s.16(2)(c)

From: Enright, Colin
Sent: August 8, 2019 8:59 AM
To: Sargeant, Anne
Cc: Moroz, Marek
Subject: PR Request - HL Barn Rehab - Proj 311_01 ECO
Attachments: P19126348_1000 Meech Lake_EEA_5July2019.pdf; RE: HL Barn Rehab - Approval to use SOA

Importance: High

Categories: Financial

Bonjour Anne,
Could you prepare a PR for the following:

PR for HL Barn Rehab Ecological Characterization Report & EEE
Proj. No.: 311_01
Distribution: 311_01 (100%)
PR Amount : $15,323.00 +Tax (GST/QST) (Quebec)
SOA: w/ NCC Env. Approval
Firm :
Est. Completion Date : Dec 2019
Attachments: RFR excel sheet; Proposal, Use of SOA Approval

Merci!

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
☎613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

PROPOSAL

Natural Environment Investigation and Environmental Effects Analysis for a Heritage Building

1000 Meech Lake Road, Chelsea, Quebec

Submitted to:

National Capital Commission
Mr. Colin Enright, RSE
Project Officer, Design and Construction Branch
202-40 Elgin Street
Ottawa ON, K1P 1C7

Submitted by:

P19126348 Rev 1

July 5, 2019

Distribution List

1 e-copy - National Capital Commission

1 e-copy

Table of Contents

1.0 INTRODUCTION

is pleased to submit this proposal to the National Capital Commission (NCC) to conduct Natural Environment Investigation Services and prepare an Environmental Effects Analysis (EEA) for proposed rehabilitation works of the abandoned storage barn located at a heritage property at 1000 Meech Lake in Gatineau Park, Chelsea, Quebec.

This proposal is in response to a Request for Proposal (RFP) received from the NCC by email on June 19, 2019, and the subsequent email with clarifications received on July 4, 2019.

2.0 SCOPE OF WORK

understands that the objective of the Natural Environmental Investigation services would be to identify Natural Environmental considerations associated with the future Project Area, and provide recommendations as necessary to fulfill requirements set forth within applicable Federal regulations, including but not limited to *Species at Risk Act* (SARA) and *Canadian Environmental Assessment Act, 2012* (including any Act revisions[1]).

confirms that it understands and agrees to perform the scope of work outlined in the Terms of Reference, which includes provision of materials, labour, tools, and equipment necessary to complete the Work to gather data sufficient to satisfy applicable legislation, regulations, and permits based on our professional experience and understanding of the typical expectations of the relevant regulators.

The Natural Environment Investigation scope of work will include the following surveys: vegetation, tree inventory, wildlife, bat and migratory birds. This includes identification of Species at Risk (SAR) and critical habitat, as well as other natural features as outlined in the Terms of Reference provided by NCC for this project.

The scope of work for the EEA report will include a description of the potential adverse environmental effects of the project, recommendations for effective and established mitigation measures to minimize environmental effects, and identification of the environmental permits and authorizations expected to be required to execute the project.

Additional scope is included for meetings and coordination of project team members, as requested by the RFP.

The approximate boundaries of the Site were defined in an email from the NCC to dated June 19, 2019, and will be considered for the purpose of defining the study areas for both tasks.

2.1 Natural Environmental Investigation Services

2.1.1 Review of Existing Data

will conduct a desktop review of published natural heritage data and information available for the Site and vicinity. This information with serve to identify significant natural features as well as SAR and migratory birds known to be present, or having the potential to be present. Information sources to be consulted include, but are not limited to:

- Existing information and reports available from NCC including the designated substances survey of the barn structure 2019)
- Environment Canada's Species at Risk Public Registry including COSEWIC status reports, assessments, and recovery strategies

[1] Bill C-69, *An Act to enact the Impact Assessment Act and the Canadian Energy Regulator Act, to amend the Navigation Protection Act and to make consequential amendments to other Acts*, received Royal Assent on June 21, 2019. As a result, CEAA 2012 will be repealed and replaced by the Impact Assessment Act (IAA). While the timing of this is unknown, the proposed IAA has requirements similar to Section 67 of CEAA 2012 which requires a determination of significance of environmental effects on federal lands.

- eBird online database
- Bat Conservation International
- Quebec Breeding Bird Atlas (QBBA)
- Centre de données sur le patrimoine naturel du Québec (CDPNQ)
- Atlas des amphibiens et des reptiles (AARQ) from the Société d'histoire Naturelle de la vallée du Saint-Laurent (SHNVSL)
- Existing aerial photography

2.1.2 Species at Risk Screening

A Species at Risk (SAR) screening will be completed for the Site and will focus on the review of records and range maps pertaining to species that are designated as SAR under the *Loi sur les Espèces Menacées ou Vulnérables* (LEMV), the *Species at Risk Act* (SARA), and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Results of the background data compilation and review will be used for the SAR screening. The habitat characteristics of the designated species identified will be reviewed and compared to the habitats on the Site to determine the probability of each species, or its habitat, being present.

Data from the site investigations described below will be used in combination with the desktop data to determine a final probability of SAR and/or SAR habitats within the Site. Known or potential critical habitat of SAR, as defined under SARA will be identified.

2.1.3 Field Surveys

The following field surveys will be conducted at the Site. Where applicable, field surveys will be guided by relevant Canadian Wildlife Services or provincially recommended protocols. A health and safety plan will be prepared before field surveys begin.

2.1.3.1 Plants and Plant Communities (Flora)

These surveys will also focus on plant SAR, and SAR habitat, but all species encountered will be inventoried. The locations of any plant SAR observed will be recorded using a hand-held GPS unit, and notes relating to the number of individuals, condition, and date(s) observed will be noted. In addition, habitat structure and features specific to the habitat requirements of the potential plant SAR will be assessed.

Alien Invasive Plants

During the plant community surveys, alien invasive species present will be identified and inventoried at the Site. A list of all alien invasive species identified at the Site will be prepared, as well as a map showing the extent of their distribution at the Site, and a description of each species.

Tree Assessment

will perform an assessment of any trees that may be affected (directly or within the critical root zone) that are > 10 cm diameter-at-breast-height (DBH). The assessment will include consideration of the health, size (DBH) and species of the specimen affected. A GPS coordinate for each tree assessed will be taken.

2.1.3.2 Wildlife and Wildlife Habitat (Fauna)

During all field surveys, area searches for wildlife will be conducted. These visual encounter surveys will be conducted following recommended procedures (McDiarmid 2012; Bookhout 1994; Pyle 1984), where possible. All species observed (including direct observations, calls, tracks and other signs) will be recorded. Specific attention will also be paid to searching for suitable habitat for SAR, as well as potential habitat.

The locations of any SAR observed will be recorded using a hand-held GPS unit, and notes relating to the number of individuals, condition / behaviour, and date(s) observed will be recorded. A list of all wildlife species identified will be prepared.

2.1.3.3 Nesting Migratory Birds and Avian Species at Risk

To identify the potential nesting of birds protected under the Migratory Birds Convention Act (MBCA), the Site will be searched for active nests. Any active or inactive nests observed will be marked using a hand-held GPS unit.

Eastern Whip-poor-will

Two surveys for eastern whip-poor-will will be conducted between June 15 – July 15, 2019. The surveys will generally follow the protocols provided in Protocole Canadien d'Inventaire des Engoulevents (2018), but will be modified to suit the Site (i.e. not a roadside survey). A single point location will be identified at the Site, and the survey will last for six minutes. The survey will be conducted during appropriate weather conditions (low wind and no rain) and will begin 30 minutes before sunset. The number of individuals, distance (> or < 100m) and direction of each bird heard during the survey will be recorded. These surveys will be performed concurrent with the bat surveys described below.

Barn Swallow

Barn swallows will be searched for during all survey events, with special attention paid to locating any active or inactive nests of this species in or on the exterior of the barn structure. Locations will be recorded using a hand-held GPS unit, notes on the location will be taken, and photographs of each nest will be taken.

2.1.3.4 Bat Surveys

will conduct site investigations to determine whether bats, specifically SAR bats, are using the structure or nearby trees at the Site for maternity roosting, and will consist of three components: a daytime habitat survey; two evening exit surveys; and acoustic monitoring concurrent with the exit surveys, as described below.

A daytime habitat survey will be conducted on the exterior and interior of the structure. This will involve searching the structure for potential entry / exit holes through which bats may gain entry, and evidence of use such as guano. Potential entry / exit holes will be documented through photographs and detailed location descriptions.

Crepuscular exit surveys will be conducted in accordance with the Protocole pour un decompte de chauve-souris dans une maternité (MFFP, April 2017). The surveys will consist of two surveyors observing the structure (positioned at opposite corners in order to each have a clear view of two sides of the structure), searching for bats exiting the structure over the course of two nights in July 2019. Surveys will consist of observing the structure from 30 minutes before sunset to 60 minutes after sunset to watch for bats exiting the roost, during appropriate weather conditions (i.e., low or no wind, no precipitation). A count of bats observed exiting the structure, as well as the location of the exit, will be made to the extent possible.

If suitable roost trees are observed at the Site, additional surveyors may be needed in order to monitoring those features during the exit surveys, which will be scoped and costed separately.

One acoustic bat detector will be deployed in close proximity to the structure and be programmed to record bat calls during the exit surveys. The data will be analyzed and auto-classified using SonoBat 4.2.1 nnE. The Sonobat program is specifically intended for discrimination of bats to the species level wherever possible, and validation of the species-level classification will be conducted by bat acoustic specialist.

2.1.4 Reporting: Ecological Characterization Report (Draft and Final)

The results of the desktop review, agency consultation and Site investigations will be summarized in an Ecological Characterization report, with supporting information including appendices and figures. The report will describe the existing conditions at the Site, including significant natural features including SAR, known to be or potentially present. The report will be prepared in English, and it will be suitable to support provincial or federal authorizations, if applicable, for the proposed project and include all required information relating to migratory birds and SAR.

will prepare a first draft of the report and submit it to the NCC for review and comment in Microsoft Word. After receiving one round of consolidated comments, the draft will be revised, and an updated version will be provided for NCC final review, in Microsoft Word. The final report will be prepared following a single round of consolidated comments on the second draft, and provided in Microsoft Word and PDF formats. will also provide all relevant shapefiles prepared for the project, and GPS coordinates of any SAR or other significant features identified at the Site.

2.2 Environmental Effects Analysis

will complete an EEA and document the findings in a report in accordance with Section 67 of CEAA 2012, to identify potential environmental effects associated with the proposed improvements, propose mitigation measures, and support the NCC's determination of whether significant adverse environmental effects may result from the proposed activities.

proposes to conduct a desktop review of previous studies completed for the Project and any resources and information provided by the NCC, to identify the Project activities, environmental setting and potential environmental effects. will also review published data and information available for the Project site and surrounding area. The results of the Ecological Characterization tasks (i.e., natural environment assessment, including a desktop species at risk screening) will be used to further define the baseline conditions and potential environmental effects.

will rely on information and resources provided by the NCC to the extent possible. It is understood that this will include the Designated Substances Survey completed for the Storage Barn by in June 2019, and materials prepared for the Federal Land Use, Design and Transaction Approvals (FLUDTA) process.

2.2.1 Reporting: Environmental Effects Analysis Report (Draft and Final)

The EEA report will be prepared using the template to be provided by the NCC and following the guidance listed in the RFP, including the Canadian Environmental Assessment Agency's *Interim Guidance for Projects on Federal Lands – Making a Determination under Section 67 of the Canadian Environmental Assessment Act 2012* (Canadian Environmental Assessment Agency 2014). The EEA report will include a description of each of the following required subjects:

- Project Identification (e.g., title, location, contacts).
- Project Description and Description of the Environment (e.g., the project description, including phases, components and activities, scheduling, and baseline environment description for the biophysical and socio-economic environment).

- Identification of Environmental Effects.
  - The EEA report will identify, describe, and evaluate the potential environmental effects of the scope of work, including environmental effects caused by malfunctions, accidents, and unplanned events that could occur in connection with the project. The identification of the environmental effects and project components scoped into the report will be summarized using an interactions matrix.
- Description of Established and Effective Mitigation Measures and Other Environmental Effects and Mitigation Measures (for all phases of the Project).
  - The EEA report will identify all technically and economically feasible mitigation measures to address potential environmental effects at the Project site.
- Determination of the Effects Analysis.
  - The EEA report will identify any significant residual environmental effects that may remain after the implementation of mitigation measures.
- Environmental monitoring program, if required.
- Anticipated permits or approvals.
  - Anticipated permits or approvals required for the works will be included as an appendix to the report.

The preparation of the EEA report is tied to the schedule for completion of the other tasks included in this proposal (e.g., inputs from the field studies), as well as the detailed design to be provided by the NCC's design consultant.

has assumed two rounds of client reviews on the draft reports prior to finalizing. will prepare a first draft of the report in English and submit it to the NCC for review and comment, in Microsoft Word format. After receiving one round of consolidated comments, the draft will be revised, and an updated version will be provided for NCC final review, in Microsoft Word. The final report will be prepared following a single round of consolidated comments on the second draft, and provided in Microsoft Word and PDF formats. The final EEA will be provided in English.

2.3 Project Coordination and Management

Scope has been included for the Ecology Lead and EEA Lead to attend one kick-off meeting. The EEA Lead will attend one EEA draft review meeting. It is assumed that these meetings will be via conference call. The team will coordinate as required with project team members to ensure consistency between the deliverables and will communicate with the NCC throughout the process as required.

Invoices will be provided to the NCC on a monthly basis. All invoices will include the description of the task, staff enlisted to carry out the task, and number of hours per staff.

2.4 Species at Risk Act Permit Application

At this time, the need for a permit under the *Species at Risk Act* (SARA) is not known. If SAR listed as endangered or threatened on Schedule 1 of the SARA are confirmed to be utilizing the Site, will coordinate preparation of a draft SARA permit application, with input from the NCC (e.g., Sections 1.2, 1.3, 2.1, 2.2, 2.6, 4.2, provision of relevant materials for appending to the application, etc.). will provide a draft application to NCC for review and following one round of minor edits, will finalize the application. assumes that the NCC sill sign the permit application and will submit the application to ECCC. Additional rounds of edits, or consultation with ECCC will be a scope change.

3.0 PROPOSED SCHEDULE

confirms that it has the capacity and ability to perform the scope of work to produce the deliverables outlined in the Terms of Reference within the established dates. proposed schedule is provided in Table 1. This proposed schedule is approximate and may be altered in discussion with the NCC, pending requirements of NCC, delays on review of the draft reports, or other unforeseen circumstances. Significant changes to the schedule will be communicated to the NCC for approval immediately.

Table 1: Proposed Schedule

Task	Timing
Kick-Off Meeting	July 2019
Desktop Review	July 2019
Field Visit 1 – Flora, Wildlife Habitat	Early July 2019
Field Visit 2 – Evening Survey (Bats and Whippoorwill)	Mid-July 2019
Field Visit 3 – Evening Survey (Bats and Whippoorwill)	Mid-to-late July 2019
Draft Environmental Effects Analysis (EEA) Report #1	August 8, 2019
Draft Environmental Characterization Report	August 22, 2019
Draft EEA Report #2	
EEA Draft Review Meeting	Week of August 26, 2019
Final EEA Report	Week of September 2, 2019 (no later than September 2, 2019)
Final Environmental Characterization Report	

4.0 COST ESTIMATE

A summary of the upset (maximum) amount per task, including all professional fees and expenses, described in this proposal are provided in Table 2. The total estimated cost for the above scope of work is **$15,323 CAD** (excluding applicable taxes). In addition, an estimate to prepare, coordinate and submit a SARA Permit application, as necessary based on the results of the Natural Environment field conditions, has been included; however, this has been subtotaled separately in Table 2 as it is not certain what level of work, if any, will be required for this task.

The cost estimate has been calculated using the rates identified in Annex 1 of the Standing Offer Agreement for Environmental Effects Analysis Services (SOA # .

The requested Fee Schedule has been completed and is attached as Appendix A.

Table 2: Proposed Cost Estimate

Task	Description	Labour: Principal	Senior Scientist / Engineer	Intermediate Scientist / Engineer	Junior Scientist / Engineer	Technician/ Technologist (Ecology)	Technician/ Technologist (CAD/GIS)	Administrative Support	Total Labour Hours	Total Labour Costs	Disbursements	Project Totals
1	**Data Gathering**	**0.0**	**0.0**	**0.0**	**6.0**	**0.0**	**0.0**	**0.0**	**14.0**		$ -	
	Review and Compile Baseline Data - Ecological report		2.0		6.0				8.0			
	Review and Compile Baseline Data - EEA				6.0				6.0			
2	**Field Survey**	**0.0**	**8.0**	**0.0**	**0.0**	**13.0**	**0.0**	**0.0**	**21.0**			
a	Vegetation Survey/Tree Inventory					2.5			2.5			
b	Wildlife and Habitat Survey					2.5			2.5			
c	Bat Survey		6.0			6.0			12.0			
d	Migratory Bird Survey		2.0			2.0			4.0			
3	**Analysis**	**4.0**	**17.0**	**4.0**	**14.0**	**6.0**	**3.0**	**1.0**	**49.0**		$ -	
	Ecological Analysis and Draft Reporting		16.0	4.0	4.0	6.0		1.0	31.0			
	EEA Analysis and Draft Reporting	4.0	1.0		10.0				15.0			
	Figures/Metrics						3.0		3.0			
4	**Meetings & Revisions**	**7.0**	**9.0**	**0.0**	**4.0**	**0.0**	**2.0**	**0.0**	**22.0**		$ -	
	Kick-off Meeting	2.0	2.0						4.0			
	EEA Draft Review Meeting	2.0							2.0			
	Ecological Report Revisions (address client comments)		7.0				2.0		9.0			
	EEA Revisions (address client comments)	3.0			4.0				7.0			
5	**Reporting**	**2.0**	**3.5**	**0.0**	**3.0**	**0.0**	**1.0**	**1.0**	**10.5**		$ -	
	Final Ecological Report	1.0	3.0					1.0	5.0			
	Final EEA Report	1.0			3.0				4.0			
	Supplemental Data		0.5				1.0		1.5			
6	**Project Coordination**	**0.0**	**4.0**	**0.0**	**0.0**	**0.5**	**0.0**	**0.0**	**4.5**		$ -	
	Project Team Communication		2.0						2.0			
	Administration (invoicing, security clearance)		2.0			0.5			2.5			
	Subtotal	**13.0**	**41.5**	**4.0**	**27.0**	**19.5**	**6.0**	**2.0**	**121.0**			
7	SARA Application	**1.0**	**14.0**	**0.0**	**4.0**	**0.0**	**1.0**	**1.0**	**21.0**		$ -	
		1.0	14.0		4.0		1.0	1.0	21.0			
	Total	**14.0**	**55.5**	**4.0**	**31.0**	**19.5**	**7.0**	**3.0**	**142.0**			$ 15,323

5.0 ASSUMPTIONS

This proposal scope and cost estimate are based on the following assumptions:

- A kick-off meeting and meeting to review the draft EEA will be required.
- The final report timing is dependent upon timely review of the draft reports by NCC. assumes NCC will need a minimum of 10 business days for review each of the two drafts. will alter the schedule, as needed, in consultation with NCC.
- If the results of the surveys identifies the need for addition surveys, recommendations for a scope change and updated cost estimate will be provided to NCC for consideration.
- is not responsible for conducting consultation and engagement with the public, Aboriginal peoples and stakeholders. All information pertaining to previous and current consultation will be provided to in a timely manner.
- It is anticipated that the information to be made available to by the NCC will meet the baseline data and information needs to complete the EEA. Scope has not been included to complete archaeological assessments or other studies beyond what is outlined in this proposal.
- Information collection, research and/or consultation with other agencies and stakeholders to prepare the report is not included.
- It is understood that there is no active use of the Project site by Aboriginal peoples
- NCC Corporate Security services will obtain, at no cost to Site Access security clearance for all staff needing to access the Site. It is assumed security clearances will be obtained in a timely manner in order to allow for the time-sensitive surveys to occur (i.e. prior to July 12, 2019).
- Scope has not been included for translation or coordination of a translator.

6.0 PROJECT TEAM

7.0 LIMITATIONS

The information presented in this proposal document is proprietary and has been prepared and submitted in confidence solely for consideration by the NCC. The contents of this proposal document are not to be communicated, disclosed, duplicated, or distributed in whole or in part to anyone or any organization outside of and the NCC without the express written permission of

Likewise, understands that all material related to this project is to be considered confidential.

8.0 CLOSURE

We trust that this proposal meets with your approval. We look forward to being of service to you on this interesting project. If you have any questions or wish us to alter this proposal to better suit your needs, please feel free to contact the undersigned.

Ecologist *Associate, Senior Environmental Impact Assessment Specialist*

APPENDIX A

Fee Schedule

NATIONAL CAPITAL COMMISSION

ENVIRONMENTAL INVESTIGATION SERVICES AND EEA, 1000 MEECH LAKE, ASSET #94038

FILE: DC-XXXX-XX-XX FEE SCHEDULE **REVISION 1**

Item No.	Description	Unit	Estimated Quantity	Unit Price	Amount
ENVIRONMENTAL INVESTIGATION SERVICES AND EEA, 1000 MEECH LAKE, ASSET #94038					
1	General Conditions & Scope of Work Tasks # 1, 3, 4, 5, 6	Lump Sum	100		
2	Vegetation survey, Scope of Work Tasks #2a	Lump Sum	2.5		
3	Wildlife Survey, Scope of Work Tasks #2b	Lump Sum	2.5		
4	Bat Survey, Scope of Work Tasks #2c	Lump Sum	12		
5	Migratory Bird Survey, Scope of Work Tasks #2d	Lump Sum	4		
6	Disbursements	Lump Sum	-		
7	**SARA Permit Coordination and Application, Scope of Work Task 7**	**Lump Sum**	21		
Total before taxes					$15,323
GST / QST 14.975%					$2,294
Proposal Total					$17,616

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is withheld pursuant to section

est retenue en vertu de l'article

16(2)(c)

of the Access to Information Act

de la Loi sur l'accès à l'information

From: Leclerc-Morin, Isabelle
Sent: August 8, 2019 8:58 AM
To: Enright, Colin
Cc: Moroz, Marek
Subject: RE: HL Barn Rehab - Approval to use SOA

Approved.

From: Enright, Colin
Sent: Thursday, August 08, 2019 7:41 AM
To: Leclerc-Morin, Isabelle
Cc: Moroz, Marek
Subject: HL Barn Rehab - Approval to use SOA

Good Morning Isabelle,

Could I have your approval to use the for the ECO & EEE on the HL Barn Rehab Project?
Thanks.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
☎613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE

PURCHASE ORDER / BON DE COMMANDE

PO-009037-2

BILL TO:
National Capital Commission
Accounts Payable
202 - 40 Elgin Street
Ottawa, ON K1P 1C7
or / ou : email / courriel :

FACTURER À:
Commission de la capitale nationale
Comptes fournisseurs
40 rue Elgin, pièce 202
Ottawa, ON K1P 1C7
payables@ncc-ccn.ca

SHIP TO / EXPÉDIER À:
National Capital Commission
202 - 40 Elgin Street
OTTAWA, ON K1P 1C7
CAN

CONFIRMATION DATE / DATE DE CONFIRMATION
13-Aug/Aoû-2019
VENDOR NUMBER / NUMÉRO DU FOURNISSEUR
PURCHASE AGREEMENT NUMBER / NUMÉRO DE L'OFFRE D'ACHAT
TOTAL AMOUNT / MONTANT TOTAL (CAD)
$17,617.62

SUPPLIER / FOURNISSEUR:

CAN

BUYER / ACHETEUR:
Thara Abraham

CONTACT PERSON / PERSONNE RESSOURCE:
Dominique Gagnon
613-239-5678, ext.5631
dominique.gagnon@ncc-ccn.ca

LINE LIGNE	DESCRIPTION	DELIVERY DATE DATE DE LIVRAISON	AMOUNT MONTANT
1	Environmental Characterization Services & EEA at HL Barn as per proposal# P19126348 Rev 1 dated 05 July 2019	02-Sep/Sep-2019	$15,323.00

NOTE TO SUPPLIER / AU FOURNISSEUR :
PAYMENT TERM/MODE DE PAIEMENT: Net 30 days/jours
SHIP VIA / MODE DE LIVRAISON : Carrier of Supplier / Transporteur du fournisseur
F.O.B. / F.A.B. : Destination
SHIPMENT COSTS / FRAIS DE TRANSPORT : Included / Inclus

SUB-TOTAL / SOUS-TOTAL :	$15,323.00
TAX / TAXES :	$2,294.62
TOTAL :	$17,617.62

Note to Supplier: A representative of the NCC Corporate Security may communicate with you to address the security requirement(s) of this transaction.
Note au fournisseur: Un représentant de la sécurité de la CCN pourrait communiquer avec vous afin d'aborder l'aspect de sécurité de cette transaction.

To ensure prompt payment, please prepare your invoice in accordance with the prices quoted and clearly indicate the Purchase Order number. Errors in invoicing can cause delay of payment. THE TOTAL AMOUNT INCLUDES ALL APPLICABLE TAXES. IF YOU ARE NOT AUTHORIZED TO COLLECT THOSE TAXES, THE NCC WILL PAY THEM DIRECTLY TO THE GOVERNMENTS.

Afin de vous assurer d'un règlement rapide, veuillez préparer votre facture selon les prix cotés et indiquer clairement le numéro de bon de commande. Des erreurs dans la facturation peuvent causer des délais de paiement. LE MONTANT TOTAL INCLUT TOUTES LES TAXES APPLICABLES. SI VOUS N'ÊTES PAS AUTORISÉ À PERCEVOIR CES TAXES, LA CCN LES REMETTRA DIRECTEMENT AUX GOUVERNEMENTS

Thara Abraham
AUTHORIZED SIGNATURE / SIGNATURE AUTORISÉE

NCC CCN Canada

REQUEST FOR REQUISITION / *DEMANDE DE RÉQUISITION*

TO/ *À* : Anne Sargeant, Admin

FROM/ *DE* : Colin Enright c/o Dominique Gagnon, Project Manager/Gestionnaire de projet

DATE: August 8th 2019

PROJECT/*PROJET* : HL Storage Barn Rehab

File # de dossier

PO COMPLETION DATE/ *DATE D'ACHÈVEMENT* ***BC*** : 31-Dec-19

PROJECT # / *No PROJET* : 311_01

DESCRIPTION:

Environmental Characterization Services & EEE at HL Barn Rehab

AMOUNT / MONTANT	With out / *Sans taxes*	HST / TVH	GST / *TPS*	QST / *TVQ*	Incl. Taxes
HST / TVH ONTARIO:		- $			- $
QST / TVQ QUÉBEC:	15,323.00		766.15 $	1,528.47 $	17,617.62 $
				REQ. TOTAL / TOTAL DE LA RÉQ.:	**17,617.62 $**

1 . Type of Requisition / Genre de transaction :

[ ] Goods - Issue Purchase Order (PO) and record assets, if applicable, as line items.
/ Biens - Produire une commande d'achat et enregister les biens, si applicable, séparément.

[X] Services - Issue Purchase Order / *Services - Émettre un bon de commande* .

2 . Method of Award / *Méthode d'attribution* :

[ ] Competitive / *Compétitif*

[ ] Increase to original contract / *Augmentation du contrat déjà existant*

[ ] Request for quotations / *Demande de quotations (attached/ci-joint)*

[X] S.O.A.

PO # / Req.#

3 . Sole Source / *Source unique* (justification required over 5K / *nécessaire si plus de 5K*)

[ ] - (SSB) Business Decision / *Décision administrative*

[ ] - (SSM) Monopoly/ *Monopole*

[ ] - (SSE) Emergency / *Urgence*

[ ] - (SSL) Other (low value) / *Autre*

COMPANY NAME/ *NOM DE LA COMPAGNIE:*

ADDRESS/ *ADRESSE*

Multi-Year Contracts Split / *Partition de contrats pluri-annuels*	*For adm. staff use only - Pour les besoins du personnel adm. seulement*	
	TAC :	
	ACCOUNT/ *COMPTE* :	
	SUB ACCOUNT/ *SOUS-COMPTE* :	
	MDC/ *C.G.* :	
	PROJECT # / *No. PROJET* :	
	ASSET ID (SITE) / *# DE L'ACTIF IMMOBILISE* :	

COMMENTS / COMMENTAIRES:

Revised January 2014

National Capital Commission

Designated Substances Survey,
Storage Barn,
Harrington Lake, Gatineau Park, QC

Type of Document:
Final

Project Number:

Prepared By:

Reviewed By:

Date Submitted:
June 7, 2019

National Capital Commission

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Environmental Engineer
Earth & Environmental

Environmental Engineer
Earth & Environmental

Date Submitted:
June 7, 2019

s.16(2)(c)

National Capital Commission
Designated Substances Survey
Storage Barn, Gatineau Park, QC

June 7, 2019

Legal Notification

This report was prepared by for the account of the National Capital Commission.

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. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Executive Summary

was retained by the National Capital Commission to complete a designated substances survey (DSS) of the abandoned storage barn located at Harrington Lake in Gatineau Park, QC. It is our understanding that the NCC is to renovate the abandoned storage barn as part of site redevelopment

The storage barn is described as a two-storey barn constructed on a concrete foundation with no basement. The upper portions of the building are constructed of wood panels and wood supporting structure, as evidenced by the attic construction. The interior consists of small storage rooms at the entrance with some interior plaster / textured materials whereas the remainder of the barn is an open area with a mix of wood and concrete walls.

The main objectives of the DSS were as follows:

- To identify the presence of designated substances and other special handling materials;
- To quantify the amounts of designated substances and special handling materials at the storage barn; and,
- To evaluate if such substances pose a health risk to demolition contractors, and to make recommendations to eliminate such risks.

The survey included a review of the designated substances with particular emphasis placed on (but not limited to): asbestos-containing materials (ACMs); lead-based paints and lead-containing materials; mercury-based paints and mercury-containing equipment; and, potential sources of silica.

Based on the completion of the DSS, the following designated substances and special handling materials were identified at the site:

- Lead-based paints;
- Silica;
- Animal droppings; and,
- Mould

No other designated substances or special handling materials were identified. The recommended remedial/management options for each of the designated substances and/or special handling materials identified during the survey are presented within the report.

Table EX-1: DSS Summary

Substance	Description	Recommendation
Lead	White Exterior Paint Exterior Green Door / Wood paint	As part of any renovation or demolition of a painted surface, workers are required to be provided with appropriate personal protective equipment (i.e., respirators, gloves, and eye protection) during any activities involving abrasion or sanding of painted surfaces. It is recommended that the Quebec Regulation Respecting the Occupation Health and Safety, 2001 (G.O.Q. 2.3888) or Ontario Ministry of Labour's Guideline "*Lead on Construction Projects*", April, 2011, be referred to when dealing with any painted surface. Leachate analysis of the paint chippings have proved the paint to be leachate toxic. The paint chippings would have to be disposed of as hazardous waste at a landfill designated for accepting hazardous materials.
Silica	Concrete foundations Exterior parging Potential base of building	It is recommended that the Quebec Regulation Respecting the Occupation Health and Safety, 2001 (G.O.Q. 2.3888), or Ontario Ministry of Labour's Guideline "*Silica on Construction Projects*", April 2011, be referred to when dealing with silica-containing materials.
Animal Dropping	Droppings present throughout Suspected dead animals	It is recommended that animal droppings be collected with the use of HEPA vacuums and the surfaces should be disinfected prior to allowing trades to enter the building. It is recommended that mould procedures as outlined in the EACO Mould Abatement Guidelines for medium sized operations be followed as a guide.
Mould	On paper / wood surfaces	It is recommended that mould procedures as outlined in the EACO Mould Abatement Guidelines for large sized operations be followed as a guide if the building is to be re-occupied. If the building is to be demolished, the mould removal can be completed as part of the demolition.

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1 Introduction and Background

1.1 Introduction

was retained by the National Capital Commission to complete a designated substances survey (DSS) of the abandoned storage barn located at Harrington Lake in Gatineau Park, QC. It is our understanding that the NCC is to renovate the abandoned storage barn as part of site redevelopment

1.2 Background

The storage barn is described as a two-storey barn constructed on a concrete foundation with no basement. The upper portions of the building are constructed of wood panels and wood supporting structure, as evidenced by the attic construction. The interior consists of small storage rooms at the entrance with some interior plaster / textured materials whereas the remainder of the barn is an open area with a mix of wood and concrete walls.

Prior to the survey, was provided with a DSS report completed by in 2009. However, the report does not meet the current Regulation Respecting Occupational Health and Safety, CQLR c.S-2.1. As such, the survey needed to be updated to meet the existing standards.

1.3 Objectives

The main objectives of the DSS were as follows:

- To identify the presence of designated substances and other special handling materials;
- To quantify the amounts of designated substances and special handling materials within the structure; and,
- To evaluate if such substances pose a health risk to demolition contractors, and to make recommendations to eliminate such risks.

1.4 Scope of Work

To accomplish the above-noted objectives, the following scope of work was followed:

- Conduct a systematic inspection of all accessible areas of the storage barn to document the location, type, quantity, and condition of designated substances and special handling materials;
- Collect and record representative building material samples for potential laboratory analysis;
- Submit representative samples for bulk asbestos and lead laboratory analyses; and,
- Interpret analytical results and prepare a detailed stand-alone survey report identifying the type, location, and condition of the designated substances and special handling materials on the site.

The DSS survey included all of the designated substances defined by the OHSA. Although there are no specific Quebec regulations for Designated Substance Surveys, the land is deemed NCC federal land and the NCC exercises its due diligence by completing a DSS prior to demolition. The survey includes, with particular emphasis placed on (but not limited to):

- Asbestos-containing materials;

- Lead-based paints and plumbing;
- Mercury-containing equipment; and,
- Potential sources of silica.

Special handling materials that were incorporated into the survey include:

- PCB-containing equipment;
- Ozone-depleting substances;
- Urea-formaldehyde foam insulation;
- Bird and animal droppings; and,
- Mould.

2 Survey Methodology and Assessment Criteria

2.1 Site Inspection

conducted the survey on May 22, 2019. The DSS consisted of a thorough systematic inspection of all accessible areas of the building to document the location, type, quantity, and condition of designated substances and special handling materials. The following **limitations** were present as part of the site visit:

- Visual inspection of the attic was conducted via the access hatch only. Due to the unknown structural integrity of the attic floor, deemed it unsafe to proceed past the hatch.

It is possible that designated substances may be present in concealed and inaccessible areas that was not feasibly assessed as part of this program. survey of the subject location was based on clear, unobstructed visual identification of suspect designated substances and hazardous building materials.

Selected photographs taken during the survey have been included in Appendix A. Details regarding the approach used in conducting the field investigation including sampling procedures and analytical methodologies are outlined in the following sections.

2.2 Asbestos-Containing Materials

The asbestos survey was undertaken in general conformance with the Regulation Respecting Occupational Health and Safety, CQLR c.S-2.1, r.13. It is noted that also followed the "Guide explicatif sur les nouvelles dispositions réglementaires" – gestion sécuritaires de l'amiante.

During the survey, destructive test openings were made in some materials where access permitted Potential ACMs were classified as being either friable or non-friable. Friable material is defined as: *material that, when dry, can be crumbled, pulverized or powdered by hand pressure, or is crumbled, pulverized or powdered*.

A total of forty-six (46) samples from eight (8) materials were collected for asbestos analysis. The number of samples that were submitted for laboratory analysis was based on Table 1 which is a summary of sample requirements from the existing Quebec Regulations.

This number of samples was considered representative based on observations pertaining to like building materials and the minimum sampling requirements (see Table 1 below).

All asbestos samples were submitted to which is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

Table 1: Minimum of Asbestos Bulk Material Sample Requirements

Item	Type of Material	Size of Area of Homogeneous Material	Minimum Number of Bulk Material Samples to be Collected
1	Surfacing material, including without limitation, material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members	Distinct zone	9
2	Thermal insulation, except as described in item 3	Any size	3 (from each mechanical systems)
3	Thermal insulation patch / cover / cement / elbow	Less than 1.8 m	1 (from each mechanical system)
4	Manufactured material	Any size	1

Analyses were performed in accordance with the EPA/600/R-93-116 Method for the Determination of Asbestos in Bulk Building Materials.

In accordance with Quebec regulation, *Regulation respecting the quality of the work environment, R.Q. c. S-2.1, r.15, Whole document* and Regulation Respecting Occupational Health and Safety, CQLR c.S-2.1, r.13, ACM is defined as a material that contains 0.1% or more (dry weight) asbestos by volume with one sample of a homogenous material.

2.3 Lead-Based Paints and Lead Containing Materials

All painted areas of significant size and different colours were sampled and analyzed for lead by others in the past. Areas, where several layers of paint existed, did not necessarily have identification of each layer unless the paint was in poor condition. However, every attempt to identify the number and colours of the layers was made.

collected a combination of various paint surface to complete lead leachate testing to assess whether the paints are considered hazardous for disposal at a landfill. The lead paints were submitted to for a TCLP EPA 6020 – Digestion – ICP MS.

The results of the lead sampling are summarized in **Section 3.2**.

2.4 Mercury-Containing Equipment

The storage barn was visibly inspected for equipment that could release mercury liquid/vapour during proposed demolition work programs. The results of the mercury inspection are summarized in **Section 3.3**.

2.5 Other Designated Substances

A visual survey of the storage barn was made to identify the presence of any other designated substances including:

- Silica;

- PCB-containing equipment;
- Ozone-depleting substances;
- Urea-formaldehyde foam insulation;
- Bird and animal droppings;
- Mould; and,
- Coke oven emissions, acrylonitrile, arsenic, benzene, ethylene oxide, isocyanates, and vinyl chloride.

The visual survey consisted of identifying the aforementioned substances or other materials/equipment that are commonly associated with these substances. The results are summarized in **Section 3.4** through **Section 3.10**.

3 Survey Findings and Recommendations

Pertinent site photographs are presented in Appendix A. A summary table of the wall/ceiling/floor construction of the storage barn, suspected asbestos materials, suspect lead paints, sampling locations, and associated analytical results is presented in Appendix B. The laboratory certificates for asbestos and lead analysis is included in Appendix C.

3.1 Asbestos-Containing Materials

3.1.1 Friable Materials

The following friable materials were observed, sampled and determined not to contain asbestos:

- Nine (9) samples of exterior white wash style material (AS1a-i) was collected from the exterior surface of the foundations / footings of the barn. All the samples collected were determined not to contain asbestos.
- Nine (9) samples of interior white texture coat (AS2a-i) were collected from the interior walls of the main floor of the storage barn. All of the samples were determined not to contain asbestos.
- Nine (9) samples of interior grey plaster (AS3a-i) were collected from the interior walls (behind the white texture coat). The plaster was identified in the small rooms near the entrance. All of the samples were determined not to contain asbestos.
- Nine (9) samples of exterior soft/loose grey parging (AS5a-i) were collected from the exterior walls of the storage barn (above the concrete foundation). All of the samples were determined not to contain asbestos.

Recommendations: No recommendations are necessary for the aforementioned friable materials. These materials may be managed/disposed of as regular construction waste.

3.1.2 Non-Friable

The following friable materials were observed, sampled, and determined not to contain asbestos:

- Three (3) samples of paper lining on the walls and ceilings (AS4a-c)) were collected in storage rooms and the main barn room. All the samples collected were determined not to contain asbestos.
- Three (3) samples of hard column parging (AS8a-c) were collected from various columns in the storage rooms. All the samples collected were determined not to contain asbestos.
- Three (3) samples of foundation concrete (AS6a-c) were collected from the exterior of the building. All the samples collected were determined not to contain asbestos.
- One (1) sample of hard window caulking (AS-7) was collected from the exterior window (front of the barn). The hard window caulking was determined not to contain asbestos.

Recommendations: No recommendations are necessary for the aforementioned non-friable materials. These materials may be managed/disposed of as regular construction waste.

3.2 Lead-Based Paints and Lead-Containing Materials

The analytical results from the previous sampling program – 2009) indicated that two paint samples collected displayed lead levels that were above the applicable criteria of 90 ppm.

The following painted surfaces at the storage barns are to be considered lead-based paints based on that report:

- White Exterior Wall paint – 99 ppm: The white exterior wall paint was shown to be flaking and in poor condition. The paint covers the lower walls of the barn.
- Green exterior door trim – 26,000 ppm: It is reported that these paints were collected from the door trims, which are currently flaking and in poor condition.

However, as part of the existing survey and collection of paint samples for leachate analysis, the laboratory also measured the lead concentrations of select paint for due diligence purposes. According to some of the paints on site measured lead levels of 47,200 ug/g to 51,500 ug/g, which is higher than previously measured in 2009.

In addition, the leachate analysis of the composite paint sample collected from interior, exterior and door paint was determined to be 106 mg/L. This level of lead within the leachate sample is considered to be leachate toxic (hazardous) and cannot be submitted as regular construction material.

Recommendations: It is recommended that flaking / peeling paint be removed / repaired following outdoor Type 2 procedures in accordance with the Lead on Construction Guidelines prior to demolishing / disturbing the paint surfaces.

As part of any renovations or demolitions, site personnel should be provided with necessary protective equipment to reduce the risk of lead-dust inhalation to any workers if the painted surfaces are being disturbed. Activities involving abrasion or sanding of painted surfaces should be minimized. Appropriate personal protective equipment (i.e., respirators, gloves, and eye protection) should be worn when undertaking any such activities. It is recommended that the Quebec Regulation Respecting the Occupation Health and Safety, 2001 (G.O.Q. 2.3888) or Ontario Ministry of Labour's Guideline "Lead on Construction Projects", April 2011, be referred to when dealing with any painted surface.

It is recommended that the disposal of the painted surfaces be completed as hazardous waste. As such, the lead paint cannot be disposed of as regular construction waste and needs to be submitted / disposed of at a hazardous waste receiver.

3.3 Mercury-Containing Equipment

No mercury-containing equipment (fluorescent lights, and thermostats) was identified during the site visit.

Recommendations: There are no recommendations regarding mercury-containing equipment.

3.4 Silica

Materials that likely contain silica within the barn structure include:

- Concrete foundations;
- Concrete beams / columns; and,
- Exterior parging that forms the lower walls of the barn.

Some parging delamination was observed around the exterior of the building and would be associated with silica debris.

Recommendations: Exposure to airborne silica is regulated under the Regulation Respecting the Quality of the Work Environment (R.Q.C. S-2,1R.15). Airborne silica can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Precautions must be taken to prevent silica-containing particles from becoming airborne during the application of such processes. Such precautions include wetting of silica-containing area(s) to be disturbed and daily wet sweeping or HEPA vacuuming of silica dust. Additionally, appropriate respiratory protection and ventilation must be utilized during the disturbance of silica-containing structures. The aforementioned recommendations and precautions should be adhered to during the demolition of the structure.

It is recommended that the Regulation Respecting the Occupation Health and Safety, 2001 (G.O.Q. 2.3888), or Ontario Ministry of Labour's Guideline "*Silica on Construction Projects*", April 2011, be referred to when dealing with silica-containing materials.

3.5 Other Designated Substances

Based on field observations and the on-site activities, there is no reason to believe that the following substances are present in the construction materials of the storage barn in sufficient quantities to exceed the Ministry of Labour exposure limits: vinyl chloride, isocyanates, arsenic, ethylene oxide, benzene or acrylonitrile.

3.6 PCB-Containing Equipment

No potential sources of PCBs were identified during the survey.

Recommendations: There are no recommendations pertaining to PCB-containing equipment.

3.7 Ozone-Depleting Substances

There was no equipment suspect of containing ODS's within the storage barn.

Recommendations: There are no recommendations regarding ODS's.

3.8 Urea-Formaldehyde Foam Insulation

No suspected urea-formaldehyde foam insulation or areas where the material would have been injected were identified during the site visit. No evidence of injection holes was observed.

Recommendations: There are no recommendations regarding UFFI.

3.9 Bird and Animal Droppings

The storage barn was identified to be non-secure with visible breaches to the wall (broken windows). Based on the site inspection, it is evident that bird and animal droppings are present throughout the building. Some suspected dead animals are also present within the building.

Recommendations: It is recommended that animal droppings be collected with the use of HEPA vacuums and the surfaces should be disinfected prior to allowing trades to enter the building, if it is to be re-occupied. It is recommended that mould procedures as outlined in the EACO Mould Abatement Guidelines, 2015 for medium sized (Level 2) operations be followed as a guide.

3.10 Visible Mould

Suspected mould is present on the various paper and wood surfaces within the storage barn. This was evidenced by black staining and suspected water damage on the various materials.

Recommendations: It is recommended that mould procedures as outlined in the EACO Mould Abatement Guidelines for large sized operations (Level 3) be followed as a guide if the building is to be re-occupied. If the building is to be demolished, the mould removal can be completed as part of the demolition.

4 General Limitations

The services performed and outlined herein were based in part upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site that were unavailable for direct observation by objects or coverings at the time of our observations.

Any of our observations relating to designated substances at the site are described in this report. Where testing was performed, it was executed in accordance with our contract for these services. It should be noted that other compounds or materials not tested for might be present in the building.

The objective of this report was to survey the environmental conditions at the site within the context of our contract with respect to the existing regulations within the applicable jurisdiction. Compliance of past and current owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

The conclusions of this report are based, in part, on the information provided by others and any testing and analyses described in the report. The possibility remains that unexpected environmental conditions may be encountered at the site locations not explored. Should such an event occur, should be notified in order that we may determine if modifications to our conclusions are necessary.

This report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, expressed or implied, are made as to the professional service provided under the terms of our contract and included in this report.

We trust this report is satisfactory for your purposes. If you have any questions regarding our submission, please do not hesitate to contact this office.

Appendix A – Site Photographs

Pages 39 to / à 41

are not relevant

sont non pertinentes

Appendix B – Summary Table

Page 43

is not relevant

est non pertinente

Appendix C –
Laboratory Certificates of Analysis

Pages 45 to / à 60

are not relevant

sont non pertinentes

Bédard, Éric

From: Enright, Colin
Sent: November 26, 2019 11:18 AM
To: Zoukou, Stephan
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan
Subject: PR Request - HL Geotech Inv. RFP
Attachments: IN-SO-040535 - Proposal for Geotechnical & Environmental Characterizatio....pdf; RE: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines - Meech Lake; RE: RFP Geotechnical Investigation Services - Meech Lake; 191121 - REV 1 BidFee Schedule Comparison Table_ clarifications.docx; RE: RFP Geotechnical Investigation Services - Meech Lake

Salut Stephan,
Could you prepare a PR for the following:
PR for HL Geotech Investigations (for 3 projects).
Distribution: 311_01 (~40% - $10,596.65) Barn
347_01 (~30% - $7,784.15) Dam
313_01 (~30% - $7,784.20) Bridge
PR Amount : $26,165.00 +Tax (GST/QST) (work in Quebec)
Firm :
SOA:
Est. Completion Date : March 2020
Attachments: RFP, Proposal, Proposal Clarifications Correspondence, Fee schedules, SOA Holder Approval
All other related documents (Competitive Proposals received, etc.) can be here:

Regards,
Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671
NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

November 26, 2019 Ref No.: IN-SO-040535, Rev. 2

National Capital Commission
Design and Construction Division
202-40 Elgin Street
Ottawa, Ontario
K1P 1C7

Attn.: Mr. Colin Enright, RSE
Project Officer

Re: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines
Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation
Heritage Property, 1000 Meech Lake, Quebec
SOA No:

is pleased to submit this proposal for the Geotechnical & Environmental Characterization Investigations and Engineering Guidelines in support of the Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation (Project) located at the Heritage Property, 1000 Meech Lake (Site) in Quebec.

This proposal is being submitted in response to the email and request received from Mr. Colin Enright of the National Capital Commission (Client) dated October 23, 2019.

Please find herein our project team, project understanding, anticipated soil conditions, proposed scope of work and corresponding estimated budget.

1. PROJECT TEAM

Project team will consist of the following selected professionals to undertake the Geotechnical & Environmental Characterization Investigations for this mandate. CVs of these team members have been attached at the end of this proposal for reference.

2. PROJECT UNDERSTANDING

understanding of the Project is based on the email received from the Client. In general, the Client has identified the following structures for rehabilitation:

- Site 1 – Lake Bridge Replacement/Repair (Asset ID 349502), Lake Weir Repair (Asset ID 349892)
- Site 2 – Barn Rehabilitation (Asset ID 94038)

The existing wooden bridge is considered to be in poor condition. We understand that the Client is intending to remove the wooden bridge and preserve the existing Hemlock abutments. The Weir, which is located northwest of the wooden bridge, has an inverted 'V' shape with aged wood planks covering both its upstream and downstream faces. The Weir is topped with two 500 mm deep concrete caps (east and west ends), complete with 200 mm wooden wide weir beams that are about 3800 mm in length keyed

laterally at two ends into the concrete cap; it's believed that the caps and weir beams were constructed during the 1970s.

The Barn, which is located north of the bridge is a two-story structure currently being used as unheated storage spaces with one heated work bay at the ground level. The barn was constructed using various construction materials and includes concrete exterior walls at the ground level and a concrete slab at the second floor that is supported by steel columns.

understands that the Project will consist of the following:

- Replacement of the existing wooden bridge by an NCC owned 40' x 18', 80000 lb capacity 3 section steel bridge or a new steel bridge if the future bridge does not require traffic restriction;
- Investigate the existing structure of the dam and provide current structural foundation dimensions;
- The Barn Rehab will include two new proposed structures, a carport and a retaining wall. It is proposed that the second-floor slab be removed, and a new perimeter concrete column-beam frames and wood framed mezzanine be constructed to provide vertical and lateral support to the existing building.
    - The new carport would be a wood structure and the new retaining wall would be a reinforced concrete wall built against the existing building.

Based on the Site visit on November 7, 2019 and our understanding of the Project, has assumed the following for our Project budget:

- There will be no global grade raises;
- Should the drilling take part during the winter, the Client will have the area cleared and accessible to Snow clearing has not been included in proposed budget;
- A road cut permit will not be required, and
- A work permit from the Ministry of Natural Resources and Forestry (MNR) of Quebec is not required.

If any of the above are required, then additional fieldwork and/or Engineering will be required. would provide an additional budget estimate for approval at that time, prior to initiating any work.

3. ANTICIPATED SOIL CONDITIONS

understanding of the soil conditions on this Site are based on our review of the Quebec Ministry of Environment and Climate Change (Ministère de l'Environnement et de la Lutte contre les changements climatiques) Well Records, and the Site visit on November 7, 2019. Based on the limited available data, we anticipate the soils on the Site to consist of sand and gravel fill overlying shallow bedrock. For the

purposes of this budget, we are assuming that bedrock will be encountered within 5 meters below the ground surface (mbgs) for both Site 1 and Site 2.

The proposed scope of work and corresponding budget estimates within this proposal are based on these anticipated soil conditions. If the soils are found to be different than noted above, or if difficult soil conditions such as base heave, consolidation, artesian water, liquefaction, or deeper than expected bedrock, then additional fieldwork or Engineering may be required. would provide an additional budget estimate for approval at that time.

4. SCOPE OF WORK

The scope of work for this Project is outlined in the Client's RFP. In general, the scope of work for the Geotechnical & Environmental Investigations will include the following:

- A Geotechnical Investigation for each Site, and
- An Environmental Characterization Letter following the Phase II ESA format

The proposed scope of work for each of the above items is further described in detail in the following subsections.

4.1 GEOTECHNICAL INVESTIGATIONS

will perform the following scope of work in order to prepare the Geotechnical Investigations for this Project:

- Retain a utility locating subcontractor to provide underground utility locates;
- Retain a geotechnical drilling/excavating subcontractor to drill/excavate the boreholes and test pit at Site 1 noted below:
    - One (1) borehole to 5 mbgs or auger refusal plus an additional 1.5 m of rock coring at the northwest corner of the bridge, instrumented with a monitoring well,
    - One (1) borehole to 5 mbgs or refusal plus an additional 1.5 m of rock coring using portable equipment at the northeast side of the dam and
    - One (1) test pit at the east downstream of the dam to expose the dam's existing foundation.

- Retain a geotechnical drilling/excavating subcontractor to drill/excavate the boreholes and test pit at Site 2 noted below:
    - Three (3) boreholes to 5 mbgs or auger refusal, and
    - Two (2) boreholes to 5 mbgs or auger refusal plus an additional 1.5 m of rock coring. One (1) of these boreholes will be instrumented with a monitoring well.
    - One (1) test pit at the exterior walls of the barn to expose the barn's existing foundation.

- Supervise the fieldwork and logging of the subsoils based on the samples that are recovered;
- Submit representative soil samples to the geotechnical laboratory as described below:
- Prepare a Geotechnical Investigation report for each Site.

It's important to note that does not recommend the test pit at the east downstream of the dam. is of the opinion that conducting a test pit at that location will unearth the downstream of the dam, and the test pit will immediately infiltrate with water. has included the dam test pit in the scope of work and budget for comparison purposes. would instead recommend a borehole drilled and cored through the dam in order to investigate the founding elevation and the soils underlying the dam.

Table A: Geotechnical Scope of Work

Task	Site One: Lake Bridge Replacement/Repair, Lake Weir Repair	Site Two: Barn Rehabilitation
Geotechnical Drilling	• 1 track mounted BH to 5 m or auger refusal plus 1.5 m of rock coring, instrumented with a monitoring well at the northwest corner of the bridge • 1 portable BH to 5 m or refusal plus 1.5 m of rock coring at the northeast side of the dam near the shoreline • 1 test pit at the east downstream of the dam (to be complete during the summer of 2020)	• 1 portable BH to 5 m or refusal • 2 track mounted BHs to 5 m or auger refusal • 2 track mounted BHs to 5 m or auger refusal plus 1.5 m of rock coring. One of these boreholes will be instrumented with a monitoring well • 1 test pit against the exterior walls of the barn
Laboratory Testing	• 4 sieve analyses • 2 unit weights • 2 unconfined compressive strength • 1 Corrosion package	• 2 sieve analyses • 2 unit weights • 2 unconfined compressive strength • 1 Corrosion package

The overburden will be drilled using a track mounted drill rig outfitted with hollow stem augers or portable equipment. Coring of the bedrock will be performed using wireline diamond coring methods. Samples of the overburden will be collected using a standard split spoon sampler. Soil densities will be recorded using the Standard Penetration Tests (SPTs) and the shear strength of clayey soils will be assessed using Field Vane Tests (FVTs) and pocket penetrometer (PP) resistance values.

If the drilling takes longer than the expected timeframe due to difficult soil conditions, Site access restrictions, or weather delays, then the Client will be contacted to adjust the scope of work or the budget.

If soils are found to be different from those noted above, or difficult soil conditions are encountered, then additional fieldwork, laboratory testing, or Engineering efforts will be required. would contact the Client before performing any additional work.

If the drilling takes place during the winter, snow removal efforts will be required by the Client.

4.2 ENVIRONMENTAL CHARACTERIZATION

will perform the following scope of work in order to prepare an Environmental Characterization letter in order to assist the Client and Contractors in coordinating for possible soil disposal generated during construction. will screen all soil samples using visual and olfactory observations (sheen, odour, and staining) to look for impacted soils. Further analytical testing will be performed on select samples, including the following:

- Five (5) Bulk soil samples will be submitted for:
  - Petroleum Hydrocarbons (PHC (F1 to F4 and C10-C50))
  - Full CCME Metal Scan
  - Polycyclic Aromatic Hydrocarbons (PAHs, including BTEX) and
  - pH
- Two (2) groundwater samples will be submitted for:
  - Petroleum Hydrocarbons (PHC (F1 to F4 and C10-C50))
  - Full CCME Metal Scan
  - Polycyclic Aromatic Hydrocarbons (PAHs, including BTEX) and
  - pH

- One (1) soil sample will be submitted for soil disposal and will be tested using the Toxicity Characteristic Leaching Procedure (TCLP) as per O.Reg 347/558

will compare the laboratory analytical results for the submitted soil and groundwater samples to both federal and provincial guidelines/criteria and highlight any parameter exceedances of these limits.

will complete an Environmental Characterization letter based on the findings of the laboratory testing. will also develop a soils and groundwater management plan, which will provide guidance and options for the handling, management, and potential on-site reuse and/or off-site disposal of soil and groundwater.

It is important to note that has not been provided with a Phase I or Phase II Environmental Site Assessment of this Site, nor have we been provided with any background information to assist in selecting Contaminants of Concern (COCs).

5. BUDGET ESTIMATE

estimated budget breakdown for this work is presented in Attachment B. Invoicing will be monthly, and in accordance to the NCC SOA for Geotechnical Engineering Services, Ref No:
Applicable taxes will be invoiced in addition to the budgets shown herein. Additional services, which extend beyond the aforementioned scope of work, would be provided only with written authorization from the Client.

6. CLOSURE

We trust this offer meets with your current requirements. We thank you for the opportunity to prepare this proposal. If you have any questions regarding the proposed scope of work, please do not hesitate to contact us.

Project Coordinator

Regional Manager, Principal

Attachments:
Attachment A: Fee Schedule
Attachment B: Fee Schedule Breakdown
CVs

s.20(1)(b)

s.20(1)(c)

Attachment A: Fee Schedule

Item No.	Description	Unit	Estimated Quantity	Unit Price	Amount
GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION SERVICES, 1000 MEECH LAKE, ASSETS #94038, 349892, 349502					
1	General Conditions & Scope of Work Tasks # 1, 5, 6, 8	Lump Sum	-	-	
2	Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7	Lump Sum	-	-	
3	Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7	Lump Sum	-	-	
4	Environmental Characterization, all locations, Scope of Work Tasks #4, 7	Lump Sum	-	-	
5	Disbursements	Lump Sum	-	-	
				Total before taxes	$26,165.00
				GST / QST 14.975%	$3,918.21
				Proposal Total	$30,083.21

s.16(2)(c)
s.20(1)(b)
s.20(1)(c)

Client: **National Capital Commission**
Standing Offer:
Project: **Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation**
Mandate: **Geotechnical & Environmental Characterization Investigations and Engineering Guidelines**
Ref No: **IN-SO-040535**

Attachment B: Fee Schedule Breakdown

Proposed Task	[redacted] Personnel					Construction Services			Subcontractors or Disbursements	Estimated Cost
	Construction Supervisor	Draftsman / CAD Operator	Engineer Level D	Engineer Level E	Engineer Level F	Modified Proctor Test	Granulometry Test	Nucleodensimeter Test		
Applicable Unit Rates	[redacted] /hr	/hr	/hr	/hr	/hr	/test	/test	/test		
General Conditions & Scope of Work Tasks # 1, 5, 6, 8										
Coordination	4				8					
									Subtotal =	
Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7										
Fieldwork Supervision	14									
Geotechnical Laboratory Testing							4			
Reporting	19	2.5		10	8.5					
									Subtotal =	
Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7										
Fieldwork Supervision	25									
Geotechnical Laboratory Testing							2			
Reporting	16	6.5		8	5					
									Subtotal =	
Environmental Characterization, all locations, Scope of Work Tasks #4, 7										
Laboratory Testing										
Reporting	6			3	2					
									Subtotal =	
Disbursements										
Utility Locates Subcontractor										
Geotechnical Drilling Subcontractor										
Excavating Subcontractor										
									Subtotal =	
									Estimated Budget =	**$26,165.00**

A-2020-00070-00070

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are withheld pursuant to sections

sont retenues en vertu des articles

16(2)(c), 19(1)

of the Access to Information Act

de la Loi sur l'accès à l'information

s.16(2)(c)

s.19(1)

Bédard, Éric

From:
Sent: November 21, 2019 12:21 PM
To: Enright, Colin;
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan; Yang, Qing; Moroz, Marek; Myatt, Allison
Subject: RE: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines - Meech Lake
Attachments: IN-SO-040535 - Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines - Meech Lake, Rev. 1.pdf

Hi Colin,

Thanks for taking my call and speaking with me his morning.

As discussed, please find attached our revised proposal and comments to your bullets below:

We do require some clarifications, however, before we proceed with this work:

- proposal does not include Petroleum C10-C50 in their suite of analysis. This is to be included (a requirement of the RFP).
  - The Petroleum C10-C50 was included in our suite of analysis and is in the budget. We had forgot to write it in the breakdown for environmental testing of samples in the proposal. It's now written in the proposal.
- indicates an "Environmental Characterization Letter" will be provided. It is unclear whether this will provide sufficient detail as per the Phase II ESA format (a requirement of the RFP).
  - The Environmental Characterization Letter will follow the Phase II ESA format.
- indicates borehole depths of 2m for Site 2 (Barn). A 2m depth may not be sufficient to adequately characterize soil or gather sufficient information on anticipated contaminates. The NCC would like the depth of these boreholes to be a minimum 5m or auger refusal.
  - Based on our Site visit on November 7, 2019 at the Barn location, some rock outcrops were present around the area. Our original budget and estimate is based on the assumption that rock would be encountered within 2 m during the field drilling. As requested, we have now changed it to 5 m. Please note, that additional time and cost have been included for this addition in the revised proposal.
- does not clearly indicate the methodology for investigating the existing foundation condition and dimensions of the barn (a requirement of the RFP).
  - Within the ground level attachment (Barn) of the RFP, you had circled and recommended a total of five (5) boreholes to be drilled at the Site. There wasn't any recommended test pits against the existing walls of the barn to expose current structure foundations. As discussed during our phone call, we have now included a test pit at the barn location in our proposal at an additional cost.

In summary, an additional cost of $2,975.00 has been added to our original budget estimate should the above requirements be needed. If you have any further questions please don't hesitate to contact me.

Kind regards

Project Manager

From: Enright, Colin <Colin.Enright@ncc-ccn.ca>
Sent: Thursday, November 21, 2019 7:47 AM
To:

Cc: Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>; Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>; Lapensée, Allan <allan.lapensee@ncc-ccn.ca>; Yang, Qing <Qing.Yang@ncc-ccn.ca>; Moroz, Marek <Marek.Moroz@ncc-ccn.ca>; Myatt, Allison <allison.myatt@ncc-ccn.ca>
Subject: RE: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines - Meech Lake

Good Morning

Of the proposals received, the NCC has identified proposal as the leading complaint submission in response to this RFP request.
We do require some clarifications, however, before we proceed with this work:

- proposal does not include Petroleum C10-C50 in their suite of analysis. This is to be included (a requirement of the RFP).
- indicates an "Environmental Characterization Letter" will be provided. It is unclear whether this will provide sufficient detail as per the Phase II ESA format (a requirement of the RFP).
- indicates borehole depths of 2m for Site 2 (Barn). A 2m depth may not be sufficient to adequately characterize soil or gather sufficient information on anticipated contaminates. The NCC would like the depth of these boreholes to be a minimum 5m or auger refusal.
- does not clearly indicate the methodology for investigating the existing foundation condition and dimensions of the barn (a requirement of the RFP).

Please provide clarifications to the questions above, and also indicate whether the Proposal total fees remain unchanged following these clarifications, noting that proposal is currently the lowest compliant bidder.

Thanks.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671
NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

From:
Sent: Friday, November 15, 2019 1:18 PM
To: Enright, Colin
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan; Yang, Qing; Lu, Feiying; Moroz, Marek; Myatt, Allison; Poirier, Marie; Madularu, Iulia
Subject: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines - Meech Lake

Good afternoon Colin,

Please find attached our proposal for the Geotechnical & Environmental Characterization Investigations and Engineering Guidelines for Meech Lake.

We'd like to mention that we do not recommend doing the test pit against the dam. Excavating the test pit against the dam is considered to be unsafe and will unearth the downstream of the dam; the test pit may immediately be infiltrated with water. We recommend doing a portable borehole on top of the dam; we can core the dam vertically and we'll be able to investigate the elevation and subgrade soils below the dam. However, we included the test pit in the proposal and budget for comparison.

We'd like to thank you for providing us with this opportunity and look forward to hearing back from you.

Best Regards

Project Manager

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is withheld pursuant to section

est retenue en vertu de l'article

16(2)(c)

of the Access to Information Act

de la Loi sur l'accès à l'information

November 21, 2019 Ref No.: IN-SO-040535, Rev. 1

National Capital Commission
Design and Construction Division
202-40 Elgin Street
Ottawa, Ontario
K1P 1C7

Attn.: Mr. Colin Enright, RSE
Project Officer

Re: Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines
Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation
Heritage Property, 1000 Meech Lake, Quebec
SOA No:

is pleased to submit this proposal for the Geotechnical & Environmental Characterization Investigations and Engineering Guidelines in support of the Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation (Project) located at the Heritage Property, 1000 Meech Lake (Site) in Quebec.

This proposal is being submitted in response to the email and request received from Mr. Colin Enright of the National Capital Commission (Client) dated October 23, 2019.

Please find herein our project team, project understanding, anticipated soil conditions, proposed scope of work and corresponding estimated budget.

1. PROJECT TEAM

Project team will consist of the following selected professionals to undertake the Geotechnical & Environmental Characterization Investigations for this mandate. CVs of these team members have been attached at the end of this proposal for reference.

2. PROJECT UNDERSTANDING

understanding of the Project is based on the email received from the Client. In general, the Client has identified the following structures for rehabilitation:

- Site 1 – Lake Bridge Replacement/Repair (Asset ID 349502), Lake Weir Repair (Asset ID 349892)
- Site 2 – Barn Rehabilitation (Asset ID 94038)

The existing wooden bridge is considered to be in poor condition. We understand that the Client is intending to remove the wooden bridge and preserve the existing Hemlock abutments. The Weir, which is located northwest of the wooden bridge, has an inverted 'V' shape with aged wood planks covering both its upstream and downstream faces. The Weir is topped with two 500 mm deep concrete caps (east and west ends), complete with 200 mm wooden wide weir beams that are about 3800 mm in length keyed

laterally at two ends into the concrete cap; it's believed that the caps and weir beams were constructed during the 1970s.

The Barn, which is located north of the bridge is a two-story structure currently being used as unheated storage spaces with one heated work bay at the ground level. The barn was constructed using various construction materials and includes concrete exterior walls at the ground level and a concrete slab at the second floor that is supported by steel columns.

understands that the Project will consist of the following:

- Replacement of the existing wooden bridge by an NCC owned 40' x 18', 80000 lb capacity 3 section steel bridge or a new steel bridge if the future bridge does not require traffic restriction;
- Investigate the existing structure of the dam and provide current structural foundation dimensions;
- The Barn Rehab will include two new proposed structures, a carport and a retaining wall. It is proposed that the second-floor slab be removed, and a new perimeter concrete column-beam frames and wood framed mezzanine be constructed to provide vertical and lateral support to the existing building.
    - The new carport would be a wood structure and the new retaining wall would be a reinforced concrete wall built against the existing building.

Based on the Site visit on November 7, 2019 and our understanding of the Project, has assumed the following for our Project budget:

- There will be no global grade raises;
- Should the drilling take part during the winter, the Client will have the area cleared and accessible to Snow clearing has not been included in proposed budget;
- A road cut permit will not be required, and
- A work permit from the Ministry of Natural Resources and Forestry (MNR) of Quebec is not required.

If any of the above are required, then additional fieldwork and/or Engineering will be required. would provide an additional budget estimate for approval at that time, prior to initiating any work.

3. ANTICIPATED SOIL CONDITIONS

understanding of the soil conditions on this Site are based on our review of the Quebec Ministry of Environment and Climate Change (Ministère de l'Environnement et de la Lutte contre les changements climatiques) Well Records, and the Site visit on November 7, 2019. Based on the limited available data, we anticipate the soils on the Site to consist of sand and gravel fill overlying shallow bedrock. For the

purposes of this budget, we are assuming that bedrock will be encountered within 5 meters below the ground surface (mbgs) for both Site 1 and Site 2.

The proposed scope of work and corresponding budget estimates within this proposal are based on these anticipated soil conditions. If the soils are found to be different than noted above, or if difficult soil conditions such as base heave, consolidation, artesian water, liquefaction, or deeper than expected bedrock, then additional fieldwork or Engineering may be required. would provide an additional budget estimate for approval at that time.

4. SCOPE OF WORK

The scope of work for this Project is outlined in the Client's RFP. In general, the scope of work for the Geotechnical & Environmental Investigations will include the following:

- A Geotechnical Investigation for each Site, and
- An Environmental Characterization Letter following the Phase II ESA format

The proposed scope of work for each of the above items is further described in detail in the following subsections.

4.1 GEOTECHNICAL INVESTIGATIONS

will perform the following scope of work in order to prepare the Geotechnical Investigations for this Project:

- Retain a utility locating subcontractor to provide underground utility locates;
- Retain a geotechnical drilling/excavating subcontractor to drill/excavate the boreholes and test pit at Site 1 noted below:
    - One (1) borehole to 5 mbgs or auger refusal plus an additional 1.5 m of rock coring at the northwest corner of the bridge, instrumented with a monitoring well,
    - One (1) borehole to 5 mbgs or refusal plus an additional 1.5 m of rock coring using portable equipment at the northeast side of the dam and
    - One (1) test pit at the east downstream of the dam to expose the dam's existing foundation.

- Retain a geotechnical drilling/excavating subcontractor to drill/excavate the boreholes and test pit at Site 2 noted below:
    - Three (3) boreholes to 5 mbgs or auger refusal, and
    - Two (2) boreholes to 5 mbgs or auger refusal plus an additional 1.5 m of rock coring. One (1) of these boreholes will be instrumented with a monitoring well.
    - One (1) test pit at the exterior walls of the barn to expose the barn's existing foundation.

- Supervise the fieldwork and logging of the subsoils based on the samples that are recovered;
- Submit representative soil samples to the geotechnical laboratory as described below:
- Prepare a Geotechnical Investigation report for each Site.

It's important to note that does not recommend the test pit at the east downstream of the dam. is of the opinion that conducting a test pit at that location will unearth the downstream of the dam, and the test pit will immediately infiltrate with water. has included the dam test pit in the scope of work and budget for comparison purposes. would instead recommend a borehole drilled and cored through the dam in order to investigate the founding elevation and the soils underlying the dam.

Table A: Geotechnical Scope of Work

Task	Site One: Lake Bridge Replacement/Repair, Lake Weir Repair	Site Two: Barn Rehabilitation
Geotechnical Drilling	• 1 track mounted BH to 5 m or auger refusal plus 1.5 m of rock coring, instrumented with a monitoring well at the northwest corner of the bridge • 1 portable BH to 5 m or refusal plus 1.5 m of rock coring at the northeast side of the dam near the shoreline • 1 test pit at the east downstream of the dam (to be complete during the summer of 2020) ***(Max 9 hrs drilling/excavating time)***	• 1 portable BH to 5 m or refusal • 2 track mounted BHs to 5 m or auger refusal • 2 track mounted BHs to 5 m or auger refusal plus 1.5 m of rock coring. One of these boreholes will be instrumented with a monitoring well • 1 test pit against the exterior walls of the barn ***(Max 15 hrs drilling/excavating time)***
Laboratory Testing	• 4 sieve analyses • 2 unit weights • 2 unconfined compressive strength • 1 Corrosion package	• 2 sieve analyses • 2 unit weights • 2 unconfined compressive strength • 1 Corrosion package

The overburden will be drilled using a track mounted drill rig outfitted with hollow stem augers or portable equipment. Coring of the bedrock will be performed using wireline diamond coring methods. Samples of the overburden will be collected using a standard split spoon sampler. Soil densities will be recorded using the Standard Penetration Tests (SPTs) and the shear strength of clayey soils will be assessed using Field Vane Tests (FVTs) and pocket penetrometer (PP) resistance values.

This proposal is based on an allowance for a maximum drilling time as described above. If the drilling takes longer due to difficult soil conditions, Site access restrictions, or weather delays, then the Client will be contacted to adjust the scope of work or the budget. If soils are found to be different from those noted above, or difficult soil conditions are encountered, then additional fieldwork, laboratory testing, or Engineering efforts will be required. would contact the Client before performing any additional work. If the drilling takes place during the winter, snow removal efforts will be required by the Client.

4.2 ENVIRONMENTAL CHARACTERIZATION

will perform the following scope of work in order to prepare an Environmental Characterization letter in order to assist the Client and Contractors in coordinating for possible soil disposal generated during construction. will screen all soil samples using visual and olfactory observations (sheen, odour, and staining) to look for impacted soils. Further analytical testing will be performed on select samples, including the following:

- Five (5) Bulk soil samples will be submitted for:
  - Petroleum Hydrocarbons (PHC (F1 to F4 and C10-C50))
  - Full CCME Metal Scan
  - Polycyclic Aromatic Hydrocarbons (PAHs, including BTEX) and
  - pH
- Two (2) groundwater samples will be submitted for:
  - Petroleum Hydrocarbons (PHC (F1 to F4 and C10-C50))
  - Full CCME Metal Scan
  - Polycyclic Aromatic Hydrocarbons (PAHs, including BTEX) and
  - pH

- One (1) soil sample will be submitted for soil disposal and will be tested using the Toxicity Characteristic Leaching Procedure (TCLP) as per O.Reg 347/558

will compare the laboratory analytical results for the submitted soil and groundwater samples to both federal and provincial guidelines/criteria and highlight any parameter exceedances of these limits.

will complete an Environmental Characterization letter based on the findings of the laboratory testing. will also develop a soils and groundwater management plan, which will provide guidance and options for the handling, management, and potential on-site reuse and/or off-site disposal of soil and groundwater.

It is important to note that has not been provided with a Phase I or Phase II Environmental Site Assessment of this Site, nor have we been provided with any background information to assist in selecting Contaminants of Concern (COCs).

5. BUDGET ESTIMATE

estimated budget breakdown for this work is presented in Attachment B. Invoicing will be monthly, and in accordance to the NCC SOA for Geotechnical Engineering Services, Ref No:
Applicable taxes will be invoiced in addition to the budgets shown herein. Additional services, which extend beyond the aforementioned scope of work, would be provided only with written authorization from the Client.

6. CLOSURE

We trust this offer meets with your current requirements. We thank you for the opportunity to prepare this proposal. If you have any questions regarding the proposed scope of work, please do not hesitate to contact us.

Project Coordinator

Regional Manager, Principal

Attachments:
Attachment A: Fee Schedule
Attachment B: Fee Schedule Breakdown
CVs

s.20(1)(b)

s.20(1)(c)

Attachment A: Fee Schedule

Item No.	Description	Unit	Estimated Quantity	Unit Price	Amount
GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION SERVICES, 1000 MEECH LAKE, ASSETS #94038, 349892, 349502					
1	General Conditions & Scope of Work Tasks # 1, 5, 6, 8	Lump Sum	-	-	
2	Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7	Lump Sum	-	-	
3	Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7	Lump Sum	-	-	
4	Environmental Characterization, all locations, Scope of Work Tasks #4, 7	Lump Sum	-	-	
5	Disbursements	Lump Sum	-	-	
				Total before taxes	$26,165.00
				GST / QST 14.975%	$3,918.21
				Proposal Total	$30,083.21

s.16(2)(c)
s.20(1)(b)
s.20(1)(c)

Client: **National Capital Commission**
Standing Offer:
Project: **Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation**
Mandate: **Geotechnical & Environmental Characterization Investigations and Engineering Guidelines**
Ref No: **IN-SO-040535**

Attachment B: Fee Schedule Breakdown

Proposed Task	Personnel					Construction Services			Subcontractors or Disbursements	Estimated Cost
	Construction Supervisor	Draftsman / CAD Operator	Engineer Level D	Engineer Level E	Engineer Level F	Modified Proctor Test	Granulometry Test	Nucleodensimeter Test		
Applicable Unit Rates	/hr	/hr	/hr	/hr	/hr	/test	/test	/test		
General Conditions & Scope of Work Tasks # 1, 5, 6, 8										
Coordination	4				8					
									Subtotal =	
Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7										
Fieldwork Supervision	14									
Geotechnical Laboratory Testing							4			
Reporting	19	2.5		10	8.5					
									Subtotal =	
Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7										
Fieldwork Supervision	25									
Geotechnical Laboratory Testing							2			
Reporting	16	6.5		8	5					
									Subtotal =	
Environmental Characterization, all locations, Scope of Work Tasks #4, 7										
Laboratory Testing										
Reporting	6			3	2					
									Subtotal =	
Disbursements										
Utility Locates Subcontractor										
Geotechnical Drilling Subcontractor										
Excavating Subcontractor										
									Subtotal =	
									Estimated Budget =	**$26,165.00**

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of the Access to Information Act

de la Loi sur l'accès à l'information

Bédard, Éric

From: Enright, Colin
Sent: November 12, 2019 1:33 PM
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan; Moroz, Marek; Myatt, Allison
Subject: RE: RFP Geotechnical Investigation Services - Meech Lake
Attachments: Weir & Bridge BH.TP locations.REV1.pdf

RFP Geotechnical Investigation Services - Meech Lake
ADDENDUM 2:

1. **Revisions –**
   a. **Attachments:**
      .1Revise 3. to : "Weir & Bridge BH.TP locations.REV1.pdf" *attached*

2. **Questions Received:**
   Q1.0 Can we draw water from the lake?
   A1.0 Drawing water from the lake is subject to a DFO request for review, which would be the Proponents responsibility, within the timeline identified of this RFP (https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-001-eng.html). Alternatively, Proponents can supply their own water requirements.

   Q2.0 The Weir Test Pit will be underwater if performed during the timeline?
   A2.0 Noted. Test pit will be performed in summer 2020, and the results documented through a technical memorandum.

   Q3.0 BH2 would likely need to be cored through the ice during the timeline.
   A3.0 BH2 is to be relocated to the shoreline, exact location to be determined onsite by the NCC Representative.
   Refer to Addendum 2; Revisions 1.a.

   Q4.0 How will we locate Security Infrastructure? Is this part of our locates?
   A4.0 Security Representatives will be present to assist in identifying during the Proponents locates.

Please confirm receipt.
Thank you.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671
NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE

Canada

From: Enright, Colin
Sent: Monday, November 04, 2019 7:20 PM
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan; Moroz, Marek; Myatt, Allison
Subject: RE: RFP Geotechnical Investigation Services - Meech Lake

Hello,

The optional Site Visit will occur on **Thursday November 7th, 9:30am to 11:30am**.
Addendum 1 misidentified Thursday as the 8th.

Thank you.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671
NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

From: Enright, Colin
Sent: Monday, November 04, 2019 2:46 PM
Cc: Malepart, Philippe; Dinelle, Patrick; Lapensée, Allan; Moroz, Marek; Myatt, Allison
Subject: RFP Geotechnical Investigation Services - Meech Lake

RFP Geotechnical Investigation Services - Meech Lake
ADDENDUM 1:

1. **Revisions –**
   a. **RFP Closing:**
      .1 **The RFP Closing date is revised to: "15-November-2019 3:00PM"**
   b. **Last day for Questions:**
      .1 **Add:** "Last day for questions will be November 11th 2019, 3:00pm"
   c. **Schedule; add the following**
      .1 An optional Site Visit will be occurring on Thursday Nov 8th 2019, 9:30am to 11:30am.
      Proponents shall provide the full Names and Dates of Birth (DoB) of all individuals attending this site visit.
      Names and DoB shall be provided to Colin Enright by 4:00pm Tuesday November 5th 2019.
      Assembly area will be the round-a-bout outside the grounds front gate, at 9:30am sharp.
   d. **Background**
      .1 **Add the following attached historical geotechnical investigations, for info:**
         a. Phase II ESA HL.pdf
         b. 1780606_2001-001-R-RevB-Ph II ESA August 2017 (002).pdf

.2 **Lake Weir; add the following historical Lake Weir DWG & Photo, for info:**

a. "Temp Passerelle Dam.pdf"
b. "20190917_110111.jpg"

e. **Points of Contact**

.1 **Revise Points of Contact as follows:** "The Point of Contact for this RFP will be Colin Enright."

2. **Questions Received:**

Q1.0 Are any drawings and/or photos of the lake weir available?
A1.0 Refer to Addendum 1; Revisions 1.d.2. No subgrade information available.

Q2.0 Are any previous borehole and/or test pit logs available for the three developments?
A2.0 Refer to Addendum 1; Revisions 1.b.

Q3.0 Can you provide dimensions of the barn door and the ceiling height within the barn so we can determine types of equipment that can access the space? Alternatively, could the indoor borehole (marked near the canoe area) be moved to the exterior of the barn, immediately adjacent to barn? In this case the slab-on-grade thickness could be determine by coring using hand-held tools.
A3.0 Yes, the indoor borehole can be moved to the exterior, but a test bit or a hand auger borehole is required to investigate the interior backfill and subgrade of the SOG.
Approximate dimensions as follow, Proponents are responsible to verify:

West Elevation Double Barn Door : 8'-2" x 7'-0" (w x h)
Indoor Ceiling Height : 8'-0"

Q4.0 Scope of Work: Item 3.4 – Regarding to the recommendation for reinforcing the existing footing. Do you have as-built foundation drawings?
A4.0 As-built foundation drawings are not available. Determining the size and condition of the existing foundation is part of this geotechnical investigation.

Q5.0 Security Clearance: Item 1 – Can you provide the forms that would be required to ensure we and our subcontractors are suitably prepared to return them in a timely manner?
A5.0 NCC Security point of contact and Clearance Forms will be provided in the correspondence to the preferred Proponent, when identified.

Q6.0 In order to I was wondering if we can arrange for a site visit to review the condition, access, etc.. Is there any limitation for visiting the site or we need to be escorted by an NCC representative
A6.0 Refer to Addendum 1; Revisions 1.a. Proponents shall provide the full Names and Dates of Birth (DoB) of all individuals attending the site visit. The NCC will provide confirmation of the individuals granted escorted access for this visit. An NCC Representative will escort at all times.

Please confirm receipt.
Thank you.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction

Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE

Canada

From: Enright, Colin <Colin.Enright@ncc-ccn.ca>
Sent: Wednesday, October 23, 2019
To:
Cc: Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>; Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>; Lapensée, Allan <allan.lapensee@ncc-ccn.ca>; Yang, Qing <Qing.Yang@ncc-ccn.ca>; Lu, Feiying <Feiying.Lu@ncc-ccn.ca>; Moroz, Marek <Marek.Moroz@ncc-ccn.ca>; Myatt, Allison <allison.myatt@ncc-ccn.ca>; Poirier, Marie <Marie.Poirier@ncc-ccn.ca>; Madularu, Iulia <Iulia.Madularu@ncc-ccn.ca>
Subject: RFP Geotechnical Investigation Services - Meech Lake

Hello,

The NCC would like to request a proposal for the Geotechnical & Environmental Characterization Investigations and Engineering Guidelines on the geotechnical design aspects of future projects onsite:

Project Location : Heritage Property, 1000 Meech Lake, QC
Schedule : All Deliverables by January 17th, 2020
RFP Closing: 8-November-2019 3:00PM

Background:

1. Lake Bridge Replacement/Repair (Asset ID 349502)
   This potential project includes the replacement of the existing wooden bridge by a NCC owned 40'x18' 80,000 lb capacity 3 section steel bridge or a new steel bridges if the future bridge require no traffic restriction. The existing wooden bridge superstructure will be removed while the existing Hemlock abutments will be preserved. Preferably new helical piers will be installed to support the steel bridge while the reinforced concrete abutments can be an alternative option if any reason the helical piers construction is not possible.
2. Lake Weir Repair (Asset ID 349892)
   The Weir, located NW of the bridge, has an inverted V shape. Aged wood planks covers both its upstream and downstream faces, topped with two 500 mm deep concrete caps (east and west ends), complete with two 200mm wooden wide weir beams about 3800 mm in length keyed laterally at two ends into the concrete cap. It is believed that the concrete cap and the weir beams were constructed in 1970's.
3. Barn Rehabilitation (Asset ID 94038)
   The Barn Rehabilitation project intends the adaptive reuse of the existing building and two new proposed constructions, a carport and a retaining wall. The Barn currently is used as unheated storage spaces except for one heated work bay at the ground level. The Barn was built as two-story structure using various construction materials, including concrete exterior walls at the ground level and a concrete slab at the second floor supported by steel columns. Above the second level, it is a modern wood-truss structure. It is proposed that the second floor's concrete slab to be removed, and new perimeter concrete column-beam frames and a new wood framed mezzanine to be introduced to provide vertical and lateral supports to the existing building. The new carport would be a wood structure and the new retaining wall would be a reinforced concrete wall built tight against the existing building.

Objectives:
The objective of the Geotechnical Investigations and Engineering Guidelines RFP would be to identify geotechnical design aspects and considerations associated with the future Projects in the subject area, and provide recommendations as necessary to fulfill requirements set forth within applicable Federal regulations. The purpose of this geotechnical investigation is to assess the general surface and subsurface conditions in the area of proposed existing Structures upgrades. Based on the information obtained through the investigation, the consultant will provide the geotechnical design guidelines. The guidelines will also include the construction considerations which could influence design decision.

The objectives of the Environmental Characterization Investigations would be to characterize the quality of soil and groundwater (if present) within the area of the site to be excavated as part of the project(s) and to develop soil and groundwater recommendations for the handling, management and possible re-use on-site and/or disposal of soil and/or groundwater off-site, as appropriate, as part of the construction project(s).

The geotechnical and environmental engineering consultant will work closely with the NCC design team. The Proponent services will include, but are not limited to the following scope;

Scope of Work:

1. Provide all materials, labour, tools, equipment necessary to complete the Work in order to gather data sufficient to satisfy all applicable Legislation, Regulations, Design or Engineering Requirements, & Permits;
2. Lake Weir and Bridge:
    1. Review and incorporate relevant information, as necessary;
    2. Drilling of 2 borehole : BH1@ North West corner of the bridge ; BH2 @ North East side of the Lake Dam, to establish and prove the depth of bedrock at each of the borehole locations;
    3. Excavation of 1 test pit (TP1) in proximity to the East Downstream face of the dam to investigate the existing dam structure type, its structural elements dimensions and how it has been founded ;
    4. Preparation of geotechnical report. The geotechnical report section reporting on the Lake Weir and Bridge shall include:
        - Borehole and test pit logs with location drawing;
        - The existing dam structure type and dimensions;
        - Recommendations and test results for bridge foundation design, including:
        - Appropriate types of foundations (Helical piles and conventional reinforced concrete abutment): Design loading (Each end): 1250kN (ULS), 750kN(SLS);
        - Factored Bearing resistance at Ultimate Limit State (ULS) and at Serviceability Limit State (SLS) at stated elevations, and the anticipated uniform and differential settlements. Advise if weight of footing and soil above footing should be included;
        - Minimum depth of soil required above bearing elevation for frost protection for foundations;
        - Coefficients of active, at-rest, and passive lateral earth pressures, and recommended coefficient of lateral earth pressure;
        - Elevation of the water table;
        - Any unusual problems likely to arise during excavation or during construction of foundations and site services.
        - Comments on the conditions of the buried wooden structural members.
3. Barn Rehab and Additional Structures (Refer to "*HL Barn… .pdf*")
    1. Investigate and determine the general soil (surface and subsurface) and groundwater conditions of the proposed area by means of the proposed boreholes;
    2. Investigate the existing foundation and bearing soils;
    3. Investigate the backfilling of the SOG of the existing barn;
    4. Provide investigation results and recommendations for reinforcing the existing footing, new foundations, excavation, backfilling, etc. Spread footings can be an option for the existing and new structures. The possibilities of using Sono-tube foundation for the new carport and helical piles for the existing building should also be explored.
    5. Provide recommendations for frost protection. Except a small portion of the heated area at the ground level, the existing building and the new carport will be un-heated during the winter. Measures should be taken to prevent the frost heave movements at the foundations.
4. Environmental Characterization
    1. Collection and analysis of soil and/or groundwater samples representative of material to be excavated / disturbed during the project work.
    2. Soil and groundwater (as appropriate) shall be analyzed (as a minimum) for the following parameters:
        - Full CCME metals suite (including CrVI, B);
        - Polycyclic Aromatic Hydrocarbons (PAH);

- Petroleum Hydrocarbons (PHC, including BTEX). As the site is in Quebec, both CCME F1-F4 and C10-C50 should also be performed;
- TCLP as per O.Reg 347/558 (to keep disposal options open);

3. Soil and groundwater samples should be compared to both federal and provincial guidelines and criteria;
4. Preparation of an environmental report following the Phase II ESA format. Development of a Soil and Groundwater Management Plan, providing guidance and options for the handling, management and potential on-site reuse and/or off-site disposal of soil and groundwater.
5. Based upon the scope of work, the Proponents shall provide a sampling plan as part of their proposal. Proponents may provide recommendations for additional / alternative analysis program, as appropriate;

5. Review of attached documentation;
6. Allow for (1) number of kickoff meetings, and revisions as necessary of deliverables;
7. Provide written Draft and Final Reports and supplemental data following field and supplied document reviews;
8. Coordinate as required with project team members;

Security Clearance:

1. All Workers, including any potential subcontractors and/or suppliers, are required to attain **Site Access** security clearance. This can be performed at no cost by NCC Corporate Security services. Access may be refused to site and Contracts annulled if the adequate security clearance is not achieved.
2. Security clearances are to be established within 14 days of the NCCs communicating an acceptable Proposal, and/or the intent to proceed with a Contract.

Deliverables Format:

1. Draft Deliverables may require sanitization by the NCC prior to distribution for review;
2. Provide electronic versions of all text;
3. Provide field and final reports in MW and PDF format;

The Proponent shall ensure not to disclose materials or data collected to third parties unless authorized by the NCC.
The Proponent shall ensure not to publish or display any of these photographs related to the project (or collected during the project), in any medium (including the internet) unless authorized by the NCC;
Information related to this mandate is Protected B.

Proposal Breakdown

1. Proposals shall include your Firms typical fee proposal, as well as the attached completed Fee Schedule, which will form the basis for cost evaluation;
2. The description of the tasks shall be outlined in the fee proposal;
3. The number of hours, hourly rates and total fees shall be listed according to task in the fee proposal;
4. Fees shall be in accordance with your Firms SOA, if applicable;
5. Provide a list of the projected project team and current contact information;
6. Provide methodology synopsis of the tasks to be performed;
7. All disbursements shall be included in the fee proposal, listed separately from the fees and according to task;
8. All invoices shall include the description of the task, staff enlisted to carry out the task, number of hours per staff;

Attachments:

1. Storage Barn DSS, 2019
2. HL BARN - Preliminary Plans - 2019-09-09.pdf
3. Weir & Bridge BH.TP locations.pdf
4. 191015 - Fee Schedule_ Barn.Bridge.Weir Rehab.docx
5. Approximate Location.pdf

The Point of Contacts for this RFP will be Philippe Malepart and Patrick Dinelle.
Please respond with your intent to submit a Proposal.
Please ensure all those in CC are included in future correspondence and the Submission of Proposal.

Thank you for your prompt consideration.

Regards,

Colin Enright, RSE

Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction

Colin.Enright@ncc-ccn.ca
613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
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Canada

Page 107

is not relevant

est non pertinente

NATIONAL CAPITAL COMMISSION

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION SERVICES, 1000 MEECH LAKE,
ASSETS #94038, 349892, 349502

FILE: DC-XXXX-XX-XX FEE SCHEDULE COMPARISON

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION SERVICES, 1000 MEECH LAKE, ASSETS #94038, 349892, 349502																
Item No.	**Description**	**Unit**	**Est. Quantity**	**Unit Price**	**Amount**	**Est. Quantity**	**Unit Price**	**Amount**	**Est. Quantity**	**Unit Price**	**Amount**	**Est. Quantity**	**Unit Price**	**Amount**
1	General Conditions & Scope of Work Tasks # 1, 5, 6, 8	Lump Sum	**Fee Schedule not provided. to submit after follow up.**			**Notice of "No Bid" received.**			-	-		-	-	
2	Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7	Lump Sum							-	-		-	-	
3	Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7	Lump Sum							–	-		–	-	
4	Environmental Characterization, all locations, Scope of Work Tasks #4, 7	Lump Sum							-	-		-	-	
5	Disbursements	Lump Sum							-	-		-	-	
				Total before taxes						Total before taxes			Total before taxes	
				GST / QST 14.975%						GST / QST 14.975%			GST / QST 14.975%	
				Proposal Total						**Proposal Total**			**Proposal Total**	
				RANK	**3**		**RANK**	n/a		**RANK**	**2**		**RANK**	**4**

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION SERVICES, 1000 MEECH LAKE, ASSETS #94038, 349892, 349502									
Description	**Unit**	**Est. Quantity**	**Unit Price**	**Amount**	**Est. Quantity**	**Unit Price**	**Amount**	**Est. Quantity**	**Unit Price**	**Amount**
General Conditions & Scope of Work Tasks # 1, 5, 6, 8	Lump Sum	**No Bid**			-	-		**No Bid**		
Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7	Lump Sum				-	-				
Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7	Lump Sum				–	-				
Environmental Characterization, all locations, Scope of Work Tasks #4, 7	Lump Sum				-	-				
Disbursements	Lump Sum				-	-				
						Total before taxes	26,165.00			
						GST / QST 14.975%	3,918.21			
						Proposal Total	30,083.21			
				RANK	n/a		**RANK**	**1**		**RANK**	n/a

From: Tremblay, Thierry
Sent: November 26, 2019 10:45 AM
To: Enright, Colin
Subject: RE: RFP Geotechnical Investigation Services - Meech Lake

Good morning,

Approved.

Thanks Colin.

Regards,

Thierry Tremblay, ing., P.Eng.
Acting Chief of Engineering
Chef de l'ingénierie par interim
Division Design & Construction Division
thierry.tremblay@ncc-ccn.ca
☎613-239-5678, ext. / poste 5734
613-295-6658

Commission de la capitale nationale
National Capital Commission
Canada

From: Enright, Colin <Colin.Enright@ncc-ccn.ca>
Sent: Tuesday, November 26, 2019 10:06 AM
To: Tremblay, Thierry <Thierry.Tremblay@ncc-ccn.ca>
Subject: RE: RFP Geotechnical Investigation Services - Meech Lake

revised proposal for SOA holder approval.
Thanks.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
☎613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

From: Tremblay, Thierry
Sent: Monday, November 25, 2019 2:02 PM
To: Enright, Colin
Subject: RE: RFP Geotechnical Investigation Services - Meech Lake

Hi Colin,

Please ask to remove their estimate of drilling hours. This should be a lump sum contract.

Regards,

Thierry Tremblay, ing., P.Eng.
Acting Chief of Engineering
Chef de l'ingénierie par interim
Division Design & Construction Division
thierry.tremblay@ncc-ccn.ca
☎613-239-5678, ext. / poste 5734
613-295-6658

Commission de la capitale nationale
National Capital Commission
Canada

From: Enright, Colin <Colin.Enright@ncc-ccn.ca>
Sent: Monday, November 25, 2019 12:42 PM
To: Tremblay, Thierry <Thierry.Tremblay@ncc-ccn.ca>
Cc: Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>; Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>; Lu, Feiying <Feiying.Lu@ncc-ccn.ca>; Yang, Qing <Qing.Yang@ncc-ccn.ca>
Subject: RFP Geotechnical Investigation Services - Meech Lake

Hi Thierry,

The results of the HL RFP for Geotech investigations have been reviewed, and we would like to issue a PO to via the SOA in the amount of $30,083.21 (incl. QC tax). There is currently $377,972.50 remaining in the PA.
Feiying and Qing have been comprehensively involved in the process, and can provide further information if requested.

Please provide authorization for use of the PA.
Thanks.

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction

Colin.Enright@ncc-ccn.ca
☎613-239-5678, x.5832
613-355-0671

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE
Canada

From: Malepart, Philippe
Sent: November 29, 2019 2:46 PM
To: Zoukou, Stephan
Cc: Enright, Colin; Gruder, David
Subject: RE: PR Request - HL Geotech Inv. RFP

Salut Stephan,

Suite à notre discussion cet après-midi, merci de faire à nouveau les corrections suivantes au PR, en bleu ci-bas cette fois.

Merci et salutations,

Philippe Malépart, P.Eng. Ing., PMP
Project Manager / Gestionnaire de projets
philippe.malepart@ncc-ccn.ca
☎613-239-5678, ext. / poste 5599
343-549-6581

National Capital Commission
Commission de la capitale nationale
Canada

De : Malepart, Philippe
Envoyé : 28 novembre 2019 10:26
À : Zoukou, Stephan <Stephan.Zoukou@ncc-ccn.ca>
Objet : RE: PR Request - HL Geotech Inv. RFP

Merci Stephan de faire les corrections suivantes au PR, tel que discuté au téléphone (en rouge ci-bas)

Salutations,

Philippe Malépart, P.Eng. Ing., PMP
Project Manager / Gestionnaire de projets
philippe.malepart@ncc-ccn.ca
☎613-239-5678, ext. / poste 5599
343-549-6581

National Capital Commission
Commission de la capitale nationale
Canada

De : Enright, Colin <Colin.Enright@ncc-ccn.ca>
Envoyé : 26 novembre 2019 11:18
À : Zoukou, Stephan <Stephan.Zoukou@ncc-ccn.ca>
Cc : Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>; Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>; Lapensée, Allan <allan.lapensee@ncc-ccn.ca>
Objet : PR Request - HL Geotech Inv. RFP

Salut Stephan,

Could you prepare a PR for the following:

PR for HL Geotech Investigations (for 3 projects).
Distribution: 311_01 (~20% - $5,233) Barn
347_01 (~40% - $10,466) Dam
313_01 (~40% - $10,466) Bridge
PR Amount : $26,165.00 +Tax (GST/QST) (work in Quebec)
Firm :
SOA:
Est. Completion Date : March 2020
Attachments: RFP, Proposal, Proposal Clarifications Correspondence, Fee schedules, SOA Holder Approval

All other related documents (Competitive Proposals received, etc.) can be here:

Regards,

Colin Enright, RSE
Project Officer / Agent de projets de construction
Design & Construction Branch | Division du design & construction
Colin.Enright@ncc-ccn.ca
☎613-239-5678, x.5832
613-355-0671

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NATIONAL CAPITAL COMMISSION
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s.16(2)(c) s.20(1)(c)

PURCHASE ORDER / BON DE COMMANDE

PO-010059-2

BILL TO:
National Capital Commission
Accounts Payable
202 - 40 Elgin Street
Ottawa, ON K1P 1C7
or / ou : email / courriel :

FACTURER À:
Commission de la capitale nationale
Comptes fournisseurs
40 rue Elgin, pièce 202
Ottawa, ON K1P 1C7
payables@ncc-ccn.ca

SHIP TO / EXPÉDIER À:
National Capital Commission
202 - 40 Elgin Street
OTTAWA, ON K1P 1C7
CAN

SUPPLIER / FOURNISSEUR:

CAN

BUYER / ACHETEUR:
Thara Abraham

CONTACT PERSON / PERSONNE RESSOURCE:
Philippe Malépart

CONFIRMATION DATE / DATE DE CONFIRMATION
11-Dec/Déc-2019
VENDOR NUMBER / NUMÉRO DU FOURNISSEUR
PURCHASE AGREEMENT NUMBER / NUMÉRO DE L'OFFRE D'ACHAT
TOTAL AMOUNT / MONTANT TOTAL (CAD)
$30,083.20

LINE LIGNE	DESCRIPTION	DELIVERY DATE DATE DE LIVRAISON	AMOUNT MONTANT
1	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$10,466.00
2	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$10,466.00
3	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$5,233.00

NOTE TO SUPPLIER / AU FOURNISSEUR :

PAYMENT TERM/MODE DE PAIEMENT:	Net 30 days/jours
SHIP VIA / MODE DE LIVRAISON :	Carrier of Supplier / Transporteur du fournisseur
F.O.B. / F.A.B. :	Destination
SHIPMENT COSTS / FRAIS DE TRANSPORT :	Included / Inclus

SUB-TOTAL / SOUS-TOTAL :	$26,165.00
TAX / TAXES :	$3,918.20
TOTAL :	$30,083.20

Note to Supplier: A representative of the NCC Corporate Security may communicate with you to address the security requirement(s) of this transaction.
Note au fournisseur: Un représentant de la sécurité de la CCN pourrait communiquer avec vous afin d'aborder l'aspect de sécurité de cette transaction.

To ensure prompt payment, please prepare your invoice in accordance with the prices quoted and clearly indicate the Purchase Order number. Errors in invoicing can cause delay of payment. THE TOTAL AMOUNT INCLUDES ALL APPLICABLE TAXES. IF YOU ARE NOT AUTHORIZED TO COLLECT THOSE TAXES, THE NCC WILL PAY THEM DIRECTLY TO THE GOVERNMENTS.

Afin de vous assurer d'un règlement rapide, veuillez préparer votre facture selon les prix cotés et indiquer clairement le numéro de bon de commande. Des erreurs dans la facturation peuvent causer des délais de paiement. LE MONTANT TOTAL INCLUT TOUTES LES TAXES APPLICABLES. SI VOUS N'ÊTES PAS AUTORISÉ À PERCEVOIR CES TAXES, LA CCN LES REMETTRA DIRECTEMENT AUX GOUVERNEMENTS

Allan Lapensée
AUTHORIZED SIGNATURE / SIGNATURE AUTORISÉE

From: Zoukou, Stephan
Sent: March 3, 2020 1:54 PM
To: Zoukou, Stephan
Subject: TR: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs
Attachments: IN-SO-040535 - Change Order Request - Weir and Bridge Replacement, and Barn Rehab.pdf; RE: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Stéphan Zoukou
Adjoint aux Finances & à l'Admin.
Finance & Admin. Assistant
Design & Construction
stephan.zoukou@ncc-ccn.ca
☎613-239-5678, ext. / poste 5779

Commission de la capitale nationale
National Capital Commission
Canada

De : Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>
Envoyé : 3 mars 2020 12:41
À : Zoukou, Stephan <Stephan.Zoukou@ncc-ccn.ca>
Cc : Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>
Objet : FW: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Salut Stephane ,
Svp peut aviser sur la meilleur façon ou bien les formulaire a remplir pour cette extra a

Merci

From:
Sent: March 3, 2020 12:06 PM
To: Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>
Cc: Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>
Subject: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Hi Patrick,

As discussed and agreed to, please find attached our request for a change order for the additional drilling time for the barn. I'd like to thank you for all your help and consideration throughout this project.

Best Regards

Project Manager

March 3, 2020 Ref No.: IN-SO-040535

National Capital Commission
Design and Construction Division
202-40 Elgin Street
Ottawa, Ontario
K1P 1C7

Attn.: Mr. Patrick Dinelle
Construction Project Officer

Re: Request for Change Order
Geotechnical Investigation for Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation
Heritage Property, 1000 Meech Lake, Quebec
SOA No:

is retained by the National Capital Commission (Client) for the Geotechnical & Environmental Characterization Investigations and Engineering Guidelines in support of the Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation (Project) located at the Heritage Property, 1000 Meech Lake (Site) in Quebec.

is currently working under purchase order (PO) 010059-2, which has a total value of $26,165.00. Based on our discussion and agreement with Patrick Dinelle of the Client, this request for a change order is for an additional budget of $557.25 (excluding taxes) to cover for the additional drilling efforts that were required at the barn location. Please see the attached table for the breakdown.

We trust the above request meets with your current requirements. Please don't hesitate to contact us if you have any questions.

Project Manager

Attachment B: Fee Schedule Breakdown

Proposed Task	[redacted] Personnel					Construction Services			Subcontractors or Disbursements	Estimated Cost	Request for Additional Budget
	Construction Supervisor	Draftsman / CAD Operator	Engineer Level D	Engineer Level E	Engineer Level F	Modified Proctor Test	Granulometry Test	Nucleodensimeter Test			
Applicable Unit Rates	/hr	/hr	/hr	/hr	/hr	/test	/test	/test			
General Conditions & Scope of Work Tasks # 1, 5, 6, 8											
Coordination	4				8						
									Subtotal =		
Lake Weir & Bridge Investigations, Scope of Work Tasks #2, 7											
Fieldwork Supervision	14										
Geotechnical Laboratory Testing							4				
Reporting	19	2.5		10	8.5						
									Subtotal =		
Barn Rehab and Add. Structures, Scope of Work Tasks #3, 7											
Fieldwork Supervision	25										
Geotechnical Laboratory Testing							2				
Reporting	16	6.5		8	5						
									Subtotal =		
Environmental Characterization, all locations, Scope of Work Tasks #4, 7											
Laboratory Testing											
Reporting	6			3	2						
									Subtotal =		
Disbursements											
Utility Locates Subcontractor											
Geotechnical Drilling Subcontractor											
Excavating Subcontractor											
									Subtotal =		
									Estimated Budget =	$26,165.00	$557.25

s.16(2)(c)

From: Tremblay, Thierry
Sent: March 3, 2020 1:52 PM
To: Zoukou, Stephan
Subject: RE: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

approved

Please note that I will be out of the office on Friday, February 28, and Monday, March 2./
Veuillez noter que je serai hors du bureau vendredi le 28 février et lundi le 2 mars.

Thierry Tremblay, ing., P.Eng.
Acting Chief of Engineering
Chef de l'ingénierie par interim
Division Design & Construction Division
thierry.tremblay@ncc-ccn.ca
☎613-239-5678, ext. / poste 5734
613-295-6658

Commission de la capitale nationale
National Capital Commission
Canada

From: Zoukou, Stephan <Stephan.Zoukou@ncc-ccn.ca>
Sent: Tuesday, March 3, 2020 1:18 PM
To: Tremblay, Thierry <Thierry.Tremblay@ncc-ccn.ca>
Cc: Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>; Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>
Subject: TR: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Good afternoon Thierry,
The following is to request your approval for the use of SOA for the attached requisition.
Let me know if you have any question.

Thank you.

Stéphan Zoukou
Adjoint aux Finances & à l'Admin.
Finance & Admin. Assistant
Design & Construction
stephan.zoukou@ncc-ccn.ca
☎613-239-5678, ext. / poste 5779

s.16(2)(c)
s.19(1)

Commission de la capitale nationale
National Capital Commission
Canada

De : Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>
Envoyé : 3 mars 2020 12:41
À : Zoukou, Stephan <Stephan.Zoukou@ncc-ccn.ca>
Cc : Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>
Objet : FW: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Salut Stephane ,
Svp peut aviser sur la meilleur façon ou bien les formulaire a remplir pour cette extra a

Merci

From:
Sent: March 3, 2020 12:06 PM
To: Dinelle, Patrick <Patrick.Dinelle@ncc-ccn.ca>
Cc: Malepart, Philippe <Philippe.Malepart@ncc-ccn.ca>
Subject: IN-SO-40535 - Request for Change Order - Barn Rehabilitation, and Lake Weir/Bridge Repairs

Hi Patrick,

As discussed and agreed to, please find attached our request for a change order for the additional drilling time for the barn. I'd like to thank you for all your help and consideration throughout this project.

Best Regards

Project Manager

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is withheld pursuant to section

est retenue en vertu de l'article

16(2)(c)

of the Access to Information Act

de la Loi sur l'accès à l'information

National Capital Commission
Design and Construction Division
202-40 Elgin Street
Ottawa, Ontario
K1P 1C7

April 21, 2020

Attn: Mr. Patrick Dinelle
Project Officer

Subject: Results of Environmental Sampling
Bridge Replacement/Repair, Weir Repair, and Barn Rehabilitation
Heritage Property, 1000 Meech Lake Road, Chelsea, Québec

Ref No: IN-SO-040535

1.0 INTRODUCTION

was retained by the National Capital Commission (NCC, Client) to perform a limited scope of environmental sampling of select soils and groundwater samples retained during the Geotechnical Investigation for the proposed Lake Bridge Replacement/Repair, Lake Weir Repair, and Barn Rehabilitation (Project), located at 1000 Meech Lake Road, (Site), in Chelsea, Québec.

In general, the location of the Site is nearby the Prime Minister's cottage, located on Harrington Lake in Gatineau Park. There are three structure locations at the Site and they consist of bridge repair/replacement, weir repair, and barn rehabilitation. The bridge and weir are located along a creek at the outlet, on the south side of the lake, whereas the barn lies in a wooded area and is surrounded by a forested slope. There are soil and groundwater samples from the three individual structures included within this letter.

Bridge Repair/Replacement: The existing wooden bridge is approximately 120 m northeast of the cottage. It is a small wooden bridge along the roadway crossing the creek downstream of Harrington Lake. The upcoming construction project is intending to repair or replace the bridge abutment;

Weir Repair: The existing weir is approximately 95 m north of the cottage. It is a small approximately 0.6 m tall concrete weir upstream of the bridge at the outlet of Harrington Lake. The upcoming construction project is intending to perform localized repairs on this weir; and

Barn Rehabilitation: The existing two-story barn is approximately 330 m northeast of the cottage. It is in poor repair and is constructed of multiple construction materials. The upcoming

construction project is intending to repair and add new foundations to the barn as well as to construct a retaining wall around the barn, and an exterior carport.

A Site Location Map labeled as Figure 1 is attached at the end of this report in Appendix A.

It is important to emphasize that this letter does not constitute a Phased Environmental Site Assessment (ESA) process. has not performed an environmental study of the Site setting or of the applicable contaminants of concern. This letter is not intended to assess the environmental quality of the soils on the Site as a whole, but rather to provide factual information about the samples that were taken from the borehole locations during the Geotechnical Investigation to assist with the planning for the handling of excess soils during the construction phase.

2.0 SCOPE OF WORK

scope of work was documented in the "Proposal for Geotechnical & Environmental Characterization Investigations and Engineering Guidelines" prepared by (Ref No: IN-SO-040535 (Rev2), dated November 26, 2019), and agreed to by Mr. Allan Lapensée, of NCC, by means of a Purchase Order (PO No.: PO-10059) received on December 11, 2019.

In general, field scope of work for the Geotechnical Investigation consisted of advancing one (1) borehole at the bridge location, one (1) borehole and one (1) test pit at the weir location, and five (5) boreholes and one (1) test pit at the barn location. Borehole Location Plans labeled as Figures 2 and 3 along with the applicable borehole logs for the Project are attached at the end of this report in Appendix A.

Boreholes were generally drilled to 5.0 m below the existing ground surface (mbgs), whereas test pits were generally excavated to the underside of the existing footings. Borehole locations and depths were prescribed by the NCC in the terms of reference for this Project. The environmental sampling component for the investigation consisted of a total of five bulk soil samples, one TCLP sample, and one groundwater sample. It's important to note that the sample chemical parameters for this Project were prescribed by the Client.

3.0 FIELDWORK

The geotechnical drilling, test pits, and soil sampling was performed on December 8, 2019 and from January 8 through 16, 2020. A total of seven (7) boreholes including two (2) monitoring well installs, and two (2) test pits were performed for this Project. The boreholes and test pits were labeled as such:

<u>Weir Location:</u>

- MW19-01
- TP19-01

<u>Bridge Location</u>

- BH19-02

Barn Location

- BH19-01, BH19-02, MW19-03, BH19-04, and BH19-05
- TP19-01

Boreholes were advanced using a combination of track mounted and portable drilling equipment, and the test pits were undertaken using a rubber-tired tractor backhoe Soil samples from the boreholes were collected using standard split-spoon samplers, and from the test pits consisted of grab samples. All soil samples were field screened using visual and olfactory observations (sheen, odour, staining).

performed the groundwater sampling on January 13, 2020. Borehole MW19-01 was found to have groundwater at an approximate depth of 2.7 mbgs, whereas borehole MW19-03 was found to be dry at approximately 4.9 mbgs. Groundwater samples were collected using waterra tubing and foot valve.

4.0 LABORATORY TESTING

Soil and groundwater samples were submitted to on January 13, 2020, under Chain of Custody Nos: 755207-01-01 and 202049-01-01. The environmental sampling component of the investigation consisted of the collection of seven (7) samples, and they are described in the following table:

Table A: List of Samples Submitted

SAMPLE	SAMPLE DEPTH	DESCRIPTION	TESTED PARAMETERS
Bridge Repair/Replacement			
MW19-01 SS-3	1.5-2.1 mbgs	FILL – silty sand, trace gravel, very loose, brown, damp	Metals, PHC(F1-F4), C_{10}-C_{50}, PAHs
MW19-01	2.7 mbgs	Groundwater	Metals, PHC(F1-F4). PAHs
Weir Repair			
BH19-02 SS-1	0.2-0.8 mbgs	FILL – sand and gravel, trace roots and wood, compact, brown, damp	Metals, PHC(F1-F4), C_{10}-C_{50}, PAHs
Barn Rehabilitation			
BH19-01	0.2-0.4 mbgs	FILL – granular base course underlying the slab	Metals, PHC(F1-F4), C_{10}-C_{50}, PAHs
MW19-03 SS-3	1.5-2.2 mbgs	FILL – sand and gravel, loose, brown, damp	Metals, PHC(F1-F4), C_{10}-C_{50}, PAHs
BH19-04 SS-2	0.8-1.4 mbgs	NATIVE – sand and gravel, compact, brown, damp	Metals, PHC(F1-F4), C_{10}-C_{50}, PAHs

SAMPLE	SAMPLE DEPTH	DESCRIPTION	TESTED PARAMETERS
TCLP-1	Varies	Composite sample of BH19-01, BH19-03 SS-3, and BH19-04 SS-2	Ignitability, TCLP Metals and Inorganics, Benzo(a) Pyrene

The quantity of testing and the chemical parameters tested for were prescribed by the Client in their terms of reference.

5.0 RESULTS AND EVALUATION

The certificates of analysis along with the laboratory analytical results of the samples are attached in Appendix C.

The results of the five (5) soil samples were compared to the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for the Protection of the Environment and Human Health, Residential/Parkland use, coarse grained soil (1999 as updated) and for the case of Petroleum Hydrocarbons (PHC), the CCME Canada-Wide Standards (CWS) for PHC in Soil, Tier 1 Levels for Surface Soil, Residential/Parkland Use, Coarse Grained Soil (2008); and the Québec Ministre du Dévelopment Durable, de l'Environnement et de la Lutte contre les Changements Climatiques (MDDELCC) Soil Protection and Contaminated Sites Rehabilitation Policy, Level A, B, and C Soil Criteria (1998 as updated) or Schedule I and II of the Land Protection and Rehabilitation Regulation. A summary table displaying lab results for the five (5) soil samples compared to the CCME CSQGs (as amended) and the MDDELCC soil quality guidelines is provided in Appendix B.

The results of the one (1) groundwater sample were compared to the CCME Canadian Water Quality Guidelines (CWQGs) for the Long Term Protection of Freshwater Aquatic Life; the Québec MDDELCC Soil Protection and Contaminated Sites Rehabilitation Policy, Criteria grid applicable to Cases of Groundwater Contamination for Drinking Water (1998 as updated); and the Soil Protection and Contaminated Sites Rehabilitation Policy, Criteria Grid Applicable to Cases of Groundwater Contamination for Seepage into Surface Water. A summary table displaying lab results for the one (1) sample that was submitted for groundwater analysis compared to the CCME CWQGs and the MDDELCC water quality guidelines are provided in Appendix B.

The results of the TCLP analysis were compared to the criteria provided in Ontario Regulation (O. Reg.) 558/00 (as amended) for soil future soil disposal purposes during construction work if required.

Table B: Summary of Testing Results

SAMPLE	DESCRIPTION	SUMMARY OF RESULTS
Bridge Repair/Replacement		
MW19-01 SS-3	FILL – silty sand, trace gravel, very loose, brown, damp	No exceedance of the MDDELCC Level B or CCME CSQGs for the tested parameters in this sample.
MW19-01	Groundwater	No exceedance of the MDDELCC Drinking Water criteria or CCME CSQGs for the other tested parameters in this sample except for the metal concentrations. Water sample for metals was compromised and the results were not reliable.
Weir Repair		
BH19-02 SS-1	FILL – sand and gravel, trace roots and wood, compact, brown, damp	No exceedance of the MDDELCC Level B or CCME CSQGs for the tested parameters in this sample.
Barn Rehabilitation		
BH19-01	FILL – granular base course underlying the slab	**Exceedance of the CCME CSQGs for high pH in this sample.**
BH19-04 SS-2	NATIVE – sand and gravel, compact, brown, damp	No exceedance of the MDDELCC Level B or CCME CSQGs for the tested parameters in this sample.
MW19-03 SS-3	FILL – sand and gravel, loose, brown, damp	**Exceedance of the MDDELCC Level A criteria for Arsenic and Zinc.** **Exceedances in this sample for Petroleum Hydrocarbons (C_{10}-C_{50}), Acenaphthylene, Anthracene, Benzo(c)phenanthrene, Dibenzo(a,i)pyrene, and Fluoranthene when compared to the MDDELCC Level A criteria;** **Exceedances in this sample for Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(j)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene when compared to the MDDELCC Level B criteria;** **Exceedances for Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(j)fluoranthene, Benzo(k)fluoranthene,**

SAMPLE	DESCRIPTION	SUMMARY OF RESULTS
		Dibenzo(a,h)anthracene, Naphthalene, Phenanthrene, Pyrene and high pH when compared to the CCME CSQGs
TCLP-1	Composite sample of BH19-01, BH19-03 SS-3, and BH19-04 SS-2.	Considered as non-hazardous solid waste according to O.Reg 558/00

6.0 CONCLUSIONS

Based on the exceedances shown in Table B, the following recommendations for the handling of the soils as follows:

Bridge Repair / Replacement:

- The fill soils, as represented by sample MW19-01 SS-3, were found to meet the MDDELCC Level B or CCME CSQGs for the tested parameters.
- The groundwater sample, as represented by MW19-01, the parameters tested (i.e. VOCs, PHCs, PAHs, and pH) were found to meet with the MDDELCC Drinking Water criteria or CCME CWQGs. The sample for metals was compromised and thus the results are not reliable. It is recommended to proceed with a resampling of the groundwater and to resubmit the sample for dissolved metals.
- The native soils at these locations were not assessed.

Weir Repair:

- The fill soils, as represented by sample BH19-02 SS-1, were found to meet with the MDDELCC Level B or CCME CSQGs for the tested parameters.
- The native soils at this location was not assessed.

Barn Rehabilitation:

- The fill soils, as represented by sample BH19-01, had exceedances of pH when compared to the CCME CSQGs. However, pH is not considered a contaminant for the purposes of this Environmental Sampling Letter. The native soils, as represented by sample BH19-04 SS-2, were found to meet with the MDDELCC Level B or CCME CSQGs for the tested parameters.
- The fill, as represented by MW19-03 SS-3, had exceedances of Arsenic and Zinc when compared to the MDDELCC Level A criteria; and Petroleum Hydrocarbons (C_{10}-C_{50}), Acenaphthylene, Anthracene, Benzo(c)phenanthrene, Dibenzo(a,i)pyrene, and Fluoranthene when compared to the MDDELCC Level A criteria; and Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(j)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene when compared to the MDDELCC Level B; and Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(b)fluoranthene,

Benzo(j)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Naphthalene, Phenanthrene, Pyrene and high pH when compared to the CCME CSQGs.

- The soil, as characterized by the TCLP sample, is considered as non-hazardous solid waste under O.Reg. 558/00 (as amended).

7.0 SOIL MANAGEMENT PLAN

In preparing the soil management plan, we understand that the intent of the future construction for the noted structures in section 1.0 are not considered to be for remediation purposes. Therefore, the soil and groundwater management associated with the proposed work is for the management of excess soils during construction only, and does not constitute a Phased Environmental Site Assessment (ESA) process.

As indicated in section 5.0, only one soil sample MW19-03 SS-3 displayed exceedances in PAHs and C_{10}-C_{50} when compared to the MDDELCC Level A and Level B criteria of the Quebec Soil Protection and Contaminated Site Rehabilitation Policy (Policy). As such, the soil will need to be excavated from the Site and managed in accordance to the excess soils management options within the Policy; Contractors are to refer to Appendix 5 of the Policy.

The remaining soil samples that were tested did not display any exceedances when compared to the MDDELCC Level A criteria, and as such, would not limit restrictions associated with their management and would be considered inert fill; this includes the soils within the locations of the bridge repair/replacement, weir repair, and barn rehabilitation except for the soils near the vicinity of borehole MW19-03.

For residential use areas, the available management options for a site that may contain a combination of soils which display exceedances of the MDDELCC Level B criteria and soils that do not display exceedances above the MDDELCC Level A criteria, may include the following options:

- Disposal in a solid waste landfill as daily/weekly cover;
- In-situ treatment; or
- Disposal in an approved landfill (both in Quebec or Ontario).

Based on the anticipated volume of contaminated soil to be generated at the site during construction, the in-situ treatment would not be considered an economical option. Therefore, the off-site disposal option in an approved landfill would most likely be a suitable option for the excess soil management.

At any time during the construction phase, should any suspicious contaminated soils be encountered, it is recommended that such soils be stockpiled on Site; the soil materials will need to be stockpiled under and covered with polyethylene sheets. The soils will also need to be sampled by trained field staff, and tested for the following parameters for disposal purposes:

- Metals
- PAHs
- HP C_{10}-C_{50}
- VOCs

If the soils are being disposed in an Ontario approved landfill facility, it is recommended that a TCLP analysis be complete on the sample. If the tested soils display no exceedances, and all parameters are below the MDDELCC Level A criteria, there would be no restriction for its re-use on Site or its disposal as inert fill off-site.

Haul trucks leaving site with contaminated soils for landfill facilities should have tarps on to control dust and particulate emission during hauling to the landfill site. Wheels, tires and undercarriage of the haul trucks and any heavy equipment used at site should be inspected and cleaned to avoid soil tracking off-site.

8.0 CLOSURE

We trust that the information herein meets your current requirements. Should you have any questions, please do not hesitate to contact the undersigned, at your convenience.

Sincerely,

Project Manager

Director, Senior Principal

Enclosures: Appendix A
Appendix B
Appendix C

APPENDIX A

SITE LOCATION MAP
BOREHOLE LOCATION PLAN
BOREHOLE LOGS

APPENDIX B

SUMMARY TABLE RESULTS

APPENDIX C
LABORATORY RESULTS

GEOTECHNICAL INVESTIGATION REPORT

WEIR AND BRIDGE REPLACEMENT

1000 MEECH LAKE ROAD

CHELSEA, QUEBEC

File No.: IN-SO-040535

APRIL 24, 2020

Prepared for:

National Capital Commission

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1. INTRODUCTION

was retained by the National Capital Commission (Client) to carry out a Geotechnical Investigation for the Weir and Bridge Replacement (Project) located at 1000 Meech Lake Road (Site) in Chelsea, Quebec.

A Purchase Order (PO-010059-2) was received on December 11, 2019 from Thara Abraham of the Client to proceed with the investigation.

is pleased to present the results of this Geotechnical Investigation. This report is prepared for the sole use of the Client. The use of the report, or any reliance on it by any third party, is the responsibility of such third party. This geotechnical investigation report is subject to the limitations shown in Appendix A. It is understood that the Project will be performed in accordance with all applicable codes and standards present within its jurisdiction.

2. SITE AND PROJECT DESCRIPTION

2.1 Site Description

The Site is located nearby the Prime Minister's cottage on Harrington Lake in Gatineau Park. Specifically, the location of the existing wooden bridge is approximately 120 m northeast of the cottage, and the weir is approximately 95 m north of the cottage. In general, the existing wooden bridge lies within a gravelly access road, above a creek with a downstream flow to the east direction of the Site; the bridge has a support capacity of 30,000 kilograms and is supported by hemlock abutments.

The existing weir is located approximately 70 m west of the bridge; it lies at the outlet of Harrington Lake. Based on the Request for Proposal (RFP) and supporting documents from the Client, we understand that the weir was constructed in the 1970s. It appears to consist of a 0.3 m high by 0.2 m wide by 3.8 m long wooden beam topped with a triangular concrete cap. It Is founded approximately 0.6 m below the ground surface.

The location of the Site is shown on the Site Location Map and attached as Figure 1 in Appendix B.

2.2 Project Description

understanding of the Project is based on the information provided by the Client at the time of the proposal, specifically the RFP. understands that the proposed Project will consist of the following:

- Removal of the existing bridge structure while attempting to preserve its existing hemlock abutments, and construction of a new 12 m x 5 m three span steel bridge with an increased capacity of 36,000 kilograms;
    - Helical piles are intended to be installed to support the future steel bridge, and

  - Replacement of the existing hemlock bridge abutments with new concrete abutments may also be an option.
- Possible replacement of the existing weir structure.

In preparing this report, it's important to note that the current Project is in its preliminary concept design stage and has not been provided with specific design details. Furthermore, has not performed any assessment of the existing conditions or structural integrity of the hemlock abutments or the weir

3. SCOPE OF WORK

scope of work for this investigation was documented in the proposal (Ref No: IN-SO-40535 Rev. 2, dated November 26, 2019) and agreed to by issuance of PO-010059-2 that was received on December 11, 2019. In general, the scope of work for this Geotechnical Investigation included the following items. It is important to emphasize that the location and depth of the boreholes were prescribed by the Client.

- retained a private underground utility locating subcontractor to provide public and private underground utility clearances;
- retained a geotechnical drilling subcontractor and drilled the following boreholes using a track mounted drill rig:
  - Two (2) boreholes to auger refusal or a maximum of 5.0 mbgs, one located next to the bridge and one located next to the weir;
  - One (1) of these boreholes included a monitoring well install.
- retained an excavating subcontractor and excavated the following test-pit using a rubber-tire backhoe:
  - One (1) test-pit against the existing weir's east downstream face to investigate its foundation and dimensions.
- supervised the drilling/excavations and logged the soil conditions at the borehole and test-pit locations based on the samples that were recovered;
- recorded the groundwater level at the monitoring well location,
- recorded the ground surface elevations at the borehole/test-pit locations using a laser level;
- submitted representative soil samples to the geotechnical laboratory for the following testing:
  - Moisture contents on all the recovered soil samples,
  - Grain size analysis on four (4) soil samples, and
  - Corrosion package on one (1) soil sample.
- prepared this Geotechnical Investigation report based on the results of the fieldwork and laboratory testing.

It is important to re-emphasize that assessments of the existing weir and bridge abutments are outside of scope of work. mandate was to drill the boreholes and excavate the test pits at the locations and to the depths requested by the Client. Additional investigation may be required to properly assess the founding soils at individual pier locations or to assess the seepage below the weir, if necessary.

4. FIELDWORK AND LABORATORY TESTING

4.1 Fieldwork

The fieldwork was conducted on December 17, 2019 and from January 8 to 9, 2020. The field program included the advancement of one (1) test-pit labelled as TP19-01, and two (2) boreholes labelled as MW19-01 and BH19-02. The locations of the test-pit and boreholes is shown in the Borehole Location Plan on Figure 2 in Appendix B.

The excavation of the test-pit was performed by an excavation subcontractor, using a rubber-tire backhoe to excavate through the overburden soils. The drilling of the boreholes was performed by a geotechnical drilling subcontractor, by using a track mounted drill rig outfitted with hollow stem augers. Soil samples were recovered using a standard 50 mm diameter split spoon sampler. The compaction of cohesionless soils were assessed using Standard Penetration Test (SPTs) and the shear strengths of cohesive soil samples were estimated using Field Vane Test (FVTs) and Pocket Penetrometer (PP) resistance values.

The drilling program was supervised by geotechnical field staff. The subsurface stratigraphy encountered in the test-pit and boreholes was recorded by the representative, and submitted to laboratory for further examination. The test-pit was advanced and terminated at approximately 0.9 mbgs. Both boreholes, MW19-01 and BH19-02, were advanced to approximately 5.3 mbgs at the request of the Client.

The ground surface elevations at the test-pit and borehole locations were recorded by field staff using a self-leveling laser level. They were related to a temporary benchmark defined as the top of the weir. This temporary benchmark was assigned an arbitrary elevation of 100.00 m. It is important to emphasize that the temporary benchmark and the corresponding elevations described within this report are non-geodetic (NG) and are to be used for comparison purposes only within the context of this report.

4.2 Laboratory Testing

The laboratory testing component of this investigation consisted of determination of moisture contents on all the recovered soil samples, and grain size analysis on four (4) soil samples.

also submitted one (1) soil sample to a subcontractor laboratory to assess corrosion potential to ductile iron or concrete (pH, sulphides, chloride, sulphates, redox potential, and resistivity). Soil sample MW19-01 SS5 was delivered to in Ottawa on January 10, 2020, under chain of custody Ref No: 2002467.

The geotechnical laboratory testing along with the corrosion potential results are attached in the Geotechnical Laboratory Results in Appendix D.

In addition to the geotechnical laboratory testing, also submitted several soil and water samples to a certified laboratory for environmental testing in order to support the management of excess soils and water. The results of the environmental testing are provided under separate cover.

5. SOIL AND GROUNDWATER CONDITIONS

The subsurface conditions encountered at the borehole locations are summarized in Table 5-1 below and briefly discussed in the following subsections. A location-specific graphical representation of each borehole and test-pit is provided in detail on the Borehole Logs attached in Appendix C.

Table 5-1: Summary of Subsurface Conditions

Inferred Soil Layer	Bridge Structure	Weir Structure	
	MW19-01 mbgs (NG)	BH19-02 mbgs (NG)	TP19-01 mbgs (NG)
FILL	0.0 to 3.2 (101.7 to 98.5)	0.0 to 1.7 (101.0 to 99.3)	0.0 to 0.6 (99.9 to 99.3)
Silty Clay	-	-	0.6 to 0.9* (99.3 to 99.0)
Silty Sand	3.2 to 3.8 (98.5 to 97.9)	-	-
Silt	3.8 to 5.3* (97.9 to 96.4)	1.7 to 5.3* (99.3 to 95.7)	-

* End of borehole/test-pit at the indicated depth. Refusal not encountered.

It is important to note that the subsurface descriptions presented below and on the borehole logs represent the materials encountered at the discrete borehole locations only. They may vary between and beyond borehole locations. This is especially true in previously excavated and/or filled areas such as near existing and former utility trenches and around existing building foundations.

5.1 FILL

In all the boreholes, a FILL layer was present. The FILL was described as silty sand with trace gravel in MW19-01, and sand and gravel in BH19-01. The recorded SPT N-values in this FILL ranged from 10 to 2 in MW19-01 indicating a compact to very loose degree of compactness, and the N-values in BH19-02 ranged from 76 to 27 indicating a very dense to compact degree of compactness. The FILL was brown in colour and was revered in a damp to wet condition corresponding to moisture contents of 13 to 40 %. Some noticeable trace organics such as roots/rootlets and wood were retrieved in the spoon samples. The FILL depth in these boreholes extended from 0 to approximately 3.2 mbgs, corresponding to elevations near 101.7 to 98.5 NG.

The results of the grain size analyses on representative FILL samples are further presented in the table below. Based on the grain size distribution, the tested samples can be described as sand/silty sand with some to trace gravel, some silt, and some clay

Table 5-2: Summary of Grain Size Analyses in FILL

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-02 SS1	0.9 – 1.5	15	61	24	
MW19-01 SS2	0.9 – 1.5	9	65	26	

5.2 Silty Sand

In borehole MW19-01, the FILL was underlain by a native silty sand. The recorded SPT N-value for the silty sand was 25, indicating a compact degree of compactness. The silty sand was grey in colour and retrieved in a wet condition corresponding to a moisture content of 19 %. The depth of the silty sand extended from 3.2 to 3.8 mbgs, corresponding to elevations near 98.5 to 97.9 NG.

The results of the grain size analyses on a representative silty sand sample is further presented in the table below. Based on the grain size distribution, the tested sample can be described as sand with trace silt and trace gravel.

Table 5-3: Summary of Grain Size Analyses in Silty Sand

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
MW19-01 SS5	3.2 – 3.8	3	88	9	

5.3 Silt

In both boreholes MW19-01 and BH19-02, the silty sand or FILL were found to be underlain by a native silt with sand seams and some clay. The recorded SPT N-value for the silt ranged from 21 to 5, and the recorded pocket penetrometer (PP) values indicated a shear strength of approximately 147 kPa at the top to 48 kPa indicating a very stiff to firm consistency. The silt was grey in colour and recovered in a damp to wet condition corresponding to moisture contents of 17 to 29 %. The depth of this native silt extended from approximately 1.7 to termination depth of 5.3 mbgs, corresponding to elevations near 99.3 to 95.7 NG.

The results of the grain size analyses on a representative silt sample is further presented in the table below. Based on the grain size distribution, the tested sample can be described as silty clayey sand.

Table 5-4: Summary of Grain Size Analyses in Silt

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-02 SS3	1.7 – 2.3	0	54	46	

5.4 Groundwater

One (1) monitoring well was installed at borehole MW19-01, and the groundwater measurement for that borehole is recorded and summarized in the table below.

Table 5-5: Summary of Groundwater Observations

Borehole Location	Well Screen Details		Groundwater Observations	
	Screened Interval mbgs (NG)	Screened Subsoil	Water Level mbgs (NG)	Date
MW19-01	2.3 to 5.3 (99.4 to 96.4)	FILL/Silty Sand/Silt	2.7 (99.0)	January 10, 2020

The observed groundwater levels are subject to stabilization over time, seasonal fluctuations and in response to precipitation and snowmelt events. They are anticipated to be at their highest levels during the thaw in early spring.

The long-term monitoring of ground water or hydraulic testing was not part of scope of work for this Geotechnical Investigation.

5.5 Existing Weir Foundation

As part of this geotechnical investigation, excavated one test-pit, TP19-01, against the existing weir's east downstream face to investigate its foundation and dimensions. A detailed representation of the test-pit and the structure foundation is attached in Appendix C.

The soils at the test-pit consisted of a coarse gravel with trace sand FILL from the surface to 0.4 mbgs corresponding to elevations near 99.9 to 99.5 NG. The FILL generally had a dense degree of compactness, it was brown in colour, and was recovered in a moist condition. Below the coarse gravel FILL was a silty sand with trace gravel FILL which extended from 0.4 to 0.6 mbgs, corresponding to elevations near 99.5 to 99.3 NG. The silty sand FILL had a loose degree of compactness, was brown in colour, and retrieved in a moist state. Below the FILL, a native silty clay was encountered; it was stiff to very stiff in consistency, grey in colour, and retrieved in a moist state. The silty clay was encountered at a depth of 0.6 to termination depth of 0.9 mbgs, corresponding to elevations near 99.3 to 99.0 NG.

In general, the existing weir foundation consisted of a 300 mm deep concrete cap on top of a 300 mm deep wood beam. The wood beam was observed to be founded on the native stiff to very stiff silty clay, approximately 0.6 mbgs, corresponding to an elevation near 99.3 NG.

6. PRELIMINARY RECOMMENDATIONS

The preliminary general recommendations provided in this report are based on our current understanding of the Project, which is described in Section 2, and that it will be carried out in accordance with all applicable codes and standards. Any changes to the Project described will require a review by to assess the impact of the changes on the report recommendations provided.

Based on the soils encountered in the test locations, the most important geotechnical considerations for the design and construction of the proposed Project are expected to be the following:

- **Pre-Design Geotechnical Investigation:** At the time of this investigation, has not been provided with detailed designs of the proposed structures. The Project is currently in the pre-design stage. Therefore, it is important to emphasize that this Geotechnical Investigation report is preliminary in nature. requests to be retained when the final designs and specs become available to review that they meet with the intent of the recommendations in this report;
- **Variation in Soil Conditions at the Bridge**: scope of work at the bridge structure included only for a single borehole on the roadway, west of the north abutment. This was drilled to a prescribed depth of 5.0 mbgs as per the RFP. However, understands that the upcoming work for the bridge will include helical piles around both abutments and possible helical piles within the valley of the river to support piers. River valleys typically have deeper soils, zones of sediment, organics, and varying soil conditions that are observed up on the banks. Therefore, it is recommended that additional boreholes be performed at the proposed pier locations to confirm the soil conditions at the location.
- **Construction Dewatering:** Both repairs to the existing bridge and weir are located next to surface water courses. It is expected that excavations for these projects will be below the groundwater table; therefore, the control of both groundwater and river or lake water will likely be a significant part of this Project during construction. scope of work did not include for recommendations regarding groundwater or surface quantity or qualities. It is expected that any quick near the shores will require additional consulting and a specific dewatering plan which may include temporary cofferdams, dykes or other diversion method.
- **Support of Existing Hemlock Abutments:** Should the Designers consider the use of new concrete abutments or solutions that require excavation around the bridge abutments, then it's important to emphasize that the existing hemlock abutments are not to be undermined. Designers and Contractors should review the geometry of any planned excavations regarding their depths and sloping requirements.
- **Subgrade Preparation:** Subgrade preparation for new bearing elements such as a new weir and or new concrete abutments will involve the removal of all FILL soils, organics, disturbed/reworked soils to expose a native undisturbed subgrade. All subgrades should be reviewed and assessed by the Geotechnical Engineer.

Based on our understanding of the proposed Project, as well as the subsurface conditions encountered in the boreholes, and assuming them to be representative of the subsurface conditions across the Site, the following preliminary recommendations are provided.

6.1 Site Preparation

6.1.1 General Grading

The local Site in the vicinity of each repair location should be graded in the early stages of construction to provide for positive control of surface water, directing it away from excavations and subgrades. An adequate ditching, berms, and/or pumping system may be necessary to collect any surface runoff and groundwater accumulation in order to protect subgrades, and to allow for dry working conditions.

6.1.2 Interference with Existing Underground Utilities

Designers should review the proposed excavation layouts and compare them to the location of any existing underground utilities. Existing utilities that are excavated or exposed as part of construction will need to be supported, removed, or rerouted.

6.1.3 Subgrade Preparation

Subgrade for New Concrete Abutments

Foundations for the concrete abutments will need to be founded below the design frost depth and on native undisturbed soils. Based on borehole MW19-01, the native compact silty sand and/or very stiff to firm silt would likely be the founding subgrades for the new abutment, at an approximate depth of 3.2 mbgs. However, as described above, additional investigation is recommended to review the soil condition within the river valley and at the south abutment.

Subgrade preparation will involve the removal of all FILL soils, organics, disturbed/reworked or previously excavated soils to expose a native undisturbed subgrade. The Contractor should be prepared to deal with possible construction dewatering, which will include pumping from typical sump pumps as a minimum. The exposed surface should be examined and approved by the Geotechnical Engineer prior to forming to assess the competency.

6.2 Excavations

It is anticipated that the excavations for new concrete abutments will consist of open excavations to depths of approximately 3.2 mbgs. All excavations must be undertaken in accordance with the requirements of the Legislation of Construction Code and Safety Code, as well the CNESST guidelines regarding temporary excavations. The following recommendations for excavations should be considered as a supplement to, and not a replacement of the Construction Code and Safety Code.

The banks of an excavation or trench are shored solidly with quality materials in accordance with the plans and specifications of an engineer. Shoring is not required in the following cases:

- Where the trench or excavation is dug out of solid rock that cannot be excavated otherwise than by blasting, or where no workers are required to descend into it;
- Where there is no risk of the banks of the trench or excavation collapsing and where the existing soils on Site are sloped at a 45^{o} angle or less 1.2 m from the bottom, and
- Where there is no risk of the banks of the trench or excavation collapsing and where an engineer attests that it is not necessary to shore up the banks, given the slope, nature and stability of the ground. A copy of the engineer's attestation shall be available on the construction site at all times.

Local further flattening of the side slopes may be required for excavations below the groundwater level and in zones of persistent seepage. The stability of the excavation side slopes will be highly dependent on the Contractor's methodology and ability to effectively dewater the excavations. Further consultations are recommended to review the proposed excavations and possible shoring plans prior to the start of construction.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to twice the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

Designers and Contractors should plan excavations that no adjacent structures or infrastructure are undermined. If the limit of not undermining adjacent structures cannot be met, then an Engineered Shoring system and/or underpinning program will need to be considered. This is particularly important if excavating in the vicinity of the weir and the existing hemlock abutments.

6.3 Construction Dewatering

As part of this geotechnical investigation, installed one (1) monitoring well, MW19-01, in the overburden soils near the bridge. The summary of the groundwater observations was recorded and is provided in section 5.4 above for this location.

Based on the monitoring well observations, the groundwater was measured at 2.7 mbgs or at an approximate elevation near 99.0 NG. Based on our understanding of the Project, we understand that excavations for the new foundations will need to extend to a native undisturbed soil at approximate depths of 3.2 mbgs, which will be below the groundwater table.

Furthermore, both repairs to the existing bridge and the weir are located next to existing surface water courses. It is anticipated that excavations for these projects may be below the groundwater table. Therefore, the control of both groundwater and river or lake water during construction will be a significant part of the Project. scope of work did not include for recommendations regarding groundwater or surface quantity or qualities. It is expected that any work near the shores will require additional consulting and a specific dewatering plan which may include temporary cofferdams, dykes or other diversion methods.

Both surface water and groundwater seepage are expected in all excavations and will need to be controlled. Water quantities will depend on seasonal conditions, depths of excavations, and the duration that excavations are left open. Groundwater will travel easily through the fill material, and especially near the fill-native interface.

Comprehensive construction dewatering techniques by a specialized dewatering contractor may be required during construction. This may include pumping from sumps, ditches, and/or well points. The dewatering efforts will depend on a number of factors, including excavation depths, season, weather conditions, and the length of time the excavations are open. It should be left to the Contractor to determine the means and methods of dewatering necessary to meet the Project requirements and align with their construction methodology and schedule.

6.4 Frost Protection

According to Canadian Climate Normals, the frost index in Chelsea, Quebec is 1,008 °C-Day; the design frost depth for this Site is 1.8 mbgs. All foundations, for unheated or isolated structures or underground utilities must be provided with a minimum of 1.8 m of soil cover for frost protection.

Should construction take place during the winter season, exposed subgrades and underlying soils must be protected by the Contractor against freezing for the entire duration of construction, or until adequate frost protection is in place. Backfill should not be placed or compacted in a frozen condition or placed on frozen subgrades.

6.5 Foundations and Bearing Capacity for Bridge

It's important to note that has not been provided with the proposed foundation details for this Project. Based on our understanding of the RFP, is anticipating that the following foundation styles are being considered for design of the bridge repairs:

- Reinforced concrete abutments, and
- Helical piles.

is assuming that there will be no modifications to the existing grade, and there will be no grade raises. If grade raises are considered, then additional Engineering assessment and a specific settlement estimate would be required.

6.5.1 Footings for New Concrete Abutments

In the case that new concrete abutments are being constructed to support the bridge, they will need to be founded on native undisturbed soil, and below the design frost depth. Therefore, in the location of MW19-01, this will be located at an approximate depth of 3.2 mbgs. However, as mentioned above, it is recommended to review the soil conditions at the other abutment location.

For convention strip footings with a minimum 1.9 m width, founded in the compact silty sand at 3.2 mbgs, the recommended factored bearing capacity under Ultimate Limit States (ULS) conditions would be 70 kPa. This includes a geotechnical resistance factor of $\Phi = 0.5$. Under Serviceability

Limit States (SLS) conditions, recommended maximum design bearing pressure of 50 kPa is recommended. This assumes a maximum tolerable differential settlement of 19 mm and tolerable total settlement in the order of 25 mm.

Again, subgrade preparation below the footings would involve the removal of all FILL soils, organics, disturbed/reworked or previously excavated soils to expose a native undisturbed subgrade.

6.5.2 Footings on Engineered Fill

Designers may consider the use of Engineered Fill to correct irregularities in the design subgrades, to fill up to the design grade, and to backfill over-excavated areas.

For strip footings founded on Engineered Fill, the recommended factored bearing capacity under ULS conditions would be the same as for the native soil (i.e. 70 kPa). This includes a geotechnical resistance factor of $\Phi = 0.5$. A corresponding recommended SLS value for footings on Engineered Fill would be 50 kPa. This assumes a maximum tolerable differential settlement in the order of 19 mm and a maximum tolerable total settlement in the order of 25 mm.

When Engineered Fill is being placed below future load bearing structures, the extents of the Engineered Fill should extend a minimum of 0.3 m beyond the edge of the footings or structure on all sides, and then must be continued downwards and outwards at a 1H:1V slope until the approved subgrade level. This footprint can become quite large if the Engineered Fill is required to be deep.

Subgrade preparation below Engineered Fill will be similar to that for footings as noted above. The exposed surface should be examined by the Geotechnical Engineer to assess the competency. Engineered Fill must be treated in accordance to the requirements in Section 6.8.

6.5.3 Helical Piles

understands that the Client is also considering the use of helical piles for new abutments and piers foundations. Typical helical plates bearing capacities for a helical pile system can be determined as per Section 18.2.1.4 of the Canadian Foundation Engineering Manual (CFEM-2006). In the location of MW19-01, the native soils were encountered at a depth of 3.2 mbgs. The helical piles will need to be designed and drilled such that all helices are founded within native soil and are below the design frost depth. Therefore, in this location, the top helix would need to be deeper than 3.2 mbgs. However, as mentioned above, it is recommended to review the soil conditions at the other pile locations. is providing the Client with the following preliminary soil parameters to assist in their helical pile design:

Table 6-1: Recommended Preliminary Design Parameters for Helical Piles

Parameter	Recommended Preliminary Design Value (at MW19-01)
Bearing capacity of bottom helix in native undisturbed Silt (>3.8 mbgs)	Q_h/A_h = 100 kPa ULS (factored) where A_h = Projected helix area
Friction properties in Native compact Silty Sand (3.2-3.8 mbgs)	Undisturbed shear strength (S_u) = 0 kPa Remoulded shear strength = 0 kPa Effective friction angle (φ') = 28° Bulk unit weight (γ_b) = 19 kN/m^3 Ranking earth pressures coefficient (K_o) = 0.53*
Shear strength properties in native very stiff to firm Silt (>3.8 mbgs)	Undisturbed shear strength (Su) = 125 kPa Remoulded shear strength = 20 kPa Effective friction angle (φ') = 0° Bulk unit weight (γ_b) = 17 kN/m^3 Ranking earth pressure coefficient (K_o) = 0

It should be noted that helical piles are typically installed as part of a design-build contract where the Contractor designs, supplies, installs, tests, and certifies the piles. The selected Contractor should be provided with the Geotechnical Investigation and the structural drawings to assist in their designs based on their experience with similar soil conditions. It is recommended that the Contractor be required to provide their shop drawings and pile bearing capacity calculations as per the requirements of Section 18.2.1.4 of Canadian Foundation Engineering Manual (CFEM, 2006) to the Geotechnical Engineer for review and approval prior to mobilizing to Site.

6.6 Lateral Earth Pressures

The recommended soil parameters presented below are intended to assist Designers in the design of the concrete abutments for this Site. They are for use under static conditions:

Table 6-2: Recommended Static (Rankine) Lateral Earth Pressure

Soil	Bulk Unit Weight 'Y' (kN/m^3)	Effective Angle of Internal Friction (φ')	Rankin Earth Pressure Coefficients*		
			K_a	K_o	K_p
New Compacted Granular Backfill	22	28	0.36	0.53	2.77

** Assumes level/flat backfill surface.*
The table above provides bulk unit weights only. The Designer will need to decide whether submerged unit weights are necessary depending on the anticipated water level.

For yielding structures, the active earth pressure coefficients, K_a, is recommended to be used. For non-yielding structures, the at-rest, K_o, is recommended to be used for design.

The resultant of the applicable static or at-rest force is assumed to act at 1/3H above the base of the abutment where H is the Height of the abutment.

6.7 Corrosion Potential

One representative soil sample, MW19-01 SS5, was submitted to in Ottawa, under chain of custody Ref No: 2002467, to assess corrosion potential to ductile iron or concrete. The parameters tested for included pH, sulphides, chloride, sulphates, redox potential, and conductivity. The results of the analyses are presented below in the table below and a copy of the Laboratory Certificate of Analyses is provided in Appendix D.

Table 6-3: Summary of Corrosion Parameters

Sample ID	MW19-01 SS5
pH	7.43
Redox Potential (mV)	232
Resistivity (ohm-m)	50.1
Sulphide (%)	0.67
Sulphate (ug/g)	47
Chloride (ug/g)	18

The American Water Works Association (AWWA) publication 'Polyethylene Encasement for Ductile-Iron Pipe Systems' ANSI/AWWA C105/A21.5-10 dated October 1, 2010 assigns points based on the results of the above tests. A soil or water that has a total score of ten or more points is considered corrosive to ductile iron pipe. Based on the results obtained for the sample that was submitted, the Site soils are not considered to be potentially corrosive to ductile iron pipe.

The analytical results of the soil samples were compared with applicable Canadian Standards Association (CSA) A23.1-04 and are provided in the table below.

Table 6-4: Additional Requirements for Concrete Subjected to Sulphate Attack

Class of Exposure	Degree of Exposure	Water soluble Sulphate in soil sample (%)	Cementing Material to be used
S-1	Very Severe	> 2.0	HS or HSb
S-2	Severe	0.20 – 2.0	HS or HSb
S-3	Moderate	0.10 – 0.20	MS, MSb, LH, HS, or HSb

The chemical sulphate content analyses for the selected soil sample tested indicate a sulphate concentration of 47 ug/g, as shown in Table 6-3. The results were compared with Canadian Standards Association (CSA) Standards A23.1 for sulphate attack potential on concrete structures and possesses a "negligible" risk for sulphate attack on concrete material. Accordingly,

conventional GU or MS Portland cement may be used in the construction of the proposed concrete elements.

6.8 Engineered Fill

All new fill soils that underlie footings or other structural applications must consist of Engineered Fill in conformance with the following requirements.

Engineered Fill will be required to backfill below the footing bases (as required) and the following strict requirements must be met:

- Prior to placing any Engineered Fill, all unsuitable fill materials must be removed, and the subgrade approved by the Geotechnical Engineer. Any deficient areas should be repaired prior to placement;
- Placement of a non-woven geotextile should be incorporated in order to provide separation between the two materials;
- The proposed fill material must be tested for grain size and modified Proctor; it must be reviewed and approved by the Geotechnical Engineer before being considered as Engineered Fill. Typically, a crushed well-graded granular material such as an MG-20 or MG-56 (NQ 2560-114) type material is suitable. However, other suitable granular materials may be proposed and considered depending on the Site-specific conditions;
- Engineered Fill should be placed in maximum loose lifts of 300 mm and adequately compacted to achieve 95% of its Modified Proctor Maximum Dry Density (MPMDD). Engineered fill must have full-time compaction testing on-Site by geotechnical personnel;
- When Engineered Fill is being placed below future load bearing structures, the extents of the Engineered Fill should extend a minimum of 0.3 m beyond the edge of the footings or structure on all sides, and then must be continued downwards and outwards at a 1H:1V slope until the approved subgrade level. This footprint can become quite large if the Engineered Fill is required to be deep.

Fill that is placed on un-approved subgrades and/or without prior approval and/or review by the Geotechnical Engineer will not be considered as Engineered Fill and may need to be excavated and replaced, depending on the situation.

6.9 Concrete Abutment Backfill

The backfill placed against the new concrete abutments should be a compactable free-draining non-frost susceptible material. Typically, a pit -run sandy soil meeting the grading requirements of a MG 20, MG 112 or CG 14 (NQ 2560-114) Granular Materials is acceptable, however, other materials may be considered if they are tested and approved by the Geotechnical Engineer ahead of time. Backfill should be placed and compacted as outlined below.

- Backfill should not be placed in a frozen condition, or placed on a frozen subgrade;

- Backfill should be placed uniformly on the exterior of the abutments to avoid build-up of unbalanced lateral pressures;
- Backfill should attempt to match texture of the existing adjacent soils. If imported materials are used, side slopes with frost tapers are recommended. Frost tapers should be a back-slope of 10H:1V through the frost zone, (i.e.,1.8 m from finished grade);
- For backfill that would underlie paved areas or exterior slabs-on-grade, each lift should be uniformly compacted to at least 95% of its MPMDD, and
- For backfill on exteriors that would underlie landscaped areas, each lift should be uniformly compacted to at least 90% of its MPMDD.

6.10 Perimeter Drainage

The concrete abutment should be provided with perimeter drainage to avoid the buildup of hydrostatic pressure. The options for a perimeter drainage system are to use conventional drainage tile or use a composite drainage blanket such as Miradrain 6200 or equivalent. If a conventional perimeter drain system is installed, it may be constructed with 100 mm diameter weeping tiles placed on a 150 mm bed of 19 mm clear stone and then covered with 150 mm of the same stone. The stone and weeping tile should be enveloped on the bottom, sides and top with a non-woven geotextile filter cloth (such as Terrafix 270 or equivalent). The drainage weeping tile system should be placed at the footing level and be connected to a "frost-free weep holes. In areas where an asphalt or concrete pavement will not be present adjacent to the concrete abutment, the upper 0.3 m of the exterior foundation backfill should be a low permeable soil to reduce surface water infiltration.

7. CONSTRUCTION MONITORING

The recommendations presented in this report are based on the assumption that an adequate level of construction monitoring by qualified geotechnical personnel during construction will be provided. Based on our understanding of the scope of the project, an adequate level of construction monitoring is considered to be as follows:

- Design review of helical piles by the Geotechnical Engineer;
- Review and approval of all subgrades by the Geotechnical Engineer;
- Full-time monitoring of pile installation;
- Laboratory testing and pre-approval of proposed FILL soils;
- Part time compaction testing of backfill soils, and
- Periodic testing of concrete.

An important purpose of providing an adequate level of monitoring is to check that recommendations, based on data obtained at the discrete borehole locations, are relevant to other areas of the site.

8. CLOSURE

A description of limitations which are inherent in carrying out site investigation studies is given in Appendix A and forms an integral part of this report.

We trust this report meets your present requirements. Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Project Manager

Geotechnical Project Manager

Geotechnical Project Manager

APPENDIX A

LIMITATIONS OF REPORT

LIMITATIONS OF REPORT
GEOTECHNICAL STUDIES

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the Client. Note that no scope of work, no matter how exhaustive, can identify all conditions below ground. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the specific locations tested, and conditions may become apparent during construction which were not detected and could not be anticipated at the time of the site investigation. Conditions can also change with time. It is recommended practice that be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the boreholes.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid. Unless otherwise noted, the information contained herein in no way reflects on environmental aspects of either the site or the subsurface conditions.

The comments given in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs, e.g. the thickness of surficial topsoil or FILL layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and cannot warranty their accuracy. Similarly, cannot warranty the accuracy of information supplied by the Client.

APPENDIX B

SITE LOCATION MAP
BOREHOLE LOCATION PLAN

Pages 155 to / à 156

are not relevant

sont non pertinentes

APPENDIX C

LIST OF SYMBOLS AND DEFINITIONS FOR GEOTECHNICAL SAMPLING BOREHOLE LOGS

Pages 158 to / à 161

are not relevant

sont non pertinentes

APPENDIX D

GEOTECHNICAL LABORATORY TEST RESULTS
CORROSION PARAMETER TEST RESULTS

Pages 163 to / à 178

are not relevant

sont non pertinentes

GEOTECHNICAL INVESTIGATION REPORT

BARN REHABILITATION

1000 MEECH LAKE ROAD

CHELSEA, QUEBEC

File No.: IN-SO-040535

APRIL 24, 2020

Prepared for:

National Capital Commission

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APPENDICES

1. INTRODUCTION

was retained by the National Capital Commission (Client) to carry out a Geotechnical Investigation for the proposed Barn Rehabilitation (Project) at the heritage property located at 1000 Meech Lake Road (Site) in Chelsea, Quebec.

A Purchase Order (PO-010059-2) was received on December 11, 2019 from Thara Abraham of the Client to proceed with the investigation.

is pleased to present the results of this Geotechnical Investigation. This report is prepared for the sole use of the Client. The use of the report, or any reliance on it by any third party, is the responsibility of such third party. This geotechnical investigation report is subject to the limitations shown in Appendix A. It is understood that the Project will be performed in accordance with all applicable codes and standards present within its jurisdiction.

2. SITE AND PROJECT DESCRIPTION

2.1 Site Description

The Site consists of an existing historical barn at the Prime Minister's cottage located on Harrington Lake in Gatineau Park. The barn is approximately 330 m north-east of the cottage. In general, the Site lies in a wooded area and is surrounded within a forested slope. The elevations of the existing ground surface are highest on the north side of the barn, sloping downwards toward the south. There are visible cobbles and/or boulders at the surface on the north and east sides of the barn.

The existing barn structure is a two storey structure and is approximately 144 m^2 in area (9 m x 16 m). We understand that the barn was constructed using multiple construction materials, including cast in place concrete for the exterior walls and a concrete slab-on-grade at the ground floor. The second floor is an elevated concrete slab supported on steel columns. The barn also includes a heated work bay area at the east side of the ground level and does not have a basement level. The location of the Site is shown on the Site Location Map and attached as Figure 1 in Appendix B.

2.2 Project Description

understanding of the Project is based on the information provided by the Client at the time of proposal. The Request for Proposal (RFP) contained a project description and a Preliminary Floor Plan which is attached at the end of this report in Appendix E for reference purposes. understanding of the Project is as follows:

- Removal of the existing second-floor slab;
- Design and construction of new interior perimeter concrete columns to support beams, frames, and a wooden mezzanine within the barn. This is understood to have maximum interior column gravity factored loads of 185 kN.
- Design and Construction of a new reinforced concrete retaining wall built against the exterior of the existing barn, and

- Design and construction of a new carport independent of the barn structure approximately 54 m^2 in area (10.4 m x 5.2 m). This structure is understood to be founded on individual columns with maximum column gravity factored loads of 70 kN.

The above structures are residential structures and therefore, we understand that they do not require a Site Classification for Seismic Site response according to Table 4.1.8.4 of the National Building Code (NBCC-2010); however, at the request of the Client, and based on the limited field investigation, is providing a preliminary Seismic Site Classification in section 6.5. is assuming that there will be no grade raises for this Site and that all new foundations will be founded at approximately 1.8 m below the existing ground surface (mbgs) in order to be below the design frost depth.

In preparing this report, it's important to note that has not been provided with the design details for the new construction or Site grading. Therefore, this report should be considered as preliminary in nature. requests to be retained once the final drawings and specifications become available to ensure the final design meets with the intent of the recommendations in this report.

3. SCOPE OF WORK

scope of work for this investigation was documented in the proposal (Ref No: IN-SO-40535 Rev. 2, dated November 26, 2019) and agreed to by issuance of PO-010059-2 that was received on December 11, 2019. In general, the scope of work for this Geotechnical Investigation included the following items. It is important to emphasize that the location and depth of the boreholes were prescribed by the Client within their RFP documents.

- retained a private underground utility locating subcontractor to provide public and private underground utility clearances at the borehole locations;
- retained a geotechnical drilling subcontractor to drill the following boreholes using a combination of a track mounted drill rig and portable drilling equipment:
  - Five (5) boreholes to auger refusal or to a maximum of 5.0 mbgs,
  - One (1) of the above boreholes included the installation of a monitoring well;
- retained an excavating subcontractor to excavate the following test-pit using a backhoe:
  - One (1) test-pit against the exterior wall of the barn to expose the footing;
- supervised the drilling/excavations and logged the soil conditions at the borehole and test-pit locations based on the samples that were recovered;
- recorded a groundwater level in the monitoring well;
- recorded the ground surface elevations at the borehole/test-pit locations using a laser level;
- submitted representative soil samples to the geotechnical laboratory for the following testing:
  - Moisture contents on all the recovered soil samples,
  - Grain size analysis on six (6) soil samples, and
  - Corrosion package on one (1) soil sample;

- prepared this Geotechnical Investigation report based on the results of the fieldwork and laboratory testing.

4. FIELDWORK AND LABORATORY TESTING

4.1 Fieldwork

The fieldwork was conducted on December 17, 2019 and January 8 through 16, 2020. The field program included the advancement of one (1) test-pit labelled as TP19-01, and five (5) boreholes labelled as BH19-01, BH19-02, MW19-03, BH19-04, and BH19-05. The locations of the test-pit and boreholes is shown on the Borehole Location Plan on Figure 2 in Appendix B.

The excavation of the test-pit was performed by an excavation subcontractor, using a rubber-tired tractor backhoe to excavate through the overburden soils and expose the footing.

The drilling of the boreholes was performed by a geotechnical drilling subcontractor, using a combination of track mounted drill rig and portable drilling equipment. Exterior boreholes were advanced using hollow-stem continuous flight augers through the overburden. Interior boreholes were advanced using an electric rack and pinion drill outfitted with NW sized casings and wash boring methods. Soil samples were recovered using a standard 50 mm diameter split spoon sampler. The compaction of cohesionless soils were assessed using Standard Penetration Test (SPTs) and the shear strengths of cohesive soil samples were estimated using Field Vane Test (FVTs) and Pocket Penetrometer (PP) resistance values.

The drilling program was supervised by geotechnical field staff. The subsurface stratigraphy encountered in the test-pit and boreholes was recorded by the representative based on the samples that were recovered. submitted representative samples to the geotechnical laboratory for visual examination and laboratory testing. The test-pit was advanced and terminated at approximately 1.1 mbgs. Boreholes BH19-01, BH19-02, MW19-03, BH19-04, and BH19-05 were advanced to depths ranging from approximately 2.7 to 5.2 mbgs.

The ground surface elevations at the test-pit and borehole locations were recorded by field staff using a self-leveling laser level. They were related to a temporary benchmark defined as the top of the ground floor slab of the existing barn structure. This temporary benchmark was assigned an arbitrary elevation of 100.00 m. It is important to emphasize that the temporary benchmark and the corresponding elevations described within this report are non-geodetic (NG) and are to be used for comparison purposes only within the context of this report.

4.2 Laboratory Testing

The laboratory testing component of this investigation consisted of determination of moisture contents on all the recovered soil samples, and grain size analysis on six (6) soil samples. also submitted one (1) soil sample to a subcontractor laboratory to assess corrosion potential to ductile iron or concrete (pH, sulphides, chloride, sulphates, redox potential, and resistivity). Soil sample

BH19-02 SS3 was delivered to in Ottawa on January 10, 2020, under chain of custody Ref No: 2002467.

The geotechnical laboratory testing along with the corrosion potential results are attached in the Geotechnical Laboratory Results in Appendix D.

In addition to the geotechnical laboratory testing, also submitted several soil and water samples to a certified laboratory for environmental testing in order to support the management of excess soils and water. The results of the environmental testing are provided under separate cover.

5. SOIL AND GROUNDWATER CONDITIONS

The subsurface conditions encountered at the borehole and test pit locations are summarized in Table 5-1 below and briefly discussed in the following subsections. A location-specific graphical representation of each borehole is provided in detail on the Borehole Logs attached in Appendix C.

Table 5-1: Summary of Subsurface Conditions encountered in Boreholes and Test Pits

Inferred Soil Layer	BH19-01 mbgs (NG)	BH19-02 mbgs (NG)	MW19-03 mbgs (NG)	BH19-04 mbgs (NG)	BH19-05 mbgs (NG)	TP19-01 Mbgs (NG)
Concrete	Approximately 150 mm thick	-	-	-	-	-
Granular Base FILL	Approximately 80 mm thick	-	-	-	-	-
FILL	0.2 to 1.4 (99.8 to 98.6)	0.0 to 1.5 (100.6 to 99.1)	0.0 to 1.8 (99.1 to 97.3)	0.0 to 0.7 (101.3 to 100.6)	0.0 to 1.5 (98.8 to 97.3)	0.0 to 1.1* (99.8 to 98.7)
Silt	-	-	-	-	1.5 to 2.3 (97.3 to 96.5)	-
Silty Clay	1.4 to 3.0 (98.6 to 97.0)	1.5 to 2.1 (99.1 to 98.5)	-	-	2.3 to 2.9** (96.5 to 95.9)	-
Sand and Gravel	3.0 to 4.9* (97.0 to 95.1)	2.1 to 5.2* (98.5 to 95.4)	1.8 to 4.9** (97.3 to 94.2)	0.7 to 2.7** (100.6 to 98.6)	-	-
Refusal	Not encountered	Not encountered	4.9 (94.2)	2.7 (98.6)	2.9 (95.9)	Not encountered

* End of borehole/test-pit at the indicated depth. Refusal not encountered.

** End of borehole at the indicated depth due to practical auger refusal.

It is important to note that the subsurface descriptions presented below and on the borehole logs represent the materials encountered at the discrete borehole locations only. They may vary

between and beyond borehole locations. This is especially true in previously excavated and/or filled areas such as near existing and former utility trenches and around existing building foundations.

5.1 Concrete

Borehole BH19-01 was located inside the barn structure. The surficial covering for this borehole consisted of the existing concrete slab-on-grade. The thickness of the slab was approximately 150 mm. The slab was found to be underlain by a granular base FILL. The granular base FILL consisted of a compact sand with some gravel. It was brown in colour and recovered in a damp condition. The thickness of this existing granular base FILL was found to be approximately 75 mm.

It's important to emphasize that the thicknesses and conditions of the surficial coverings within this report and on the borehole logs are for information and planning purposes only. They should not be used for quantity take-offs or taken as a quality assessment.

5.2 FILL

In all the borehole locations, a FILL layer was present, either at the surface (BH19-02 through BH19-05) or overlain by a granular base FILL (BH19-01). The FILL generally varied at the borehole locations:

- In borehole BH19-01, the FILL was described as silty clay with trace gravel and trace sand; this FILL layer also contained some cobbles and/or boulders with depth. The recorded SPT N-value in this FILL was 8 and was found to be stiff/compact in consistency/compactness. It was grey in colour at the top and becoming brown with depth and was recovered in a moist condition corresponding to moisture contents of 43 to 50 %. The FILL depth at this borehole extended from approximately 0.2 to 1.4 mbgs, corresponding to approximate elevations near 99.8 to 98.6 NG.
- In boreholes BH19-02, MW19-03, and BH19-04, the FILL was described as sand/silty sand or clayey silt with some to trace gravel. The recorded SPT N-value in this FILL layer ranged from 2 to 9 indicating a very loose to loose degree of compactness. It was brown in colour and recovered in a damp to moist condition corresponding to moisture contents of 6 to 25 %. The FILL depth for these boreholes extended from approximately 0 to 1.8 mbgs, corresponding to approximate elevations near 100.6 to 97.3 NG.
- In borehole BH19-05, the FILL was described as sand and gravel with trace silt. The recorded SPT N-values for this layer ranged from 8 to 3, indicating a loose to very loose degree of compactness. It was brown in colour and recovered in a damp condition corresponding to moisture contents of 8 to 13 %. The FILL depth for this borehole extended from approximately 0 to 1.5 mbgs, corresponding to approximate elevations near 98.8 to 97.3 NG.

The results of the grain size analyses on a representative FILL sample is further presented in the table below. Based on the grain size distribution, the tested sample can be described as gravelly sand, some silt.

Table 5-2: Summary of Grain Size Analyses in FILL

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-05 SS1	0.2 – 0.8	28	53	18	

5.3 Silt

In borehole BH19-05, the FILL noted above was found to be underlain by native silt with sand seams, some clay, and trace gravel. The recorded SPT N-value for the silt was 6, and the recorded pocket penetrometer (PP) value indicated a shear strength of approximately 184 kPa indicating a very stiff consistency. The silt was brown in colour and recovered in a moist condition corresponding to moisture content of 20 %. It's important to note that due to the surrounding trees, the silt contained noticeable tree roots within the recovered soil samples. The depth of this silt layer extended from 1.5 to 2.3 mbgs, corresponding to approximate elevations near 97.3 to 96.5 NG.

The results of the grain size analyses on a representative silt sample is further presented in the table below. Based on the grain size distribution, the tested sample can be described as silty clayey sand, some gravel.

Table 5-3: Summary of Grain Size Analyses in Silt

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-05 SS3	1.5 – 2.1	14	46	40	

5.4 Silty Clay

In boreholes BH19-01, BH19-02, and BH19-05, the FILL and/or silt were found to be underlain by a native silty clay with sand seams. The recorded SPT N-value in this layer ranged from 21 to 12. Based on the PP values, the undrained shear strength was found to range from approximately 196 kPa near the surface down to approximately 25 kPa, indicating very stiff consistency near the surface but becoming firm with depth. The silty clay was brown in colour and recovered in a moist to wet condition, corresponding to moisture contents of 24 to 43 %. The depth of the silt clay extended from approximately 1.4 to 3.0 mbgs, corresponding to approximate elevations near 99.1 to 95.9 NG. Borehole BH19-05 was terminated within this layer due to practical auger refusal.

The results of the grain size analyses on a representative silty clay sample is further presented in the table below. Based on the grain size distribution, the tested sample can be described as silty clayey sand, trace gravel.

Table 5-4: Summary of Grain Size Analyses in Silty Clay

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-02 SS3	1.5 – 2.1	0	56	44	
BH19-01 SS3	1.8 – 2.4	1	47	52	

5.5 Sand and Gravel

In boreholes BH19-01, BH19-02, MW19-03, and BH19-04, the FILL or native silty clay were found to be underlain by a native sand and gravel layer with some silt and cobbles and/or boulders with depth. The recorded SPT N-values in this sand and gravel layer ranged from 4 to 100, indicating a loose to very dense degree of compactness. The occasional refusals indicate a significant cobble and/or boulder content. The sand and gravel was brown in colour and recovered in a damp to moist condition, corresponding to moisture contents of 7 to 15 %. The depth of this layer extended from approximately 0.7 to 5.2 mbgs, corresponding to approximate elevations near 100.6 to 94.2 NG. All the above boreholes were terminated within this layer at the indicated depths in table 5-1 or due to practical auger refusal.

The results of the grain size analyses on representative sand and gravel samples are further presented in the table below. Based on the grain size distribution, the tested samples can be described as gravel and sand or gravelly sand with trace to some silt.

Table 5-5: Summary of Grain Size Analyses in Sand and Gravel

Sample ID	Sample Depth (mbgs)	% Gravel	% Sand	% Silt	% Clay
BH19-02 SS6	3.8 – 4.4	33	56	11	
BH19-01 SS7	4.0 – 4.6	46	44	10	

5.6 Groundwater

One (1) monitoring well was installed at borehole MW19-03; the groundwater measurement for that borehole is recorded and summarized in the table below.

Table 5-6: Summary of Groundwater Observations

Borehole Location	Well Screen Details		Groundwater Observations	
	Screened Interval mbgs (NG)	Screened Subsoil	Water Level mbgs (NG)	Date
MW9-03	3.4 to 4.9 (95.7 to 94.2)	Sand and Gravel	Dry	January 10, 2020

At the time of the groundwater observation on January 10, 2020, the monitoring well was dry. The observed groundwater level is subject to stabilization over time, seasonal fluctuations and in response to precipitation and snowmelt events. They are anticipated to be at their highest levels during the thaw in early spring.

The long-term monitoring of ground water or hydraulic testing was not part of scope of work for this Geotechnical Investigation.

5.7 Existing Barn Footings

One (1) test-pit, TP19-01, was excavated against the exterior wall of the barn to expose its footings. The soils at the test-pit consisted of sand and gravel FILL from the surface to the bottom. The degree of compactness for the FILL was loose at the top and becoming compact with depth; it was brown in colour and had a damp moisture state. The depth of the test-pit extended from approximately 0 to 1.1 mbgs, corresponding to approximate elevations near 99.8 to 98.7 NG.

The geometry of the existing foundation and soils in the test-pit is further displayed in the test-pit log TP19-01 in Appendix C. In general, the existing foundation consisted of a reinforced concrete structure; the footing was found to have a thickness of 0.1 m, with a projection of 0.4 to 0.5 m beyond the wall; the elevation at the bottom of the foundation was 98.7 NG. The footing was observed to be founded on the sand and gravel FILL, which was estimated to be generally compact. There was no existence of a perimeter drain, and the founding soils had a damp moisture state.

6. PRELIMINARY RECOMMENDATIONS

The preliminary recommendations provided in this report are based on our current understanding of the Project which is described in Section 2, and that it will be carried out in accordance with all applicable codes and standards. Any changes to the Project described will require a review by to assess the impact of the changes on the report recommendations provided.

The most important geotechnical considerations for the design and construction of the proposed Project are expected to be the following:

- **Pre-Design Geotechnical Investigation:** At the time of this investigation, has not been provided with detailed designs of the proposed structures or grading plans. The Project is currently in the pre-design stage. Therefore, it is important to emphasize that this Geotechnical Investigation report is preliminary in nature. requests to be retained when the final designs and specs become available to review that they meet with the intent of the recommendations in this report;
- **Support of Existing Barn Footings:** All excavations should be completed and maintained in accordance with the requirements of the Legislation of Quebec Safety Code for the construction industry. Designers and Contractors should review the geometry of planned excavations regarding their depths and sloping requirements. This should be compared to the location of existing barn footings to ensure they are not undermined. If the limitation of

avoiding undermining or encroaching on adjacent properties cannot be avoided, then underpinning of the existing structure may be necessary. This is especially important for the existing barn structure as the existing footings appear to be founded above the frost line on fill soils. New footings will need to be founded deeper on native soils below the frost line, and therefore will undermine the existing building.

- **Multiple Bearing Pressures Provided:** It is important to emphasize that is providing separate design bearing pressures for this Project. Separate design bearing pressures are provided for the interior building columns, exterior retaining wall, and carport foundations. The bearing pressures are based on the founding soils and the diameter or dimension of the footing. Designers should be aware to select bearing pressures consistent with the structure and foundation depth;

- **Subgrade Preparation:** Subgrade preparation for footings will involve the removal of all FILL soils, organics, disturbed/reworked soils to expose a native undisturbed subgrade. All footing subgrades should be reviewed and assessed by the Geotechnical Engineer.

- **Design Frost Depth:** The design frost depth for unheated or isolated structures is 1.8 mbgs. All footings should be founded below this depth. It is important to note that the existing barn is not founded below the frost depth and, therefore, likely undergoes season heaving.

- **Structural Separation Between Barn and Retaining Wall:** recommends that Designers include for a structural separation between the new retaining wall and the existing barn.

Based on our understanding of the proposed Project, as well as the subsurface conditions encountered in the boreholes, and assuming them to be representative of the subsurface conditions across the Site, the following preliminary recommendations are provided.

6.1 Site Preparation

6.1.1 General Grading

The Site should be graded in the early stages of construction to provide for positive control of surface water, directing it away from excavations and subgrades. An adequate ditching and/or pumping system will be necessary to collect any surface runoff and groundwater accumulation in order to protect subgrades, and to allow for dry working conditions.

6.1.2 Interference with Existing Underground Utilities

Designers should review the proposed excavation locations and compare them to the location of any existing underground utilities. Existing utilities that are excavated or exposed as part of construction will need to be supported, removed, or rerouted.

6.1.3 Subgrade Preparation

Subgrade preparation for footings and piers will involve the removal of all FILL soils, organics, disturbed/reworked or previously excavated soils to expose a native undisturbed subgrade. The Contractor should be prepared to deal with possible construction dewatering, which will include pumping from typical sump pumps as a minimum. The exposed surface should be examined and approved by the Geotechnical Engineer prior to forming to assess the competency.

Anticipated Subgrade for Interior Barn Columns

It is anticipated that all foundations for the interior barn columns will be founded at least 1.8 mbgs below the design frost depth inside the existing building structure. Based on the drilled interior borehole, BH19-01, the stiff upper crust of the silty clay deposit will be the founding subgrade for foundations at 1.8 mbgs. However, it's important to note that the existing building foundations are founded at an approximate depth of 1.1 mbgs on FILL soils, and therefore, undermining the existing structure needs to be avoided. If undermining the existing structure is necessary, then the designers will need to consider underpinning the existing footings.

Anticipated Subgrade for Exterior Retaining Wall

All foundations for the new exterior retaining wall will need to be founded at least 1.8 mbgs below the design frost depth. Based on boreholes BH19-02, MW19-03, and BH19-04 for the new retaining wall, the stiff silty clay or loose to compact sand and gravel will be the founding subgrades for foundations at 1.8 mbgs.

We understand that the new retaining wall be constructed against the existing barn structure. Similar to the barn structure interior columns subgrade preparation, the existing foundations of the building cannot be undermined, and is recommending underpinning of the existing footings.

Anticipated Subgrade for New Carport Footings

Foundations for the new carport are also anticipated to be founded at 1.8 mbgs below the design frost depth. Based on boreholes MW19-03 and BH19-05, the very stiff silt/silty clay or loose sand and gravel will be the founding subgrades for the foundations at 1.8 mbgs.

6.2 Excavations

It is anticipated that the excavations for this Project will consist of shallow excavations to a maximum depth of approximately 1.8 mbgs, and these excavations will likely be performed using open excavations.

6.2.1 Open Excavations

All excavations must be undertaken in accordance with the requirements of the Legislation of Construction Code and Safety Code, as well the CNESST guidelines regarding temporary excavations. The following recommendations for excavations should be considered a supplement to, and not a replacement of the Construction Code and Safety Code.

The banks of an excavation or trench are shored solidly with quality materials in accordance with the plans and specifications of an engineer. Shoring is not required in the following cases:

- Where the trench or excavation is dug out of solid rock that cannot be excavated otherwise than by blasting, or where no workers are required to descend into it;
- Where there is no risk of the banks of the trench or excavation collapsing and where the existing soils on Site are sloped at a 45^{o} angle or less 1.2 m from the bottom, and
- Where there is no risk of the banks of the trench or excavation collapsing and where an engineer attests that it is not necessary to shore up the banks, given the slope, nature and stability of the ground. A copy of the engineer's attestation shall be available on the construction site at all times.

6.2.2 Excavations Deeper than Existing Barn Footings

Since the new retaining wall and interior columns will be constructed adjacent or inside the existing building structure, Designers and Contractors should review the geometry of the planned excavations regarding their depths and sloping requirements. This should be compared to the existing barn footings to ensure they are not undermined. Undermining is prevented by ensuring that no excavation penetrates below an imaginary line constructed outwards and downwards 10H:7V, from the toe of any existing or proposed footings or load bearing elements.

If the strict limitations of not undermining existing structures cannot be met, then the existing barn foundations will need to be underpinned. Further consultations are recommended during detailed design if underpinning is foreseen by the designers.

6.2.3 Construction Dewatering

As part of this geotechnical investigation, installed one (1) monitoring well, MW19-03, in the overburden soils. The summary of the groundwater observations was recorded and is provided in section 5.6 above. Based on the monitoring well observations, the monitoring well was dry at the time of measurement on January 10, 2020. is anticipating that the maximum excavation depths for this Project will extend to an approximate depth of 1.8 mbgs. Based on the monitoring well observations, and recovered soil samples, the excavations should be above the groundwater level.

Surficial water seepage into excavations should still be anticipated by Contractors for this Site and will be subject to seasonal conditions and depths of excavations. The amount of water will depend upon the season of construction and the precipitation. Suitable surface water control measures should be taken during construction so as to prevent disturbance to the finished subgrade, movement of soils in the excavation sides, and to allow for safe working conditions. Pumping by using conventional sump pumps in the excavations may be suitable for this Project, subject to field confirmation and proper sequencing of the excavation. However, the estimation of groundwater quantities was not part of scope of work for this Geotechnical Investigation.

6.3 Frost Protection

According to Canadian Climate Normals, the frost index in Chelsea, Quebec, is 1,008 °C-Day. The design frost depth for this Site is 1.8 mbgs. All foundations, for unheated or isolated structures or underground utilities must be provided with a minimum of 1.8 m of soil cover for frost protection.

Where adequate soil cover cannot be provided, then an equivalent insulation detail should be designed or approved by a Geotechnical Engineer. Designers and Contractors must be aware that this detail may be such that the insulation may need to be placed below the footings and then the footings or slabs poured on top, and therefore, pre-approval or design ahead of time is recommended to ensure excavations, foundations, and backfilling are properly planned.

Should construction take place during the winter season, exposed subgrades and underlying soils must be protected by the Contractor against freezing for the entire duration of construction, or until adequate frost protection is in place. Backfill should not be placed or compacted in a frozen condition or placed on frozen subgrades.

Based on the test pit that was performed on the exterior of the barn, the existing footing was founded at an approximate depth of 1.1 mbgs, which is above the design frost depth for this Site. Therefore, it should be anticipated that the barn foundation moves seasonally in response to freeze-thaw cycles. As the new retaining wall and interior columns are intended to be founded below the frost depth there could be differential movement between the two structures. recommends that the design incorporate a structural separation between the new retaining wall and the existing barn.

6.3.1 Insulation Detail

understands that the Client may require insulation details for their Project during construction. As discussed above, the design frost depth for this Site is 1.8 mbgs. All unheated structures must be provided with 1.8 m of soil cover or an equivalent insulation detail for frost protection. Where 1.8 m of soil cover cannot be provided, a rigid board insulation that is fabricated from extruded polystyrene and manufactured with high compressive strength would be suitable. This detail will need to be designed and installed as per the specifications provided by the supplier; the design details of the insulation will need to be reviewed and approved by the Geotechnical Engineer prior to placement.

It's important to emphasize that should the Designers consider the use of an insulation detail below footings or slabs, the insulation detail will need to be placed on top of an inspected and approved undisturbed native subgrade. The subgrade must be inspected prior to placement of the insulation.

6.4 Foundations and Bearing Capacity

It important to note that has not been provided with the proposed foundation details for this Project. is anticipating that the following foundation styles are being considered:

- Interior columns for the barn structure will be supported with either individual pad footings or alternatively sono-tube piers.

- Exterior retaining wall will be supported with strip footings, and
- The columns for the new carport will be supported with pad and/or strip footings.

understands that the Client is looking to explore the option of helical piles for foundations. However, due to the presence of cobbles and/or boulders within the native sand and gravel layer and the FILL, does not recommend the use of helical piles for foundation design.

is assuming that there will be no modifications to the existing grade, and there will be no grade raises. If grade raises are considered, then additional Engineering assessment and a specific settlement estimate would be required.

6.4.1 Interior Columns for Barn Structure

is assuming that the interior columns for the barn structure will be supported by pad footings founded at a minimum depth of 1.8 mbgs, which is the design frost depth for this Site. However, because of the shallow depth of the existing barn footings at 1.1 mbgs, recommends the designers to underpin the existing footings in order not to undermine the foundations. Other options for consideration would be the use of sono-tube piers, which would be drilled, and therefore, limit the area of local undermining. is providing the following bearing capacities for design considerations:

- For concrete pads with a minimum 1.5 m width founded in the native stiff silty clay or compact sand and gravel, the recommended factored bearing capacity under Ultimate Limit States (ULS) conditions would be 225 kPa. This includes a geotechnical resistance factor of $\Phi = 0.5$. Under Serviceability Limit States (SLS) conditions, a maximum SLS design bearing pressure of 100 kPa is recommended. This assumes a maximum tolerable differential settlement of 19 mm.

- For circular sono-tube piers with a minimum 0.6 m diameter founded in the native stiff silty clay or compact sand and gravel, the recommended factored bearing capacity under ULS conditions would be 225 kPa. This includes a geotechnical resistance factor of $\Phi = 0.5$. Under SLS conditions, a maximum SLS design bearing pressure of 100 kPa is recommended. This assumes a maximum tolerable differential settlement of 19 mm.

6.4.2 Exterior Retaining Wall

is assuming that the exterior retaining wall will by supported by strip footings founded at a minimum depth of 1.8 mbgs below the design frost depth for the Site. Similar to the interior columns in the above section 6.4.1, is recommending the designers to consider underpinning the existing structure footings in order not to undermine the building foundations.

- For strip footings with a minimum 0.6 m width founded in the very stiff silty clay or loose sand and gravel, the recommended factored bearing capacity under ULS conditions would be 225 kPa. This includes a geotechnical resistance factor of $\Phi = 0.5$. Under SLS conditions, a SLS design bearing pressure of 100 kPa is recommended. This assumes a

maximum tolerable differential settlement of 19 mm and tolerable total settlement in the order of 25 mm.

6.4.3 Carport

is assuming that the carport will by supported by pads and/or strip footings founded at a minimum depth of 1.8 mbgs below the design frost depth for the Site.

- For pads and/or strip footings with a minimum 1.0 m width founded in the very stiff silt or loose sand and gravel, the recommended factored bearing capacity under ULS conditions would be 225 kPa. This includes a geotechnical resistance factor of $\Phi = 0.5$. Under SLS conditions, a SLS design bearing pressure of 100 kPa is recommended. This assumes a maximum tolerable differential settlement of 19 mm and tolerable total settlement in the order of 25 mm.

6.4.4 Footings on Engineered Fill

Designers may consider the use of Engineered to correct irregularities in the design subgrades, and to backfill over-excavated areas.

For footings founded on Engineered Fill, the recommended factored bearing capacity under ULS conditions would be the same as for the native soil (i.e. 225 kPa). This includes a geotechnical resistance factor of $\Phi = 0.5$. A corresponding recommended SLS value for footings on Engineered Fill would be 100 kPa. This assumes a maximum tolerable differential settlement in the order of 19 mm and a maximum tolerable total settlement in the order of 25 mm.

When Engineered Fill is being placed below future load bearing structures, the extents of the Engineered Fill should extend a minimum of 0.3 m beyond the edge of the footings or structure on all sides, and then must be continued downwards and outwards at a 1H:1V slope until the approved subgrade level. This footprint can become quite large if the Engineered Fill is required to be deep.

Subgrade preparation below Engineered Fill will be similar to that for footings as noted above. The exposed surface should be examined by the Geotechnical Engineer to assess the competency. Engineered Fill must be treated in accordance to the requirements in Section 6.9.

6.5 Seismic Site Classification

As mentioned in Section 2, Project Description, the structures for this Project are considered to be residential structures, and they do not require a Seismic Site Classification response according to Table 4.1.8.4 of the NBCC-2010. As requested by the Client, is providing a preliminary Seismic Site Class based on the limited available data.

It's important to note that bedrock was not encountered within the depths of the field investigation for this Site. Based on the limited field drilling for the Site, is recommending the new structures to be designed under "Site Class E" in accordance to Table 4.1.8.4 of the NBCC-2010, and subject to the limitations of the code.

6.6 Barn Slab-on-Grade Concrete Floor

was not provided with any design criteria for the floor slab loadings and, therefore, we have assumed that the floor slabs are lightly loaded with no heavy racking or process machinery that require specific support. A typical floor slab loading for a lightly loaded slab-on-grade would be a maximum value of 24 kPa. If this is not the case, then should be retained to perform additional consulting in regard to design of the floor slab. For design purposes and based upon a properly prepared native subgrade surface covered with 200 mm MG-20 (NQ 2560-114), a typical preliminary modulus of subgrade reaction appropriate for the slab design would be approximately 30,000 kN/m^3 on Engineered Fill and compacted to 95 percent of its Modified Proctor Maximum Dry Density (MPMDD). Alternative values would require additional analysis and testing. All aggregates used on top of approved undisturbed native subgrades shall be free of potentially swelling material caused by pyrite (shale, argillaceous limestone, etc.). Aggregates shall be certified "DB" as per NQ 2560-500.

A capillary moisture barrier consisting of a layer of either BC 5-20 clear stone or MG-20 at least 200 mm thick should underlie the slab. This layer should be compacted to 95 percent of its MPMDD and placed on approved subgrade surfaces.

If floor coverings are to be used, vapour barriers are also recommended to be incorporated beneath the slab. Floor toppings may be impacted by curing and moisture conditions of the concrete. Floor finish manufacturer's specifications and requirements should be consulted, and procedures outlined in the specifications should be followed. The slabs should be free-floating and should not be tied into the foundation walls. The placement of construction and control joints in the concrete should be in accordance with generally accepted practice.

6.7 Lateral Earth Pressures

The recommended soil parameters presented below are intended to assist Designers in the design of the retaining wall for this Site. They are for use under static conditions:

Table 6-1: Recommended Static (Rankine) Lateral Earth Pressure

Soil	Bulk Unit Weight 'Y' (kN/m^3)	Effective Angle of Internal Friction (φ')	Rankin Earth Pressure Coefficients*		
			K_a	K_o	K_p
New Compacted Granular Backfill	22	28	0.36	0.53	2.77

** Assumes level/flat backfill surface.*
The table above provides bulk unit weights only. The Designer will need to decide whether submerged unit weights are necessary depending on the anticipated water level.

For yielding structures, the active earth pressure coefficients, K_a, is recommended to be used. For non-yielding structures, the at-rest, K_o, is recommended to be used for design.

The resultant of the applicable static or at-rest force is assumed to act at 1/3H above the base of the wall where H is the Height of the wall.

6.8 Corrosion Potential

One representative soil sample, BH19-02 SS3, was submitted to in Ottawa, under chain of custody Ref No: 2002467, to assess corrosion potential to ductile iron or concrete. The parameters tested for included pH, sulphides, chloride, sulphates, redox potential, and conductivity. The results of the analyses are presented below in the table below and a copy of the Laboratory Certificate of Analyses is provided in Appendix D.

Table 6-2: Summary of Corrosion Parameters

Sample ID	BH19-02 SS3
pH	7.36
Redox Potential (mV)	217
Resistivity (ohm-m)	149
Sulphide (%)	< 0.02
Sulphate (ug/g)	12
Chloride (ug/g)	6

The American Water Works Association (AWWA) publication 'Polyethylene Encasement for Ductile-Iron Pipe Systems' ANSI/AWWA C105/A21.5-10 dated October 1, 2010 assigns points based on the results of the above tests. A soil or water that has a total score of ten or more points is considered corrosive to ductile iron pipe. Based on the results obtained for the sample that was submitted, the Site soils are not considered to be potentially corrosive to ductile iron pipe.

The analytical results of the soil samples were compared with applicable Canadian Standards Association (CSA) A23.1-04 and are provided in the table below.

Table 6-3: Additional Requirements for Concrete Subjected to Sulphate Attack

Class of Exposure	Degree of Exposure	Water soluble Sulphate in soil sample (%)	Cementing Material to be used
S-1	Very Severe	> 2.0	HS or HSb
S-2	Severe	0.20 – 2.0	HS or HSb
S-3	Moderate	0.10 – 0.20	MS, MSb, LH, HS, or HSb

The chemical sulphate content analyses for the selected soil sample tested indicate a sulphate concentration of 12 ug/g, as shown in Table 6-2. The results were compared with Canadian Standards Association (CSA) Standards A23.1 for sulphate attack potential on concrete structures and possesses a "negligible" risk for sulphate attack on concrete material. Accordingly,

conventional GU or MS Portland cement may be used in the construction of the proposed concrete elements.

6.9 Engineered Fill

All new fill soils that underlie footings and slabs and in building interiors, or other structural applications must consist of Engineered Fill in conformance with the following requirements.

Engineered Fill will be required to backfill below the footing bases (as required) and below the interior of the addition below the floor slabs. In order to qualify as Engineered Fill, the following strict requirements must be met:

- Prior to placing any Engineered Fill, all unsuitable fill materials must be removed, and the subgrade approved by the Geotechnical Engineer. Any deficient areas should be repaired prior to placement;
- Placement of a non-woven geotextile should be incorporated in order to provide separation between the two materials;
- The proposed fill material must be tested for grain size and modified Proctor; it must be reviewed and approved by the Geotechnical Engineer before being considered as Engineered Fill. Typically, a crushed well-graded granular material such as an MG-20 or MG-56 (NQ 2560-114) type material is suitable. However, other suitable granular materials may be proposed and considered depending on the Site-specific conditions;
- Engineered Fill should be placed in maximum loose lifts of 300 mm and adequately compacted to achieve 95% of its MPMDD. Engineered fill must have full-time compaction testing on-Site by geotechnical personnel;
- When Engineered Fill is being placed below future load bearing structures, the extents of the Engineered Fill should extend a minimum of 0.3 m beyond the edge of the footings or structure on all sides, and then must be continued downwards and outwards at a 1H:1V slope until the approved subgrade level. This footprint can become quite large if the Engineered Fill is required to be deep.

Fill that is placed on un-approved subgrades and/or without prior approval and/or review by the Geotechnical Engineer will not be considered as Engineered Fill and may need to be excavated and replaced, depending on the situation.

6.10 Exterior Retaining Wall and Carport Backfill

The exterior backfill placed against the new retaining wall and carport foundations should be a compactable free-draining non-frost susceptible material. Typically, a pit-run sandy soil meeting the grading requirements of a CG 14 (NQ 2560-114) Granular Materials is acceptable, however, other materials may be considered if they are tested and approved by the Geotechnical Engineer ahead of time. In landscaped areas (without asphalt cover), the upper 0.3 m below landscape details

should be a low permeable soil to reduce surface water infiltration. Backfill should be placed and compacted as outlined below.

- Backfill should not be placed in a frozen condition, or placed on a frozen subgrade;
- Backfill should be placed uniformly on the exterior of foundation walls to avoid build-up of unbalanced lateral pressures;
- For backfill that would underlie paved areas or exterior slabs-on-grade, each lift should be uniformly compacted to at least 95% of its MPMDD, and
- For backfill on exteriors that would underlie landscaped areas, each lift should be uniformly compacted to at least 90% of its MPMDD.

6.11 Perimeter Drainage

Under-floor drainage is generally not required for buildings with a floor slab higher than 0.3 m above the surrounding grade. However, perimeter drainage is recommended in any case.

The retaining wall should be provided with perimeter drainage to avoid the buildup of hydrostatic pressure on the back of the wall. The options for a perimeter drainage system are to use conventional drainage tile or use a composite drainage blanket such as Miradrain 6200 or equivalent. If a conventional perimeter drain system is installed, it may be constructed with 100 mm diameter weeping tiles placed on a 150 mm bed of 19 mm clear stone and then covered with 150 mm of the same stone. The stone and weeping tile should be enveloped on the bottom, sides and top with a non-woven geotextile filter cloth (such as Terrafix 270 or equivalent). The drainage weeping tile system should be placed at the footing level and be connected to a "frost-free" outlet, such as a sump or storm sewer. Perimeter drains should not be connected to the interior under-floor systems. If a composite drainage blanket or geodrain system is used, it is still recommended that the exterior foundation walls be backfilled with a free-draining non-frost susceptible soil. In areas on the building exterior where an asphalt or concrete pavement will not be present adjacent to the foundation wall, the upper 0.3m of the exterior foundation wall backfill should be a low permeable soil to reduce surface water infiltration. Exterior grades should be sloped away from the foundation wall. All roof drain downspouts should be led directly to a frost-free outlet away from the building.

6.12 Underground Utilities

The recommendations within this section are intended to be a supplement to, and not a replacement of the most recent local municipal requirements.

6.12.1 Bedding & Cover

The following are recommendations for service trench bedding and cover materials:

- Bedding for buried utilities should consist of an CG 14 (NQ 2560-114) material and placed in accordance with municipal requirements, assuming the subgrade soils are not allowed to become disturbed;

- The use of clear stone is not recommended for use as pipe bedding. The voids in the stone may result in a low gradient water flow and infiltration of fines from the surrounding soils and cover materials, causing settlement and loss of support to pipes and structures;
- The cover material should be a CG 14 (NQ 2560-114) material. The dimensions should comply with pertinent spec section;
- The bedding material & cover materials should be compacted to at least 90% of its MPMDD, and
- Compaction equipment should be used in such a way that the utility pipes are not damaged during construction.

6.12.2 Trench Backfill

Backfill above the cover for buried utilities should be in accordance with the following recommendations:

- For service trenches underlying pavement areas, the backfill should be placed and compacted in uniform lift thickness compatible with the selected compaction equipment and not thicker than 300 mm. Each lift should be compacted to a minimum of 90% of its MPMDD;
- Excavation backfill should attempt to match texture of the existing adjacent soils. If imported materials are used, side slopes with frost tapers are recommended. Frost tapers should be a back-slope of 10H:1V through the frost zone, (i.e.,1.8 m from finished grade);
- During backfilling, care should be taken to ensure the backfill proceeds in equal stages simultaneously on both sides of the pipe, and
- No frozen material should be used as backfill; neither should the trench base be allowed to freeze.

The quality and workmanship in the construction is as important as the compaction standards themselves. It is imperative that the guidelines for the compaction be followed for the full depth of the trench to achieve satisfactory performance.

7. CONSTRUCTION MONITORING

The recommendations presented in this report are based on the assumption that an adequate level of construction monitoring by qualified geotechnical personnel during construction will be provided. Based on our understanding of the scope of the project, an adequate level of construction monitoring is considered to be as follows:

- Review and approval of all subgrades by the Geotechnical Engineer;
- Review of any underpinning programs;
- Laboratory testing and pre-approval of proposed FILL soils;
- Full time compaction testing of Engineered Fill soils;
- Part time compaction testing of backfill soils, and
- Periodic testing of concrete.

An important purpose of providing an adequate level of monitoring is to check that recommendations, based on data obtained at the discrete borehole locations, are relevant to other areas of the site.

8. CLOSURE

A description of limitations which are inherent in carrying out site investigation studies is given in Appendix A and forms an integral part of this report.

We trust this report meets your present requirements. Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Project Manager

Geotechnical Project Manager

Geotechnical Project Manager

APPENDIX A

LIMITATIONS OF REPORT

LIMITATIONS OF REPORT
GEOTECHNICAL STUDIES

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the Client. Note that no scope of work, no matter how exhaustive, can identify all conditions below ground. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the specific locations tested, and conditions may become apparent during construction which were not detected and could not be anticipated at the time of the site investigation. Conditions can also change with time. It is recommended practice that be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the boreholes.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid. Unless otherwise noted, the information contained herein in no way reflects on environmental aspects of either the site or the subsurface conditions.

The comments given in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs, e.g. the thickness of surficial topsoil or FILL layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and cannot warranty their accuracy. Similarly, cannot warranty the accuracy of information supplied by the Client.

APPENDIX B

SITE LOCATION MAP
BOREHOLE LOCATION PLAN

Pages 206 to / à 207

are not relevant

sont non pertinentes

APPENDIX C

LIST OF SYMBOLS AND DEFINITIONS FOR GEOTECHNICAL SAMPLING DETAILED BOREHOLE LOGS

Pages 209 to / à 215

are not relevant

sont non pertinentes

APPENDIX D

GEOTECHNICAL LABORATORY TEST RESULTS
CORROSION PARAMETER TEST RESULTS

Pages 217 to / à 234

are not relevant

sont non pertinentes

APPENDIX E

PRELIMINARY FLOOR PLANS

Pages 236 to / à 237

are not relevant

sont non pertinentes

NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE

PURCHASE ORDER / BON DE COMMANDE

PO-010059-4

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National Capital Commission
Accounts Payable
202 - 40 Elgin Street
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40 rue Elgin, pièce 202
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202 - 40 Elgin Street
OTTAWA, ON K1P 1C7
CAN

SUPPLIER / FOURNISSEUR:

CAN

BUYER / ACHETEUR:
Thara Abraham

CONFIRMATION DATE / DATE DE CONFIRMATION
25-May/Mai-2020
VENDOR NUMBER / NUMÉRO DU FOURNISSEUR
PURCHASE AGREEMENT NUMBER / NUMÉRO DE L'OFFRE D'ACHAT
TOTAL AMOUNT / MONTANT TOTAL (CAD)
$30,723.90

CONTACT PERSON / PERSONNE RESSOURCE:
Zachary Jenner
zachary.jenner@ncc-ccn.ca

LINE LIGNE	DESCRIPTION	DELIVERY DATE DATE DE LIVRAISON	AMOUNT MONTANT
1	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$10,466.00
2	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$10,466.00
3	Geotechnical & Environmental characterization Investigations as per Ref # IN-SO-040535, Rev. 2 dated 26 Nov 2019	31-Mar/Mar-2020	$5,233.00
4	C/O 1 Geotechnical & Environmental Characterization Investigation as per your Proposal: IN-SO-040535 dated March 3, 2020. PA Rates	30-Apr/Avr-2020	$557.25

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PURCHASE ORDER / BON DE COMMANDE	PO-010059-4

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Lina Jarazin

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