-	-	-	86		84		86		84		N/A	1686532
D12-Benzo(a)pyrene	%	-	-	-	86		86		88		84		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0595		DF0596		DF0597		DF0598			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-01 CFE-2	CR	F-01 CFE-3	CR	F-02 CFE-2	CR	F-02 CFE-3	CR	RDL	QC Batch
D14-Terphenyl	%	-	-	-	90		88		88		86		N/A	1686532
D8-Acenaphthylene	%	-	-	-	88		86		86		84		N/A	1686532
D8-Naphthalene	%	-	-	-	92		92		90		88		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0599		DF0599		DF0600		DF0601			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-03 CFE-1	CR	F-03 CFE-1 Lab-Dup	CR	F-03 CFE-2	CR	F-04 CFE-1	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	13		13		15		18		N/A	N/A
PAH														
Acenaphthene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Acenaphthylene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Anthracene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(a)anthracene	mg/kg	0.1	1	10	0.5	A-B	0.1	A	<0.1		<0.1		0.1	1686532
Benzo(a)pyrene	mg/kg	0.1	1	10	0.6	A-B	0.2	A-B	<0.1		<0.1		0.1	1686532
Benzo(b)fluoranthene	mg/kg	0.1	1	10	0.6	A-B	0.2	A-B	<0.1		<0.1		0.1	1686532
Benzo(j)fluoranthene	mg/kg	0.1	1	10	0.3	A-B	<0.1		<0.1		<0.1		0.1	1686532
Benzo(k)fluoranthene	mg/kg	0.1	1	10	0.3	A-B	<0.1		<0.1		<0.1		0.1	1686532
Benzo(b+j+k)fluoranthene	mg/kg	-	-	-	1.2		0.2		<0.1		<0.1		0.1	1686532
Benzo(c)phenanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(ghi)perylene	mg/kg	0.1	1	10	0.4	A-B	0.2	A-B	<0.1		<0.1		0.1	1686532
Chrysene	mg/kg	0.1	1	10	0.6	A-B	0.2	A-B	<0.1		<0.1		0.1	1686532
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
7,12-Dimethylbenzanthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Fluoranthene	mg/kg	0.1	10	100	1.4	A-B	0.4	A-B	<0.1		0.1	A	0.1	1686532
Fluorene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	0.4	A-B	0.1	A	<0.1		<0.1		0.1	1686532
3-Methylcholanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Naphthalene	mg/kg	0.1	5	50	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Phenanthrene	mg/kg	0.1	5	50	0.7	A-B	0.2	A-B	<0.1		<0.1		0.1	1686532
Pyrene	mg/kg	0.1	10	100	1.0	A-B	0.3	A-B	<0.1		0.1	A	0.1	1686532
2-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1,3-Dimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
2,3,5-Trimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Surrogate Recovery (%)														
D10-Anthracene	%	-	-	-	80		86		86		84		N/A	1686532
D12-Benzo(a)pyrene	%	-	-	-	82		84		90		78		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0599		DF0599		DF0600		DF0601			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-03 CFE-1	CR	F-03 CFE-1 Lab-Dup	CR	F-03 CFE-2	CR	F-04 CFE-1	CR	RDL	QC Batch
D14-Terphenyl	%	-	-	-	84		90		90		90		N/A	1686532
D8-Acenaphthylene	%	-	-	-	76		84		88		86		N/A	1686532
D8-Naphthalene	%	-	-	-	82		90		92		88		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0602		DF0603		DF0604		DF0605			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921570			
	Units	A	B	C	F-04 CFE-2	CR	F-05 CFE-1B	CR	F-05 CFE-3	CR	F-06 CFE-1	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	18		15		13		10		N/A	N/A
PAH														
Acenaphthene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Acenaphthylene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Anthracene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(a)anthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.4	A-B	0.1	1686532
Benzo(a)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.5	A-B	0.1	1686532
Benzo(b)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.5	A-B	0.1	1686532
Benzo(j)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.3	A-B	0.1	1686532
Benzo(k)fluoranthene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.2	A-B	0.1	1686532
Benzo(b+j+k)fluoranthene	mg/kg	-	-	-	<0.1		<0.1		<0.1		1.0		0.1	1686532
Benzo(c)phenanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Benzo(ghi)perylene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.4	A-B	0.1	1686532
Chrysene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.6	A-B	0.1	1686532
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
7,12-Dimethylbenzanthracene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Fluoranthene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		1.1	A-B	0.1	1686532
Fluorene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		0.4	A-B	0.1	1686532
3-Methylcholanthrene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Naphthalene	mg/kg	0.1	5	50	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Phenanthrene	mg/kg	0.1	5	50	<0.1		<0.1		<0.1		0.4	A-B	0.1	1686532
Pyrene	mg/kg	0.1	10	100	<0.1		<0.1		<0.1		0.9	A-B	0.1	1686532
2-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
1,3-Dimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
2,3,5-Trimethylnaphthalene	mg/kg	0.1	1	10	<0.1		<0.1		<0.1		<0.1		0.1	1686532
Surrogate Recovery (%)														
D10-Anthracene	%	-	-	-	86		88		68		92		N/A	1686532
D12-Benzo(a)pyrene	%	-	-	-	82		90		70		90		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0602		DF0603		DF0604		DF0605			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921570			
	Units	A	B	C	F-04 CFE-2	CR	F-05 CFE-1B	CR	F-05 CFE-3	CR	F-06 CFE-1	CR	RDL	QC Batch
D14-Terphenyl	%	-	-	-	88		92		70		94		N/A	1686532
D8-Acenaphthylene	%	-	-	-	88		88		68		90		N/A	1686532
D8-Naphthalene	%	-	-	-	90		94		70		94		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0606			
Sampling Date					2016/10/26			
COC Number					E-921570			
	Units	A	B	C	F-06 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	24		N/A	N/A
PAH								
Acenaphthene	mg/kg	0.1	10	100	<0.1		0.1	1686532
Acenaphthylene	mg/kg	0.1	10	100	<0.1		0.1	1686532
Anthracene	mg/kg	0.1	10	100	<0.1		0.1	1686532
Benzo(a)anthracene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(a)pyrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(b)fluoranthene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(j)fluoranthene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(k)fluoranthene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(b+j+k)fluoranthene	mg/kg	-	-	-	<0.1		0.1	1686532
Benzo(c)phenanthrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Benzo(ghi)perylene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Chrysene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
7,12-Dimethylbenzanthracene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Fluoranthene	mg/kg	0.1	10	100	<0.1		0.1	1686532
Fluorene	mg/kg	0.1	10	100	<0.1		0.1	1686532
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
3-Methylcholanthrene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Naphthalene	mg/kg	0.1	5	50	<0.1		0.1	1686532
Phenanthrene	mg/kg	0.1	5	50	<0.1		0.1	1686532
Pyrene	mg/kg	0.1	10	100	<0.1		0.1	1686532
2-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		0.1	1686532
1-Methylnaphthalene	mg/kg	0.1	1	10	<0.1		0.1	1686532
1,3-Dimethylnaphthalene	mg/kg	0.1	1	10	<0.1		0.1	1686532
2,3,5-Trimethylnaphthalene	mg/kg	0.1	1	10	<0.1		0.1	1686532
Surrogate Recovery (%)								
D10-Anthracene	%	-	-	-	68		N/A	1686532
D12-Benzo(a)pyrene	%	-	-	-	70		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

PAH BY GCMS (SOIL)

Maxxam ID					DF0606			
Sampling Date					2016/10/26			
COC Number					E-921570			
	Units	A	B	C	F-06 CFE-3	CR	RDL	QC Batch
D14-Terphenyl	%	-	-	-	70		N/A	1686532
D8-Acenaphthylene	%	-	-	-	70		N/A	1686532
D8-Naphthalene	%	-	-	-	74		N/A	1686532
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

HYDROCARBONS BY GCFID (SOIL)

Maxxam ID					DF0595		DF0596		DF0597		DF0598			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-01 CFE-2	CR	F-01 CFE-3	CR	F-02 CFE-2	CR	F-02 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	23		18		26		24		N/A	N/A
PETROLEUM HYDROCARBONS														
Petroleum Hydrocarbons (C10-C50)	mg/kg	300	700	3500	<100		<100		<100		<100		100	1686531
Surrogate Recovery (%)														
1-Chlorooctadecane	%	-	-	-	84		83		82		86		N/A	1686531
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam ID					DF0599		DF0599		DF0600		DF0601			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-03 CFE-1	CR	F-03 CFE-1 Lab-Dup	CR	F-03 CFE-2	CR	F-04 CFE-1	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	13		13		15		18		N/A	N/A
PETROLEUM HYDROCARBONS														
Petroleum Hydrocarbons (C10-C50)	mg/kg	300	700	3500	240	<A	230	<A	<100		<100		100	1686531
Surrogate Recovery (%)														
1-Chlorooctadecane	%	-	-	-	79		77		84		85		N/A	1686531
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam ID					DF0602		DF0603		DF0604		DF0605			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921570			
	Units	A	B	C	F-04 CFE-2	CR	F-05 CFE-1B	CR	F-05 CFE-3	CR	F-06 CFE-1	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	18		15		13		10		N/A	N/A
PETROLEUM HYDROCARBONS														
Petroleum Hydrocarbons (C10-C50)	mg/kg	300	700	3500	<100		<100		<100		350	A-B	100	1686531
Surrogate Recovery (%)														
1-Chlorooctadecane	%	-	-	-	86		82		68		78		N/A	1686531
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

HYDROCARBONS BY GCFID (SOIL)

Maxxam ID					DF0606			
Sampling Date					2016/10/26			
COC Number					E-921570			
	Units	A	B	C	F-06 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	24		N/A	N/A
PETROLEUM HYDROCARBONS								
Petroleum Hydrocarbons (C10-C50)	mg/kg	300	700	3500	<100		100	1686531
Surrogate Recovery (%)								
1-Chlorooctadecane	%	-	-	-	67		N/A	1686531
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

TOTAL EXTRACTABLE METALS (SOIL)

Maxxam ID					DF0595		DF0596		DF0597		DF0598			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-01 CFE-2	CR	F-01 CFE-3	CR	F-02 CFE-2	CR	F-02 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	23		18		26		24		N/A	N/A
METALS														
Silver (Ag)	mg/kg	2	20	40	<0.5		<0.5		<0.5		<0.5		0.5	1686094
Arsenic (As)	mg/kg	6	30	50	6	A	<5		<5		<5		5	1686094
Barium (Ba)	mg/kg	340	500	2000	220	<A	200	<A	340	A	320	<A	5	1686094
Cadmium (Cd)	mg/kg	1.5	5	20	<0.5		<0.5		<0.5		<0.5		0.5	1686094
Chromium (Cr)	mg/kg	100	250	800	47	<A	47	<A	67	<A	45	<A	2	1686094
Cobalt (Co)	mg/kg	25	50	300	20	<A	16	<A	20	<A	15	<A	2	1686094
Copper (Cu)	mg/kg	50	100	500	37	<A	41	<A	46	<A	36	<A	2	1686094
Tin (Sn)	mg/kg	5	50	300	<4		<4		<4		<4		4	1686094
Manganese (Mn)	mg/kg	1000	1000	2200	740	<A	520	<A	630	<A	480	<A	2	1686094
Molybdenum (Mo)	mg/kg	2	10	40	<1		<1		<1		1	<A	1	1686094
Nickel (Ni)	mg/kg	50	100	500	40	<A	37	<A	54	A-B	42	<A	1	1686094
Lead (Pb)	mg/kg	50	500	1000	11	<A	10	<A	12	<A	11	<A	5	1686094
Zinc (Zn)	mg/kg	140	500	1500	130	<A	100	<A	140	A	110	<A	10	1686094
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

TOTAL EXTRACTABLE METALS (SOIL)

Maxxam ID					DF0599		DF0600		DF0601		DF0602			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921569			
	Units	A	B	C	F-03 CFE-1	CR	F-03 CFE-2	CR	F-04 CFE-1	CR	F-04 CFE-2	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	13		15		18		18		N/A	N/A
METALS														
Silver (Ag)	mg/kg	2	20	40	<0.5		<0.5		<0.5		<0.5		0.5	1686094
Arsenic (As)	mg/kg	6	30	50	<5		<5		5	<A	6	A	5	1686094
Barium (Ba)	mg/kg	340	500	2000	180	<A	200	<A	330	<A	250	<A	5	1686094
Cadmium (Cd)	mg/kg	1.5	5	20	<0.5		<0.5		0.8	<A	<0.5		0.5	1686094
Chromium (Cr)	mg/kg	100	250	800	33	<A	44	<A	42	<A	48	<A	2	1686094
Cobalt (Co)	mg/kg	25	50	300	10	<A	14	<A	12	<A	18	<A	2	1686094
Copper (Cu)	mg/kg	50	100	500	31	<A	17	<A	45	<A	41	<A	2	1686094
Tin (Sn)	mg/kg	5	50	300	<4		<4		7	A-B	<4		4	1686094
Manganese (Mn)	mg/kg	1000	1000	2200	650	<A	540	<A	910	<A	440	<A	2	1686094
Molybdenum (Mo)	mg/kg	2	10	40	2	A	<1		<1		<1		1	1686094
Nickel (Ni)	mg/kg	50	100	500	23	<A	28	<A	31	<A	49	<A	1	1686094
Lead (Pb)	mg/kg	50	500	1000	95	A-B	18	<A	310	A-B	13	<A	5	1686094
Zinc (Zn)	mg/kg	140	500	1500	150	A-B	86	<A	270	A-B	110	<A	10	1686094
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

TOTAL EXTRACTABLE METALS (SOIL)

Maxxam ID					DF0602		DF0603		DF0604		DF0605			
Sampling Date					2016/10/26		2016/10/26		2016/10/26		2016/10/26			
COC Number					E-921569		E-921569		E-921569		E-921570			
	Units	A	B	C	F-04 CFE-2 Lab-Dup	CR	F-05 CFE-1B	CR	F-05 CFE-3	CR	F-06 CFE-1	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	18		15		13		10		N/A	N/A
METALS														
Silver (Ag)	mg/kg	2	20	40	<0.5		<0.5		<0.5		<0.5		0.5	1686094
Arsenic (As)	mg/kg	6	30	50	6	A	<5		<5		6	A	5	1686094
Barium (Ba)	mg/kg	340	500	2000	250	<A	160	<A	170	<A	83	<A	5	1686094
Cadmium (Cd)	mg/kg	1.5	5	20	<0.5		<0.5		<0.5		<0.5		0.5	1686094
Chromium (Cr)	mg/kg	100	250	800	48	<A	36	<A	13	<A	22	<A	2	1686094
Cobalt (Co)	mg/kg	25	50	300	18	<A	10	<A	2	<A	2	<A	2	1686094
Copper (Cu)	mg/kg	50	100	500	41	<A	14	<A	5	<A	20	<A	2	1686094
Tin (Sn)	mg/kg	5	50	300	<4		<4		<4		<4		4	1686094
Manganese (Mn)	mg/kg	1000	1000	2200	450	<A	630	<A	100	<A	490	<A	2	1686094
Molybdenum (Mo)	mg/kg	2	10	40	<1		<1		<1		2	A	1	1686094
Nickel (Ni)	mg/kg	50	100	500	49	<A	22	<A	7	<A	9	<A	1	1686094
Lead (Pb)	mg/kg	50	500	1000	13	<A	35	<A	6	<A	35	<A	5	1686094
Zinc (Zn)	mg/kg	140	500	1500	110	<A	65	<A	16	<A	110	<A	10	1686094
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable														

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

TOTAL EXTRACTABLE METALS (SOIL)

Maxxam ID					DF0606			
Sampling Date					2016/10/26			
COC Number					E-921570			
	Units	A	B	C	F-06 CFE-3	CR	RDL	QC Batch
% MOISTURE	%	-	-	-	24		N/A	N/A
METALS								
Silver (Ag)	mg/kg	2	20	40	<0.5		0.5	1686094
Arsenic (As)	mg/kg	6	30	50	5	<A	5	1686094
Barium (Ba)	mg/kg	340	500	2000	210	<A	5	1686094
Cadmium (Cd)	mg/kg	1.5	5	20	<0.5		0.5	1686094
Chromium (Cr)	mg/kg	100	250	800	66	<A	2	1686094
Cobalt (Co)	mg/kg	25	50	300	18	<A	2	1686094
Copper (Cu)	mg/kg	50	100	500	49	<A	2	1686094
Tin (Sn)	mg/kg	5	50	300	<4		4	1686094
Manganese (Mn)	mg/kg	1000	1000	2200	620	<A	2	1686094
Molybdenum (Mo)	mg/kg	2	10	40	<1		1	1686094
Nickel (Ni)	mg/kg	50	100	500	43	<A	1	1686094
Lead (Pb)	mg/kg	50	500	1000	120	A-B	5	1686094
Zinc (Zn)	mg/kg	140	500	1500	150	A-B	10	1686094
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

GENERAL COMMENTS

All results are calculated on a dry weight basis except where not applicable.

Condition of sample(s) upon receipt: GOOD

Rev: report is in english

A,B,C,CR: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MDDELCC, 2016." entitled " Grille des critères génériques pour les sols". For all metals analyses in soil, the criterion A refers to " Background Level of St. Lawrence Lowlands Sector ".

Groundwater criteria A and B follow the appendix 7 entitled "Grille des critères de qualité des eaux souterraines" of the document mentioned above. The criterion A refers to " Drinking Water " and the criterion B refers to "Seepage into Surface Water".

These criteria references are shown for visual aid only, and should not be interpreted otherwise.

- = This parameter is not part of the regulation.

PAH BY GCMS (SOIL)

Please note that the results have not been corrected for QC recoveries (spiked blank and method blank) nor for the surrogates.

Un-rounded results are used in the Benzo(b+j+k)fluoranthene calculation. This total result is then rounded to two significant figures.

HYDROCARBONS BY GCFID (SOIL)

Please note that the results have not been corrected for QC recoveries (spiked blank and surrogates). Please note that the results have not been corrected for the method blank.

TOTAL EXTRACTABLE METALS (SOIL)

Please note that the results have not been corrected for QC recovery (spiked blank) nor for the method blank.

Results relate only to the items tested.

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

QUALITY ASSURANCE REPORT

QA/QC			Parameter	Date	Value	Recovery	Units	QC Limits
Batch	Init	QC Type		Analyzed				
1686094	JB3	QC Standard	Silver (Ag)	2016/11/02		108	%	80 - 120
			Arsenic (As)	2016/11/02		111	%	80 - 120
			Barium (Ba)	2016/11/02		105	%	80 - 120
			Cadmium (Cd)	2016/11/02		104	%	80 - 120
			Chromium (Cr)	2016/11/02		106	%	80 - 120
			Cobalt (Co)	2016/11/02		105	%	80 - 120
			Copper (Cu)	2016/11/02		107	%	80 - 120
			Tin (Sn)	2016/11/02		108	%	80 - 120
			Manganese (Mn)	2016/11/02		105	%	80 - 120
			Molybdenum (Mo)	2016/11/02		109	%	80 - 120
			Nickel (Ni)	2016/11/02		109	%	80 - 120
			Lead (Pb)	2016/11/02		121	%	80 - 120
			Zinc (Zn)	2016/11/02		107	%	80 - 120
			1686094	JB3	QC Standard DUP	Silver (Ag)	2016/11/02	
Arsenic (As)	2016/11/02					103	%	80 - 120
Barium (Ba)	2016/11/02					96	%	80 - 120
Cadmium (Cd)	2016/11/02					96	%	80 - 120
Chromium (Cr)	2016/11/02					97	%	80 - 120
Cobalt (Co)	2016/11/02					99	%	80 - 120
Copper (Cu)	2016/11/02					100	%	80 - 120
Tin (Sn)	2016/11/02					98	%	80 - 120
Manganese (Mn)	2016/11/02					96	%	80 - 120
Molybdenum (Mo)	2016/11/02					100	%	80 - 120
Nickel (Ni)	2016/11/02					102	%	80 - 120
Lead (Pb)	2016/11/02					102	%	80 - 120
Zinc (Zn)	2016/11/02					98	%	80 - 120
1686094	JB3	RPD				Silver (Ag)	2016/11/02	6.6
			Arsenic (As)	2016/11/02	7.3		%	30
			Barium (Ba)	2016/11/02	8.5		%	30
			Cadmium (Cd)	2016/11/02	8.0		%	30
			Chromium (Cr)	2016/11/02	8.4		%	30
			Cobalt (Co)	2016/11/02	5.9		%	30
			Copper (Cu)	2016/11/02	6.6		%	30
			Tin (Sn)	2016/11/02	9.4		%	30
			Manganese (Mn)	2016/11/02	8.9		%	30
			Molybdenum (Mo)	2016/11/02	9.2		%	30
			Nickel (Ni)	2016/11/02	6.6		%	30
			Lead (Pb)	2016/11/02	18		%	30
			Zinc (Zn)	2016/11/02	8.3		%	30
			Silver (Ag)	2016/11/02	3.4		%	30
			Arsenic (As)	2016/11/02	6.6		%	30
			Barium (Ba)	2016/11/02	4.2		%	30
			Cadmium (Cd)	2016/11/02	7.0		%	30
			Chromium (Cr)	2016/11/02	5.2		%	30
			Cobalt (Co)	2016/11/02	5.5		%	30
			Copper (Cu)	2016/11/02	22		%	30
			Tin (Sn)	2016/11/02	5.6		%	30
			Manganese (Mn)	2016/11/02	6.1		%	30
			Molybdenum (Mo)	2016/11/02	3.5		%	30
			Nickel (Ni)	2016/11/02	5.4		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	Units	QC Limits
Batch	Init	QC Type		Analyzed				
			Lead (Pb)	2016/11/02	2.9		%	30
			Zinc (Zn)	2016/11/02	5.5		%	30
			Silver (Ag)	2016/11/02	NC		%	30
			Arsenic (As)	2016/11/02	NC		%	30
			Barium (Ba)	2016/11/02	NC		%	30
			Cadmium (Cd)	2016/11/02	NC		%	30
			Chromium (Cr)	2016/11/02	NC		%	30
			Cobalt (Co)	2016/11/02	NC		%	30
			Copper (Cu)	2016/11/02	NC		%	30
			Tin (Sn)	2016/11/02	NC		%	30
			Manganese (Mn)	2016/11/02	NC		%	30
			Molybdenum (Mo)	2016/11/02	NC		%	30
			Nickel (Ni)	2016/11/02	NC		%	30
			Lead (Pb)	2016/11/02	NC		%	30
			Zinc (Zn)	2016/11/02	NC		%	30
			Silver (Ag)	2016/11/02	NC		%	30
			Arsenic (As)	2016/11/02	NC		%	30
			Barium (Ba)	2016/11/02	1.8		%	30
			Cadmium (Cd)	2016/11/02	NC		%	30
			Chromium (Cr)	2016/11/02	3.2		%	30
			Cobalt (Co)	2016/11/02	2.7		%	30
			Copper (Cu)	2016/11/02	2.4		%	30
			Tin (Sn)	2016/11/02	NC		%	30
			Manganese (Mn)	2016/11/02	3.2		%	30
			Molybdenum (Mo)	2016/11/02	NC		%	30
			Nickel (Ni)	2016/11/02	2.0		%	30
			Lead (Pb)	2016/11/02	2.1		%	30
			Zinc (Zn)	2016/11/02	2.2		%	30
			Silver (Ag)	2016/11/02	NC		%	30
			Arsenic (As)	2016/11/02	NC		%	30
			Barium (Ba)	2016/11/02	5.9		%	30
			Cadmium (Cd)	2016/11/02	NC		%	30
			Chromium (Cr)	2016/11/02	NC		%	30
			Cobalt (Co)	2016/11/02	NC		%	30
			Copper (Cu)	2016/11/02	NC		%	30
			Tin (Sn)	2016/11/02	NC		%	30
			Manganese (Mn)	2016/11/02	3.7		%	30
			Molybdenum (Mo)	2016/11/02	NC		%	30
			Nickel (Ni)	2016/11/02	NC		%	30
			Lead (Pb)	2016/11/02	NC		%	30
			Zinc (Zn)	2016/11/02	NC		%	30
1686094	JB3	Spiked Blank	Silver (Ag)	2016/11/02		98	%	80 - 120
			Arsenic (As)	2016/11/02		115	%	80 - 120
			Barium (Ba)	2016/11/02		110	%	80 - 120
			Cadmium (Cd)	2016/11/02		108	%	80 - 120
			Chromium (Cr)	2016/11/02		112	%	80 - 120
			Cobalt (Co)	2016/11/02		112	%	80 - 120
			Copper (Cu)	2016/11/02		135	%	80 - 120
			Tin (Sn)	2016/11/02		112	%	80 - 120
			Manganese (Mn)	2016/11/02		112	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	Units	QC Limits			
Batch	Init	QC Type		Analyzed							
1686094	JB3	Spiked Blank DUP	Molybdenum (Mo)	2016/11/02		105	%	80 - 120			
			Nickel (Ni)	2016/11/02		115	%	80 - 120			
			Lead (Pb)	2016/11/02		113	%	80 - 120			
			Zinc (Zn)	2016/11/02		114	%	80 - 120			
			Silver (Ag)	2016/11/02		94	%	80 - 120			
			Arsenic (As)	2016/11/02		107	%	80 - 120			
			Barium (Ba)	2016/11/02		106	%	80 - 120			
			Cadmium (Cd)	2016/11/02		101	%	80 - 120			
			Chromium (Cr)	2016/11/02		106	%	80 - 120			
			Cobalt (Co)	2016/11/02		106	%	80 - 120			
			Copper (Cu)	2016/11/02		109	%	80 - 120			
			Tin (Sn)	2016/11/02		106	%	80 - 120			
			Manganese (Mn)	2016/11/02		106	%	80 - 120			
			Molybdenum (Mo)	2016/11/02		102	%	80 - 120			
			Nickel (Ni)	2016/11/02		109	%	80 - 120			
1686094	JB3	Method Blank	Lead (Pb)	2016/11/02		109	%	80 - 120			
			Zinc (Zn)	2016/11/02		108	%	80 - 120			
			Silver (Ag)	2016/11/02	<0.5		mg/kg				
			Arsenic (As)	2016/11/02	<5		mg/kg				
			Barium (Ba)	2016/11/02	<5		mg/kg				
			Cadmium (Cd)	2016/11/02	<0.5		mg/kg				
			Chromium (Cr)	2016/11/02	<2		mg/kg				
			Cobalt (Co)	2016/11/02	<2		mg/kg				
			Copper (Cu)	2016/11/02	<2		mg/kg				
			Tin (Sn)	2016/11/02	<4		mg/kg				
			Manganese (Mn)	2016/11/02	<2		mg/kg				
			Molybdenum (Mo)	2016/11/02	<1		mg/kg				
			Nickel (Ni)	2016/11/02	<1		mg/kg				
			Lead (Pb)	2016/11/02	<5		mg/kg				
			Zinc (Zn)	2016/11/02	<10		mg/kg				
1686094	JB3	Method Blank DUP	Silver (Ag)	2016/11/02	<0.5		mg/kg				
			Arsenic (As)	2016/11/02	<5		mg/kg				
			Barium (Ba)	2016/11/02	<5		mg/kg				
			Cadmium (Cd)	2016/11/02	<0.5		mg/kg				
			Chromium (Cr)	2016/11/02	<2		mg/kg				
			Cobalt (Co)	2016/11/02	<2		mg/kg				
			Copper (Cu)	2016/11/02	<2		mg/kg				
			Tin (Sn)	2016/11/02	<4		mg/kg				
			Manganese (Mn)	2016/11/02	<2		mg/kg				
			Molybdenum (Mo)	2016/11/02	<1		mg/kg				
			Nickel (Ni)	2016/11/02	<1		mg/kg				
			Lead (Pb)	2016/11/02	<5		mg/kg				
			Zinc (Zn)	2016/11/02	<10		mg/kg				
			1686094	JB3	RPD [DF0602-01]	Silver (Ag)	2016/11/02	NC		%	30
						Arsenic (As)	2016/11/02	NC		%	30
Barium (Ba)	2016/11/02	0.019					%	30			
Cadmium (Cd)	2016/11/02	NC					%	30			
Chromium (Cr)	2016/11/02	0.67					%	30			
Cobalt (Co)	2016/11/02	1.2					%	30			
Copper (Cu)	2016/11/02	0.20					%	30			

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Tin (Sn)	2016/11/02	NC		%	30
			Manganese (Mn)	2016/11/02	1.4		%	30
			Molybdenum (Mo)	2016/11/02	NC		%	30
			Nickel (Ni)	2016/11/02	0.94		%	30
			Lead (Pb)	2016/11/02	NC		%	30
			Zinc (Zn)	2016/11/02	0.33		%	30
1686531	CG2	Spiked Blank	1-Chlorooctadecane	2016/11/02		85	%	60 - 120
			Petroleum Hydrocarbons (C10-C50)	2016/11/02		88	%	70 - 130
1686531	CG2	Spiked Blank DUP	1-Chlorooctadecane	2016/11/02		81	%	60 - 120
			Petroleum Hydrocarbons (C10-C50)	2016/11/02		85	%	70 - 130
1686531	CG2	RPD	Petroleum Hydrocarbons (C10-C50)	2016/11/02	NC		%	50
1686531	CG2	Method Blank	1-Chlorooctadecane	2016/11/02		89	%	60 - 120
			Petroleum Hydrocarbons (C10-C50)	2016/11/02	<100		mg/kg	
1686531	CG2	RPD [DF0599-01]	Petroleum Hydrocarbons (C10-C50)	2016/11/03	NC		%	50
1686532	SD8	Spiked Blank	D10-Anthracene	2016/11/02		82	%	50 - 130
			D12-Benzo(a)pyrene	2016/11/02		86	%	50 - 130
			D14-Terphenyl	2016/11/02		86	%	50 - 130
			D8-Acenaphthylene	2016/11/02		80	%	50 - 130
			D8-Naphthalene	2016/11/02		88	%	50 - 130
			Acenaphthene	2016/11/02		84	%	50 - 130
			Acenaphthylene	2016/11/02		84	%	50 - 130
			Anthracene	2016/11/02		83	%	50 - 130
			Benzo(a)anthracene	2016/11/02		88	%	50 - 130
			Benzo(a)pyrene	2016/11/02		86	%	50 - 130
			Benzo(b)fluoranthene	2016/11/02		87	%	50 - 130
			Benzo(j)fluoranthene	2016/11/02		89	%	50 - 130
			Benzo(k)fluoranthene	2016/11/02		86	%	50 - 130
			Benzo(b+j+k)fluoranthene	2016/11/02		87	%	50 - 130
			Benzo(c)phenanthrene	2016/11/02		88	%	50 - 130
			Benzo(ghi)perylene	2016/11/02		88	%	50 - 130
			Chrysene	2016/11/02		87	%	50 - 130
			Dibenzo(a,h)anthracene	2016/11/02		85	%	50 - 130
			Dibenzo(a,i)pyrene	2016/11/02		93	%	50 - 130
			Dibenzo(a,h)pyrene	2016/11/02		96	%	50 - 130
			Dibenzo(a,l)pyrene	2016/11/02		96	%	50 - 130
			7,12-Dimethylbenzanthracene	2016/11/02		77	%	50 - 130
			Fluoranthene	2016/11/02		83	%	50 - 130
			Fluorene	2016/11/02		79	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2016/11/02		92	%	50 - 130
			3-Methylcholanthrene	2016/11/02		90	%	50 - 130
			Naphthalene	2016/11/02		88	%	50 - 130
			Phenanthrene	2016/11/02		79	%	50 - 130
			Pyrene	2016/11/02		84	%	50 - 130
			2-Methylnaphthalene	2016/11/02		89	%	50 - 130
			1-Methylnaphthalene	2016/11/02		76	%	50 - 130
			1,3-Dimethylnaphthalene	2016/11/02		83	%	50 - 130
			2,3,5-Trimethylnaphthalene	2016/11/02		81	%	50 - 130
1686532	SD8	Spiked Blank DUP	D10-Anthracene	2016/11/02		82	%	50 - 130
			D12-Benzo(a)pyrene	2016/11/02		86	%	50 - 130
			D14-Terphenyl	2016/11/02		86	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	Units	QC Limits
Batch	Init	QC Type		Analyzed				
			D8-Acenaphthylene	2016/11/02		84	%	50 - 130
			D8-Naphthalene	2016/11/02		88	%	50 - 130
			Acenaphthene	2016/11/02		82	%	50 - 130
			Acenaphthylene	2016/11/02		88	%	50 - 130
			Anthracene	2016/11/02		83	%	50 - 130
			Benzo(a)anthracene	2016/11/02		87	%	50 - 130
			Benzo(a)pyrene	2016/11/02		82	%	50 - 130
			Benzo(b)fluoranthene	2016/11/02		88	%	50 - 130
			Benzo(j)fluoranthene	2016/11/02		87	%	50 - 130
			Benzo(k)fluoranthene	2016/11/02		79	%	50 - 130
			Benzo(b+j+k)fluoranthene	2016/11/02		85	%	50 - 130
			Benzo(c)phenanthrene	2016/11/02		87	%	50 - 130
			Benzo(ghi)perylene	2016/11/02		85	%	50 - 130
			Chrysene	2016/11/02		86	%	50 - 130
			Dibenzo(a,h)anthracene	2016/11/02		83	%	50 - 130
			Dibenzo(a,i)pyrene	2016/11/02		90	%	50 - 130
			Dibenzo(a,h)pyrene	2016/11/02		94	%	50 - 130
			Dibenzo(a,l)pyrene	2016/11/02		93	%	50 - 130
			7,12-Dimethylbenzanthracene	2016/11/02		78	%	50 - 130
			Fluoranthene	2016/11/02		81	%	50 - 130
			Fluorene	2016/11/02		81	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2016/11/02		84	%	50 - 130
			3-Methylcholanthrene	2016/11/02		89	%	50 - 130
			Naphthalene	2016/11/02		86	%	50 - 130
			Phenanthrene	2016/11/02		78	%	50 - 130
			Pyrene	2016/11/02		83	%	50 - 130
			2-Methylnaphthalene	2016/11/02		89	%	50 - 130
			1-Methylnaphthalene	2016/11/02		75	%	50 - 130
			1,3-Dimethylnaphthalene	2016/11/02		83	%	50 - 130
			2,3,5-Trimethylnaphthalene	2016/11/02		83	%	50 - 130
1686532	SD8	RPD	Acenaphthene	2016/11/02	2.4		%	50
			Acenaphthylene	2016/11/02	5.2		%	50
			Anthracene	2016/11/02	0		%	50
			Benzo(a)anthracene	2016/11/02	1.1		%	50
			Benzo(a)pyrene	2016/11/02	4.2		%	50
			Benzo(b)fluoranthene	2016/11/02	1.1		%	50
			Benzo(j)fluoranthene	2016/11/02	2.3		%	50
			Benzo(k)fluoranthene	2016/11/02	7.9		%	50
			Benzo(b+j+k)fluoranthene	2016/11/02	2.7		%	50
			Benzo(c)phenanthrene	2016/11/02	1.1		%	50
			Benzo(ghi)perylene	2016/11/02	3.5		%	50
			Chrysene	2016/11/02	1.2		%	50
			Dibenzo(a,h)anthracene	2016/11/02	3.0		%	50
			Dibenzo(a,i)pyrene	2016/11/02	3.3		%	50
			Dibenzo(a,h)pyrene	2016/11/02	2.1		%	50
			Dibenzo(a,l)pyrene	2016/11/02	3.7		%	50
			7,12-Dimethylbenzanthracene	2016/11/02	1.3		%	50
			Fluoranthene	2016/11/02	1.8		%	50
			Fluorene	2016/11/02	2.5		%	50
			Indeno(1,2,3-cd)pyrene	2016/11/02	8.5		%	50

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Batch	Init	QC Type		Analyzed				
			3-Methylcholanthrene	2016/11/02	1.7		%	50
			Naphthalene	2016/11/02	2.3		%	50
			Phenanthrene	2016/11/02	1.3		%	50
			Pyrene	2016/11/02	0.60		%	50
			2-Methylnaphthalene	2016/11/02	0		%	50
			1-Methylnaphthalene	2016/11/02	0.66		%	50
			1,3-Dimethylnaphthalene	2016/11/02	0.60		%	50
			2,3,5-Trimethylnaphthalene	2016/11/02	1.8		%	50
			Acenaphthene	2016/11/03	NC		%	50
			Acenaphthylene	2016/11/03	NC		%	50
			Anthracene	2016/11/03	NC		%	50
			Benzo(a)anthracene	2016/11/03	NC		%	50
			Benzo(a)pyrene	2016/11/03	NC		%	50
			Benzo(b)fluoranthene	2016/11/03	NC		%	50
			Benzo(j)fluoranthene	2016/11/03	NC		%	50
			Benzo(k)fluoranthene	2016/11/03	NC		%	50
			Benzo(c)phenanthrene	2016/11/03	NC		%	50
			Benzo(ghi)perylene	2016/11/03	NC		%	50
			Chrysene	2016/11/03	NC		%	50
			Dibenzo(a,h)anthracene	2016/11/03	NC		%	50
			Dibenzo(a,i)pyrene	2016/11/03	NC		%	50
			Dibenzo(a,h)pyrene	2016/11/03	NC		%	50
			Dibenzo(a,l)pyrene	2016/11/03	NC		%	50
			7,12-Dimethylbenzanthracene	2016/11/03	NC		%	50
			Fluoranthene	2016/11/03	NC		%	50
			Fluorene	2016/11/03	NC		%	50
			Indeno(1,2,3-cd)pyrene	2016/11/03	NC		%	50
			3-Methylcholanthrene	2016/11/03	NC		%	50
			Naphthalene	2016/11/03	54 (1)		%	50
			Phenanthrene	2016/11/03	NC		%	50
			Pyrene	2016/11/03	NC		%	50
			2-Methylnaphthalene	2016/11/03	71 (1)		%	50
			1-Methylnaphthalene	2016/11/03	61 (1)		%	50
			1,3-Dimethylnaphthalene	2016/11/03	65 (1)		%	50
			2,3,5-Trimethylnaphthalene	2016/11/03	67 (1)		%	50
1686532	SD8	Method Blank	D10-Anthracene	2016/11/02		88	%	50 - 130
			D12-Benzo(a)pyrene	2016/11/02		92	%	50 - 130
			D14-Terphenyl	2016/11/02		88	%	50 - 130
			D8-Acenaphthylene	2016/11/02		90	%	50 - 130
			D8-Naphthalene	2016/11/02		92	%	50 - 130
			Acenaphthene	2016/11/02	<0.1		mg/kg	
			Acenaphthylene	2016/11/02	<0.1		mg/kg	
			Anthracene	2016/11/02	<0.1		mg/kg	
			Benzo(a)anthracene	2016/11/02	<0.1		mg/kg	
			Benzo(a)pyrene	2016/11/02	<0.1		mg/kg	
			Benzo(b)fluoranthene	2016/11/02	<0.1		mg/kg	
			Benzo(j)fluoranthene	2016/11/02	<0.1		mg/kg	
			Benzo(k)fluoranthene	2016/11/02	<0.1		mg/kg	
			Benzo(b+j+k)fluoranthene	2016/11/02	<0.1		mg/kg	
			Benzo(c)phenanthrene	2016/11/02	<0.1		mg/kg	

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Benzo(ghi)perylene	2016/11/02	<0.1		mg/kg	
			Chrysene	2016/11/02	<0.1		mg/kg	
			Dibenzo(a,h)anthracene	2016/11/02	<0.1		mg/kg	
			Dibenzo(a,i)pyrene	2016/11/02	<0.1		mg/kg	
			Dibenzo(a,h)pyrene	2016/11/02	<0.1		mg/kg	
			Dibenzo(a,l)pyrene	2016/11/02	<0.1		mg/kg	
			7,12-Dimethylbenzanthracene	2016/11/02	<0.1		mg/kg	
			Fluoranthene	2016/11/02	<0.1		mg/kg	
			Fluorene	2016/11/02	<0.1		mg/kg	
			Indeno(1,2,3-cd)pyrene	2016/11/02	<0.1		mg/kg	
			3-Methylcholanthrene	2016/11/02	<0.1		mg/kg	
			Naphthalene	2016/11/02	<0.1		mg/kg	
			Phenanthrene	2016/11/02	<0.1		mg/kg	
			Pyrene	2016/11/02	<0.1		mg/kg	
			2-Methylnaphthalene	2016/11/02	<0.1		mg/kg	
			1-Methylnaphthalene	2016/11/02	<0.1		mg/kg	
			1,3-Dimethylnaphthalene	2016/11/02	<0.1		mg/kg	
			2,3,5-Trimethylnaphthalene	2016/11/02	<0.1		mg/kg	
1686532	SD8	RPD [DF0599-01]	Acenaphthene	2016/11/03	NC		%	50
			Acenaphthylene	2016/11/03	NC		%	50
			Anthracene	2016/11/03	NC		%	50
			Benzo(a)anthracene	2016/11/03	NC		%	50
			Benzo(a)pyrene	2016/11/03	NC		%	50
			Benzo(b)fluoranthene	2016/11/03	NC		%	50
			Benzo(j)fluoranthene	2016/11/03	NC		%	50
			Benzo(k)fluoranthene	2016/11/03	NC		%	50
			Benzo(b+j+k)fluoranthene	2016/11/03	NC		%	50
			Benzo(c)phenanthrene	2016/11/03	NC		%	50
			Benzo(ghi)perylene	2016/11/03	NC		%	50
			Chrysene	2016/11/03	NC		%	50
			Dibenzo(a,h)anthracene	2016/11/03	NC		%	50
			Dibenzo(a,i)pyrene	2016/11/03	NC		%	50
			Dibenzo(a,h)pyrene	2016/11/03	NC		%	50
			Dibenzo(a,l)pyrene	2016/11/03	NC		%	50
			7,12-Dimethylbenzanthracene	2016/11/03	NC		%	50
			Fluoranthene	2016/11/03	NC		%	50
			Fluorene	2016/11/03	NC		%	50
			Indeno(1,2,3-cd)pyrene	2016/11/03	NC		%	50
			3-Methylcholanthrene	2016/11/03	NC		%	50
			Naphthalene	2016/11/03	NC		%	50
			Phenanthrene	2016/11/03	NC		%	50
			Pyrene	2016/11/03	NC		%	50
			2-Methylnaphthalene	2016/11/03	NC		%	50
			1-Methylnaphthalene	2016/11/03	NC		%	50
			1,3-Dimethylnaphthalene	2016/11/03	NC		%	50

Maxxam Job #: B675459
Report Date: 2016/11/11

GHD Consultants Ltée
Client Project #: 11128193-A1
Site Location: PARC SALOURIN
Your P.O. #: 76204856
Sampler Initials: FA

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC				Date					
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	Units	QC Limits	
			2,3,5-Trimethylnaphthalene	2016/11/03	NC		%	50	
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).</p> <p>(1) Les résultats du duplicata excèdent le critère d'acceptabilité pour le RPD. Ceci est probablement dû à l'hétérogénéité de l'échantillon.</p>									

Maxxam Job #: B675459
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Client Project #: 11128193-A1
Site Location: PARC SALOURIN
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VALIDATION SIGNATURE PAGE

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



Caroline Bougie

Caroline Bougie, B.Sc. Chemist

David Provencher



David Provencher, B.Sc., Chemist

Nouredine Chafiaai



Nouredine Chafiaai, B.Sc., Chemist

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

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Section C
Mitigation Measures included in the
Application for the Certificate of
Authorization Pursuant to the
Loi sur la conservation et la mise en valeur
de la faune

Water and Sediment Quality

N°	Mitigation measures
Potential Accidents	
1	Inspect equipment and machinery prior to their entering the site and, in the event of a leak, immediately repair or exclude the machinery from the site.
2	Perform general maintenance and refueling of machinery at the locations identified by the Site Supervisor, at a distance larger than 30 m away from a watercourse.
3	<p>All machinery and equipment used on or within 20 m of the high water mark of a watercourse shall use hydraulic oil with:</p> <ul style="list-style-type: none"> • Biodegradable content of at least 80% and biodegradability certified according to OECD B301 or equivalent ($\geq 60\%$ biodegradability in 28 days). <p>The Contractor shall take the necessary measures to fully drain the machinery before filling with vegetable or biodegradable oil; A maximum of 5% of residual oil will be tolerated. The Contractor shall present documentation proving that the machinery is compliant.</p>
4	Take the necessary measures to ensure that the containers, portable tanks and movable tanks used comply with the manufacturing standards specified in the Petroleum Products Regulations (RSQ, c. P-29.1, r.2).
5	Store and handle hazardous materials and hazardous waste in accordance with federal, provincial and federal laws, regulations, codes and guidelines.
6	Provide and maintain emergency kits for spills of hazardous materials (portable bag) in all equipment used on site. These kits should include minimal absorbents (towels, puddings, peat moss, etc.), recovery bags and obturators (carpet, epoxy paste, etc.). Place well-identified leak tight containers at the site to receive oil residues and waste in the event of a spill.
7	The Contractor must have at all times an emergency petroleum recovery kit (barrels) at each site where work is being carried out on the site. The kit must include sufficient absorbent rollers to allow operation on the watercourse to contain petroleum products within the perimeter of the machinery involved by constructing a floating boom.
8	Establish a spill prevention and response plan and clearly identify the individuals and agencies in charge as well as the procedures to be followed in the event of an environmental emergency. The Contractor shall also provide an environmental protection plan as stated in the technical specifications.

N°	Mitigation measures
Potential Accidents (Cont'd)	
9	<p>Report any spills with environmental consequences to the following authorities:</p> <ul style="list-style-type: none"> • Environment Canada Emergency Department (1-866-283-2333) • Urgence Environnement du Québec (1-866-694-5454) and • Ville de Vaudreuil -Dorion (450-455-3371); <p>Recover contaminated materials, if applicable, and dispose of them with a firm authorized by MDDELCC.</p>
10	Develop and submit a fire safety plan to the Vaudreuil-Dorion Fire Department and the Pincourt Fire Department.
Suspended matter (Land Works)	
11	Sediment barriers or any other more effective technique approved by MDDELCC have to be installed along the working areas in order to protect the surface water and the sewer system. These barriers should be checked periodically to ensure their proper functioning.
12	The Contractor must plan the works such as to be able to protect water bodies from erosion and gulying and limit sediment transport to the Ottawa River. Temporary shoreline access will need to be stabilized if sediments are introduced into water bodies. An anti-erosion fence (sediment barrier) will be installed at Sabourin Park to prevent sediment input to water bodies and left in place at the end of the works.
13	Unless otherwise indicated by the Departmental Representative remove the temporary erosion control and sediment transport devices after completion of the works (except for the sediment barrier along the riparian protection strip at Sabourin Park).
14	It is prohibited to discharge into a watercourse water from pumping, drainage or any other source or activity, that contains suspended solids beyond the norm set by the Canadian Council of Ministers of the Environment (CCME) which is an increase of 25 mg/L compared to natural TSS content of the river.
15	If water is discharged into a sewer system, municipal regulations must be respected.
16	The Contractor shall submit a water management methodology to demonstrate that the water drained or pumped to a watercourse, sewer system or drainage or drainage system does not contain suspended solids in quantities exceeding the permitted thresholds.
17	Conduct regular inspections of areas of intervention to detect signs of erosion and transport of fine particles to water bodies; Implement appropriate corrective measures without any delay.
18	Work is prohibited within the 10-meter riparain protection strip (calculated from the high water mark - LHE), except for the access site to the river chosen by the Contractor in Sabourin Park.

N°	Mitigation measures
Suspended Matter (River Works)	
19	Restore the riparian strip damaged by the works (if any) as it happens, such as to reproduce the natural bank of the watercourse.
20	All granular material placed in the aquatic environment will be clean.
21	Whenever possible, develop spawning grounds from upstream to downstream so as not to increase the risk of deposition of fine sediment on newly placed spawning grounds.
22	Place materials directly on the river bottom instead of emptying the bucket during its descent.
23	During operations it is recommended to reduce the speed of descent and ascent of the hydraulic excavator and to avoid dragging the shovel on the bottom in order to flatten the surfaces to be worked.
24	Wherever possible, maximum TSS concentrations of 25 mg / l above normal concentrations should be maintained at 100 meters downstream of the work. In the event of an increase of 25 mg / l above natural concentrations, the Departmental Representative will convene a site meeting with the contractor to discuss steps to be taken to correct the situation quickly.
25	The Contractor is required to submit a work methodology demonstrating that all efforts have been expended to keep a maximum increase in TSS concentrations of 25 mg / l above the natural value of the river.
26	The movement of ground equipment (excavator or others) is prohibited in potentially exposed work areas in the river or in shallow water depths.
27	No temporary rock jetty will be allowed in the water.
28	Watercourses must be kept free of waste material or debris.
Soil Quality	
29	In order to preserve the archaeological potential of the areas used for construction and stockpiling (Park Sabourin and the MTMDET lot), soil deformation and rutting caused by the frequent passages of trucks should be avoided. The Contractor shall take the necessary measures to meet this constraint and present them in his methodology which shall be submitted after the award of the contract.
30	The proposed reinforcement method shall be developed in accordance with good engineering practice, such as, for example, in accordance with the MTMDET «Guide d'utilisation des géosynthétiques de separation et de renforcement des chaussées», which aims to limit deformation in unpaved roads to 35 - 75 mm. The method must take into account the Sabourin Park and the MTMDET lot land use plan, including the location of stockpiles, truck lanes, and truck shore access road.

N°	Mitigation measures
Soil Quality (Cont'd)	
31	The reinforcement method shall be maintained throughout the duration of the project works. For example lost aggregates should always be replaced such as to maintain the required thickness at all times.
32	If the method developed proves to be ineffective at Sabourin Park during the course of the project works, adjustments should be made. These adjustments would also be applied on the MTMDET lot as required.
33	Disposal of waste and scrap materials on site is prohibited.
34	Dispose of surplus materials, waste, tools and equipment off site.
Air Quality	
35	Use well-maintained and heavy machinery and equipment in good functioning order, in accordance with their operation characteristics by inspecting them before their entry to the work site.
36	Use trucks with air-tight or standard buckets as needed, covered with a tarp, to reduce fine particle air dispersion.
37	Wet dry materials and cover waste to prevent wind from carrying dust or debris.
38	Plan for wetting the stones on site in case their handling should generate too much dust.
39	Confine the movement of machinery on preferred routes within the intervention area and prohibit the movement of heavy machinery outside the designated areas.
40	Observe speed limits and allowable loads in order to maintain the quality of the road network and reduce noise and dust emissions.
41	Use dust suppressant when required on site: No dust suppressant that includes hygroscopic chloride salts will be used on site at a distance of less than 50 m from the river (BNQ 2410-300). Surfaces within this area will be treated only with water. During summer works, the Contractor will have to regularly wet the exposed surfaces (access roads, construction site).
42	Clean roads when needed.
43	Provide vehicles with a functional exhaust system.
44	Stop the engines of vehicles and gasoline equipment when not in use.

N°	Mitigation measures
Air Quality (Cont'd)	
45	<p>The following criteria for the emission of fine and total particulate matter should be respected: Fine particles (2.5 µm): 3 hours (35 µg / m³, Environment Canada), 24 hours (30 µg / m³; Annex K of the Clean atmosphere regulations)</p> <p>Total particulate matter: 1 hour (300 µg / m³, Clean air regulation replacing Community Regulations 44 and 44-1), 8 hours (190 µg / m³; Clean air regulation replacing Community Regulations 44 and 44-1).</p>
Land Vegetation	
46	Respect municipal regulation regarding trees.
47	Whenever applicable respect municipal regulation regarding construction permits that have to be obtained (excavation/fill).
48	Tree-cutting is allowed at Sabourin Park and the MTMDET lot. However the Contractor shall endeavor to limit tree-cutting to a minimum. Limits of the wooded area to be preserved at the MTMDET lot shall be respected (drawing 60444059-RV-D-1001).
49	Preserve and protect newly planted trees along the shoreline in Sabourin Park (planted as part of a citizen initiative), most of which are located within the 10-m wide protected riparian zone.
50	Protect trees and shrubs on adjacent properties.
51	Protect trees and shrubs that will not be cut on the site and stockpiling areas and trucking lanes. Encase with a protective wood casing from grade level to a minimum height of 2 m.
52	Avoid unnecessary traffic, dumping and storage of materials over root zones of protected trees.
53	Removal of topsoil from Sabourin Park and the MTMDET lot is prohibited during their use as site and stockpiling areas.
54	Proceed with the replanting works planned for the MTMDET lot (plan 60444059-RV-D-1001).
55	The Contractor shall take all necessary measures to protect riparian wetlands and aquatic grass beds in the study area (protection against mechanical destruction or high TSS content)
56	The Contractor shall minimize the movement of aquatic equipment between the work areas specified in the contract to avoid disturbance outside these zones.
57	In case of an unforeseen wetland degradation, the Contractor shall submit a site rehabilitation plan to PWGSC for approval.

N°	Mitigation measures
Invasive Exotic Species	
58	In the event of machinery having to be used in aquatic or riparian locations of the project area where invasive plant species are present (common reed, common purple loosestrife, reed canary grass listed at 5 locations), the Contractor shall clean all machinery that will be used in an environment that includes one of these species before working at another location so that it is free from mud, animal species or plant fragments. After the contract is awarded, a map showing the location of the detected invasive plant species will be provided to the Contractor. If other locations with invasive plant species are discovered during the work, the cleaning procedure for the machinery should be applied.
59	Any removed topsoil containing the seed of invasive species will be transported to a site authorized by the MDDELCC.
60	<p>For the floating equipment, the Contractor shall demonstrate that they are free of invasive species.</p> <ul style="list-style-type: none"> • For equipment that has been cleaned and stored onshore just prior to the start of the river works, the Contractor shall only be required to provide, in writing to the Departmental Representative, a list of such equipment, place of storage and the proposed date for launching. The Departmental Representative must be able to verify that the equipment has been properly cleaned and stored on land prior to the start of the work. • For equipment already in water, the Contractor must prove that his equipment has remained in the immediate area of the island of Montreal during the last 12 months or more, otherwise he must: <ul style="list-style-type: none"> ▪ Provide a written inspection report, immediately prior to mobilization of equipment to site, certifying that they are free of invasive species. The inspection report should be carried out by a biologist qualified in the identification of freshwater aquatic fauna. Sampling should be done by divers. The report shall contain, but is not limited to, the following information: the list of equipment inspected (tugboats, barges, etc.), date and place of inspection, summary of sampling protocols, identification, list of samples, a table of results and an attestation regarding the presence or absence of invasive species. The report must contain photographs and be signed by the competent biologist before being handed over to the project manager together with the other required contractual documents before mobilizing the equipment on the site of the works.

N°	Mitigation measures
Invasive Exotic Species (Cont'd)	
60 (Cont'd)	<ul style="list-style-type: none"> ▪ In the event that the inspection report confirms the presence of invasive species, the Contractor shall be required to replace the equipment or to complete the cleaning of the equipment at his own expense. The description of the cleaning work carried out should be included in the new inspection report (after cleaning) with all the relevant information mentioned above. ▪ The Departmental Representative reserves the right to seek a second opinion at any time.
61	In the event that invasive species are observed, the Contractor shall interrupt the work and carry out, at his own expense, the cleaning of the affected equipment and follow the procedure mentioned above.
Fish Population and Habitat	
62	Periods of annual restrictions on water works are from March 15 th to July 1 st for lotic water zones and from March 15 th to September 15 th for lentic water zones.
63	Apply all the mitigation measures to protect water quality (potential accidents, suspended solids during work on land and river).
64	Install silt curtains for suspended sediments according to Plan C-1002 to protect the most important aquatic grassland areas that can be used as feeding areas by the copper redhorse (see details in the Specifications document)
65	The Contractor shall take all necessary measures to protect riparian wetlands and aquatic grass beds in the study area (protection against mechanical destruction or high TSS content).
66	The Contractor shall limit the movement of aquatic equipment to the work zones specified in the contract in order to avoid disturbance in areas outside these zones.
67	In case of an unforeseen wetland degradation, the Contractor shall submit a site rehabilitation plan to PWGSC for approval.
68	Apply all the mitigation measures which aim at preventing the propagation of invasive exotic species.
Special Status Species	
69	Periods of annual restrictions on water works are from March 15th to July 1st for lotic water zones and from March 15th to September 15th for lentic water zones.
70	Apply all the mitigation measures to protect water quality (potential accidents, suspended solids during work on land and river).

N°	Mitigation measures
Special Status Species (Cont'd)	
71	Install silt curtains for suspended sediments according to Plan C-1002 to protect the most important aquatic grassland areas that can be used as feeding areas by the copper redhorse (see details in the Specifications document)
72	Install silt curtains for suspended sediments according to Plan C-1002 to protect the colonies of hornleaf riverweed (see details in the Specifications document).
73	Proceed with the relocation of the hornleaf riverweed as described in Section 329225.
74	The Contractor shall take all necessary measures to protect riparian wetlands and aquatic grass beds in the study area (protection against mechanical destruction or high TSS content).
75	The Contractor shall limit the movement of aquatic equipment to the work zones specified in the contract in order to avoid disturbance in areas outside these zones.
76	In case of an unforeseen wetland degradation, the Contractor shall submit a site rehabilitation plan to PWGSC for approval.
77	Due to the potential presence of the Spiny Softshell Turtle and Geographic Turtle, any nesting indicator in site areas or stockpiling areas for the selected materials shall be reported to the Departmental Representative and measures will be taken to protect these species.
Quality of Life - Sound Environment	
78	The Contractor shall provide a noise prevention plan, specifying measures to maintain the noise at levels that meet the MDDELCC criteria during construction. Special attention must be paid to the "Manoir Des Îles" retirement home adjacent to Sabourin Park and the Pincourt Municipal Housing Office.
79	The works will take place according to a schedule that abides by the applicable regulation.
80	The Departmental Representative will put in place a communication procedure that will allow citizens to be informed about the site's noise management and to make complaints or comments if necessary.
81	Ambient noise levels shall be assessed prior to the commencement of the work by a specialized firm mandated by the Departmental Representative. In the event of complaints regarding noise levels, a site meeting will be held immediately and acoustic measurements will be taken during the work. The measurement protocol (frequency and location of measurements) will be established at the site meeting according to the problem encountered and the construction methods will be adjusted to reduce the sources of noise. If necessary, additional mitigation measures will have to be implemented to reduce noise levels.

N°	Mitigation measures
Quality of Life - Sound Environment (Cont'd)	
82	<p>The guidelines "Lignes directrices relativement au niveau sonore provenant d'un chantier de construction industriel" issued by the Ministry of Sustainable Development, Environment and Climate Change shall be applied:</p> <ol style="list-style-type: none"> .1 All reasonable and feasible measures shall be taken by the Contractor to ensure that the acoustic rating level (LAr, 12h) from the construction site is equal to or less than the highest of the following noise levels: 55 dB or the level Of initial noise if it is greater than 55 dB. This limit applies to any reception point where the occupancy is residential or the equivalent (hospital, institution, school) .2 It is agreed that there are situations where the constraints are such that the Contractor cannot perform the work while respecting these limits. If necessary, the Contractor is required to: <ol style="list-style-type: none"> .a Anticipate these situations as early as possible, identify and circumscribe them. .b Specify the nature of the work and the noise sources involved. .c Justify the construction methods used in comparison with possible alternatives. .d Demonstrate that all reasonable and feasible measures are taken to minimize the extent and duration of exceedance. .e Estimate magnitude and duration of expected exceedances. .f Plan follow-up actions to assess the actual impact of these situations and to take corrective action as necessary.
83	Use equipment that generate reduced noise levels. Ensure that the equipment used is equipped with a good quality muffler in working condition.
84	Place noisy equipment away from sensitive areas (residences) whenever possible.
85	Maintain well leveled access roads to reduce truck impact noise.
86	Set up variable intensity alarms for vehicles moving backward.
87	Limit the use of engine brakes to emergency situations.
88	Turn off any electrical or mechanical equipment that is not in use.
89	Avoid impact sound from rear panels of dump trucks and adopt methods of unloading materials to minimize impact noise.

N°	Mitigation measures
Cleaning	
90	Throughout the works clean the streets used by vehicles and machinery to ensure cleanliness when needed.
Traffic management and security	
91	The Contractor shall submit his Traffic Management Plan for approval within ten (10) business days of the award of the Contract. This traffic management plan should plan to minimize traffic obstructions during peak hours and take into account other adjoining construction sites planned during the work period.
92	To ensure smooth traffic on Harwood Boulevard, a restriction will be imposed on the Contractor for all travel between Sabourin Park and the MTMDET lot. No traffic lights will be permitted for a left turn at the exit of Sabourin Park.
93	The Contractor shall plan his work so as to prohibit the transport by truck of bulk material between the MTMDET lot and the Sabourin Park and any other transport of bulk material from the west of the Taschereau Bridge during periods of morning rush hour on working days, between 6:30 am and 9:00 am.
94	The Contractor shall provide measures to reduce soil scour caused by the movement of construction vehicles, particularly in rainy weather.
95	Confine the movement of machinery on preferred routes within the intervention area and prohibit the movement of heavy machinery outside the designated areas.
96	Observe speed limits and allowable loads in order to maintain the quality of the road network and reduce noise and dust emissions.
97	Provide a signaler at Sabourin Park entrance at all times during actual trucking operations to ensure safe movement of Manoir des Îles residents, cyclists and pedestrians, as well as management of entrances and exits of the work site, including sound management of traffic on the road network adjacent to the work area. When and if needed, provide a signaler to manage access to the MTMDET lot.
98	The portion of Sabourin Avenue between Harwood Boulevard and the entrance to the Manoir des Îles parking lot must be kept clear of obstructions at all times. In case of use by ambulances, the latter will have priority.
Recreational activities	
99	Issue notices to the public to keep them informed of the stages of work affecting the aquatic environment, in particular to limit the disturbance to recreational fishing and navigation activities.
100	Issue notices aimed at navigation to inform boaters or works in progress.

N°	Mitigation measures
Recreational activities (Cont'd)	
101	The navigation channel will not be impeded during construction.
102	Delineate precisely the work zone
103	The Contractor shall provide access at all times to the Canadian Coast Guard crews responsible for the marking of the navigation channel. The dates of marking operations are normally between 15 May 15 th and June 15 th and after October 15 th for the removal of the markings.
Archeology	
104	No excavation of soil is permitted under this project at Sabourin Park. At the MTMDET lot, localized small-scale excavation may be permitted during site rehabilitation at the completion of the work (such as for tree planting for example). Any excavation or other activity susceptible of interfering with potential archeological resources shall be subject to the approval of the Departmental Representative.
105	Any work recognized as potentially interfering with existing vestiges may be monitored by an archaeologist if requested by the Departmental Representative.
106	<p>If discoveries are made during the execution of the works, the following measures must be respected:</p> <ol style="list-style-type: none"> .1 The Contractor shall notify the Departmental Representative of any archaeological discoveries (remnants of construction or installations, objects and fragments of objects) on the premises and wait for his written instructions before continuing work at the place of discovery. .2 Remnants, antiques and other items with some historical, archaeological or scientific interest (remains, object or object fragment) found on site remain the property of Canada. The Contractor shall protect and obtain instructions from the Departmental Representative in this regard. .3 A plan showing the evolution of the built environment on the Sabourin Park will be made available to the Contractor after the award of the contract.