



## REQUEST FOR PROPOSALS

Environmental remediation, characterization and environmental monitoring  
of parcels of land and the airport site in Kuujuaq, QC

Requested by: **Environmental Services**  
**Public Works and Government Services Canada**  
**Quebec Region**

**Project No.: R.002878.001**  
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## APPENDICES

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## 1.0 BACKGROUND

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Public Works and Government Services (PWGSC), on behalf of Transport Canada (TC), wishes to retain the services of an environmental contractor, primarily to carry out environmental remediation work, complementary characterization work, and groundwater monitoring on several surplus parcels of land belonging to TC and on the airport site in Kuujjuaq, Quebec.

The work for which this call for tenders is being issued concerns five (5) surplus parcels of land located in the village of Kuujjuaq:

- Parcel R-1-3: temporary relocation of two above-ground tanks and soil remediation at their base;
- Parcel R-6-1: temporary relocation of one above-ground tank and soil remediation at its base;
- Parcel R-8-1: visual inspection of the building in the footprint of the contaminated soil;
- Parcel R-11-8: visual inspection of two above-ground tanks and complementary soil characterization;
- Parcel R-14: environmental remediation of approximately 350 m<sup>3</sup> of soil with contamination levels in excess of applicable criteria, complementary soil characterization, and post-remediation groundwater monitoring.

In addition, subject to funding availability and field conditions, optional work may be carried out:

- Parcel R-8-1: complementary soil characterization;
- Parcel R-11-8: contaminated soil remediation near the above-ground tanks, if need be;
- Complementary soil and groundwater characterization works, in particular for poly- and perfluoroalkyl substances (PFASs) at the former firefighter training site;
- Update of a Phase I environmental site assessment (Phase I ESA) of the entire airport site;
- Airport: groundwater quality monitoring of the north-east sector of the airport, which was filled with treated soil.

## 2.0 SITE DESCRIPTION AND ENVIRONMENTAL CONTEXT

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The site of the characterization and environmental remediation work consists in fact of several parcels located in the municipality of Kuujjuaq, in northern Quebec, as well as a portion of Kuujjuaq Airport. The municipality is accessible only by air or water.

The surplus land parcels belong to TC and are located in the village of Kuujjuaq. The geographical coordinates (latitude/longitude) of the centre of the village are:

- 58° 06' 25" north
- 68° 24' 00" west

Note that at this latitude, the presence of permafrost limits the timeframe for carrying out the work required for this mandate (soil excavation) to a relatively short period, from mid-July to mid-September.

The following paragraphs provide a brief description of each parcel targeted by the work under this mandate, including photographs and a summary of the environmental condition.

A site map showing the location of TC's surplus parcels and targeted portions of the airport is provided in Appendix A.

### 2.1 Parcel R-1-3

Parcel R-1-3 is used by the hospital and is the site of buildings 909A, 909B (warehouse) and 912 (residence) and a shed. TC is not the owner of the buildings on this lot. According to TC representatives, there appears to be a new construction on the parcel since 2015.

Oil spots on the ground were reported in 2002 and 2005 (Dessau, 2006) near a heating oil tank located near the warehouse (909B), and soil decontamination work was carried out in 2006 (Nunatech Inc.). According to TC information, there are four (4) above-ground heating oil tanks (which do not belong to TC) next to the buildings on this parcel. An environmental assessment conducted in 2009 documented a spot/leak near one of these tanks. In 2010, one of the tanks (RH65) near the warehouse (building 909B) was identified as being non-compliant (Stantec, 2010). The 2010 analysis results for the soil in this sector showed PHC C<sub>10</sub>-C<sub>50</sub>, PAH and MAH concentrations below the MDDELCC's A criteria and PHC concentrations below the CCME criterion for petroleum hydrocarbons.

As part of the land transfer, the province of Quebec requested that additional soil analyses be nonetheless conducted on this parcel. This work was carried out in July 2016 (Stavibel, 2017), including a portion of the characterization work, as well as some environmental remediation work (oil spots observed on the ground). All of the results of this work demonstrated that criterion B was met. However, the analysis results showed an exceedance of the CCME residential/parkland criterion for the PCH F3 fraction (C<sub>10</sub>-C<sub>34</sub>)

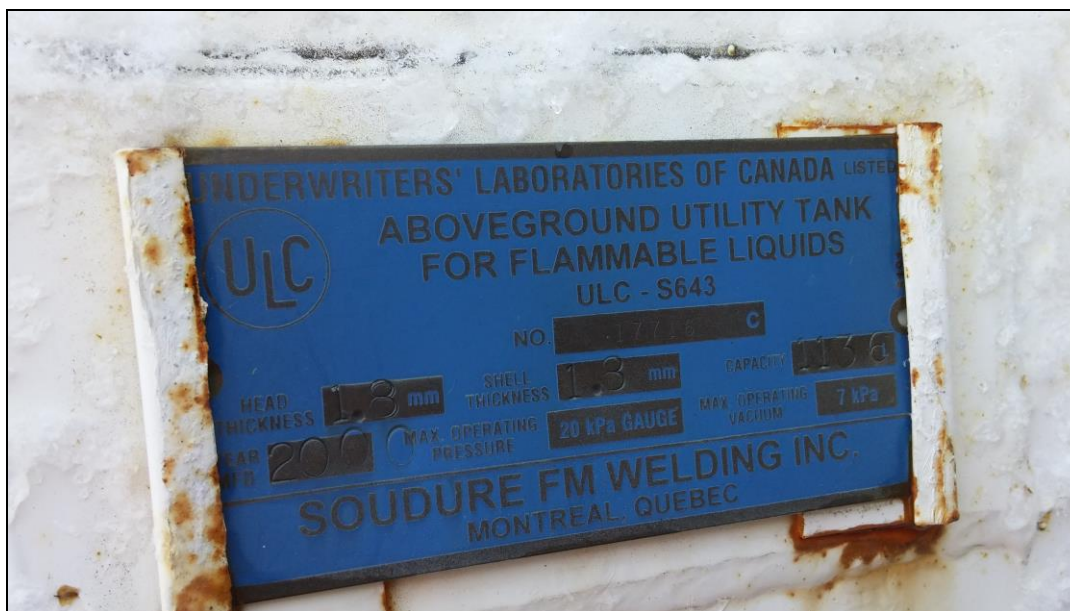
for excavation of bottom samples R-1-3-RE2 and R-1-3-RE4. An analysis of sample R-1-3-RE4 also revealed PHC C10-C50 concentrations in the A–B range.

Although these objectives met the parcel remediation objectives, observations made by TC after the work (in September 2016) indicated new traces of oil near the two above-ground tanks (one is a 1136-litre and the other possibly 2270-litre) located on the parcel. Complementary soil characterization work was therefore carried out at both sites in September 2017 (Consortium Avataa/SNC-Lavalin Stavibel, 2018). The results of the soil analyses showed exceedances of MDDELCC criterion B for PAHs and BTEX and criterion C for PHC C10-C50. BTEX and PAH levels also exceeded the CCME guidelines for residential use, as did the values for the F1 and F3 fractions.

The following four (4) photos illustrate parcel R-1-3 and the tanks in question.







## 2.2 Parcel R-6-1

Parcel R-6-1 is the site of Building 601 (Radio-Canada). TC is not the owner of the building on this lot.

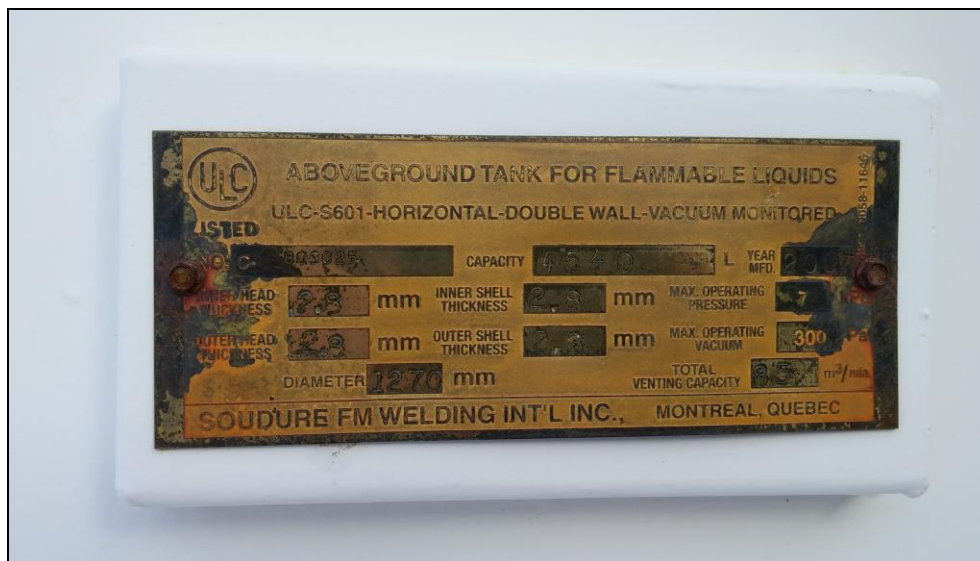
Soil decontamination work was carried out in 2006 (Nunatech Inc.). The analysis results obtained for the samples of the north, east and west excavation walls and bottom met MDDELCC criterion A. However, excavation toward the south had to be interrupted because of the presence of an above-ground tank (4540-litre). The measured HPC C10-

C50 concentrations exceeded MDDELCC criterion B. A membrane was therefore placed on the wall. A characterization study carried out in 2016-2017 revealed there was no volatile organic compounds vapour in the building.

The following three (3) photos illustrate parcel R-6-1 and the tank concerned.







### 2.3 Parcel R-8-1

Parcel R-8-1, located at the intersection of Airport Road and Kigiak Road, is the site of a building (store) identified as number 1030, which is not owned by TC. In September 2014, TC noted (without having been informed beforehand) that an extension to the building was under construction. In July 2016, this expansion work was still under way, or at least was unfinished, since the facing of the extension was not finished (see photos).

Soil decontamination was carried out in 2006 (Nunatech Inc., 2006), but excavation was interrupted in proximity to the building and tank. The HPC C10-C50 concentrations measured in walls EW-1, WW-1, NW-1, SW-2 and WW-2 did not meet the site usage criteria. However, over-excavation of the walls proved impossible because of the infrastructure on the site (buildings to the north, south and west; a tank to the west; and pavement to the north and east). A membrane was therefore placed on the excavation walls to prevent the migration of residual contaminants toward the fill materials.

Soil contaminated with C<sub>10</sub>-C<sub>50</sub> PHCs in the B–C to > D range therefore still remains on this site (Nunatech Inc., 2006). An air characterization study conducted in 2016-2017 revealed there was no volatile organic compounds vapour in the building (including the extension). There is now a new tank against the extension, and the original tank is still in its original location.

The footprint of the current building was surveyed in September 2017, confirming the location of the extension over the suspected enclave of contaminated soil.

The following three (3) photos illustrate parcel R-8-1 and the building extension.



## 2.4 Parcel R-11-8

Parcel R-11-8 of buildings identified as numbers T-2 and 2A (rehabilitation centre and child care centre), which are TC property. Two remedial excavations were undertaken/carried out at the site in 2006 (Nunatech, 2006): one because oil spots were found on the ground near the child care centre, and the other near the tank adjacent the rehabilitation centre. A single composite sample of the excavation bottom and walls was taken during the excavation near the child care centre. An analysis of the sample revealed no PHC C10-C50 contamination (contamination level < A).

As for the excavation near the tank adjacent the rehabilitation centre, samples taken from the north excavation wall and excavation bottom revealed PHC C10-50 concentrations in the B–C range and > D, respectively. Vertical over-excavation and horizontal over-excavation to the north were carried out to remove the contaminated soil. The excavation reached the bedrock, both vertically and to the north; therefore no new samples could be taken.

In September 2013, as part of the project to replace the tank at the rehabilitation centre, characterization work, followed by remediation work, was carried out at the site of the concrete slab for the new tank (Biogénie, 2013). Soil with C10-50 concentrations above MDDELCC criterion C was found to the right of the future tank location. The contaminated soil was excavated, and the soil remaining showed concentrations below MDDELCC criterion A, with the exception of the south wall, which showed concentrations in the B–C range (3,500 mg/kg).

The following five (5) photos illustrate parcel R-11-8.











## 2.5 Parcel R-14

Parcel R-14 is a vacant lot on Naalavvik Street, site of the former Building T-21, originally the home of the TC social club, later occupied by a karate school, and finally demolished in 2010. A playground occupies the site now.

Contaminated soil was excavated on this parcel in 2003, near an above-ground oil tank. Decontamination work had to be stopped in order to preserve the integrity of the existing tank and the building. Soil remediation was carried out in September 2014, and three monitoring wells were installed on the site.

Soil with PHC C<sub>10</sub>-C<sub>50</sub> and/or HAP concentrations above level B of the policy criteria and F2-F3 PHC, PAH and/or chromium concentrations above the applicable CCME guidelines (residential/parkland use) remains on the site. Metals were detected in the groundwater in concentrations exceeding the federal interim guidelines (LVM, 2015). Two additional characterizations were carried out in 2015 and 2016, respectively, to delineate the area of contamination. The volume of soil with concentrations above the federal guidelines (residential/parkland use) has been estimated at approximately 341 m<sup>3</sup>, 264 m<sup>3</sup> of which is contaminated above MDDELCC criterion B (Stavibel, 2017).

In addition, an analysis of groundwater samples taken in 2016 from two of the three wells on parcel R-14 revealed results similar to those obtained in 2015, i.e. copper (Cu) concentrations above both the MDDELCC guidelines for residential use and the *Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*. The water in one of the wells also has cadmium (Cd) and molybdenum (Mo) concentrations in exceedance of the federal guidelines.

A groundwater monitoring campaign in 2017 also revealed exceedances of the MDDELCC criteria for residential use and applicable CCME guidelines. Furthermore, PAH concentrations in exceedance of the CCME guidelines were detected in the downstream well.

The groundwater on parcel R-14 does not meet the guidelines/criteria applicable to the study site.

Complementary remediation work has therefore been recommended.

Groundwater quality monitoring is also recommended, notably to ascertain whether the soil remediation work, once completed, has brought the site into compliance with applicable criteria.

The following five (5) photos illustrate parcel R-14 and the monitoring wells on it.







## 2.6 Airport site

The airport site has undergone several studies, including a Phase I environmental site assessment (Phase I ESA) and an environmental compliance audit (ECA) in 2010 (Stantec, 2010). A Phase II environmental site assessment (Phase II ESA) was subsequently conducted to verify the environmental quality of the soil in the areas of potential environmental concern (APECs) identified in the Phase I ESA deemed by TC to be a priority.

An evaluation of the data collected during the Phase II ESA revealed that 9 of the 11 APECs, namely zones 3, 4, 5, 6, 8, 12, 13, 14 and 16, showed contaminant concentrations in exceedance of CCME or MDDEP criteria.

Since then, additional work has been carried out, and TC is of the view that an update of the Phase I ESA would be appropriate.

### **2.6.1 Former firefighter training site**

The former firefighter training site, identified as APEC 8 in the 2010 Phase I ESA, is located approximately 100 m from the VHF omni-directional range (VOR) on the side opposite to the airstrip. This area, part of which is slightly sloped, consists of land on which vegetation grows (grasses, weeds, shrubs, trees).

Barrels containing hazardous materials and petroleum products have been observed on the former firefighter training site. Several wrecked vehicles, scrapage and other abandoned materials litter the site. Samples of surface soil were taken in 2010 (Stantec, 2010) where spots were observed. One sample, taken from a depth of between 0.0 and 0.20 m, revealed PHC C10-C50 and F2-F3 concentrations in exceedance of the MDDELCC criteria (criterion C) and CCME guidelines applicable to land for commercial/industrial use.

In 2014 (LVM, 2014), soil characterization was undertaken using five test trenches in the area forming the former firefighter training site (TT-14-07, TT-14-09 to TT-14-12), one trench (TT-14-08) in a previous training area, one trench (TT-14-13) to the right of vehicle/engine storage area, and five monitoring wells (MW-14-06 to MW-14-10) on the site's periphery.

All of the samples analyzed revealed PHC C10-C50, metal, PAH and MAH concentrations below level C of the MDDELCC's policy criteria and below the CCME's recommended levels, except for samples TT-14-07-MA-01 and TT-14-11-MA-01, in which the F2 fraction of petroleum hydrocarbons exceeded the applicable CCME criterion.

It should be noted that perfluorooctane sulfonate (PFOS) concentrations above Environment Canada's recommendations were observed by LVM on the firefighter training site (TT-14-08-MA-01, TT-14-09-MA-01, TT-14-10-MA-01, TT-14-10-MA-02 and TT-14-10-MA-04).

As for the groundwater, the analysis results did not reveal any exceedances of the CCME federal interim recommendations or the RESIE criteria for groundwater for the parameters analyzed (PHC C10-C50, petroleum hydrocarbon fractions F1-F4, metals, MAHs and PAHs), except for sample MW-14-09, in which certain PAH concentrations exceeded CCME recommendations.

It should also be noted that four of the six samples had revealed PFOS concentrations above the reference values presented by Health Canada on August 16, 2010.

Complementary characterization work was therefore recommended in order to determine precisely how much of the soil was affected. Environmental monitoring of the groundwater was also recommended.

The following five (5) photos illustrate the former firefighter training site and the wells on it.







## 2.6.2 North-east sector

Since 2001, this area of the airport site has been used to store contaminated soil. Decontamination by biopile of 6,400 m<sup>3</sup> of kerosene- and fuel oil-contaminated soil took place between July 2003 and November 2005. Additional decontamination by biopile, of a total of over 3,000 m<sup>3</sup> of aviation fuel- and heating oil-contaminated soil, was carried out between 2011 and 2013. All of the soil treated that had a residual level of contamination below the B criteria of the *Soil Protection and Contaminated Sites Rehabilitation Policy* (MDDELCC, 1999 revised in 2001, hereafter the Policy) were used in this same area or on its periphery as backfill material.

Nine (9) groundwater monitoring wells had been installed on the periphery of the soil treatment area in 2012 and 2014.

In August 2014, a groundwater characterization revealed that the groundwater varied in depth from 1.57 m to 3.92 m below ground surface. The results of the chemical analyses conducted on the groundwater samples indicated BTEX, PHC C<sub>10</sub>-C<sub>50</sub> and PAH concentrations below the RESIE criteria and applicable alert levels. The groundwater samples had BTEX and PHC F1 and F2 concentrations below the federal interim guidelines. One sample (MW-12-03) had PAH concentrations above the federal interim guidelines.

In the most recent groundwater characterization, carried out in September 2017, the groundwater varied in depth from 2.54 m to 4.54 m below ground surface. The results of the chemical analyses conducted on the groundwater samples indicated BTEX, PHC C<sub>10</sub>-C<sub>50</sub> and PAH concentrations below the RESIE criteria and applicable alert levels. In MW-12-03 only, PAH concentrations exceeded CCME guidelines. It should be noted that four (4) wells (MW-14-01, MW-14-02, MW-14-03 and MW-12-02) out of the nine (9) installed were found to be dry during all of the campaigns.

A comparison of the groundwater results of 2013 with those of 2017 showed an improvement in groundwater quality at the study site. In 2017, only MW-12-03 produced samples that did not meet the guidelines for PAHs, whereas in 2013 and 2015, PO-12-01 also revealed exceedances. In addition, PAH concentrations in MW-12-03 are decreasing.

It has nonetheless been recommended to continue monitoring the groundwater, since in 2015, a slight increase in concentrations had been observed, for certain PAH parameters in wells MW-12-01, MW-12-03 and MW-12-04, with respect to the previous year, and no follow-up had been done in 2016.

The following two (2) photos illustrate the area backfilled with treated soil (in 2014).





## 3.0 MANDATE

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### 3.1 Mandate description and objectives

#### 3.1.1 *General description*

The present mandate can be divided into four (4) main components:

- 1- Environmental remediation of parcel R-14 in the village and post-remediation environmental monitoring of the groundwater on that parcel.
- 2- Temporary relocation of the above-ground tanks, environmental remediation of the contaminated soil at their bases on two (2) parcels (2 tanks on parcel R-1-3 and 1 tank on parcel R-6-1) in the village.
- 3- Visual inspection of two (2) tanks on parcel R-11-8 and complementary characterization of the soil on that parcel.
- 4- Visual inspection of the building on the site of the contaminated soil on parcel R-8-1.

Depending on field observations and analysis results, as well as client funds availability, the following optional work may be added to the mandate:

- 5- Complementary soil and groundwater characterization works, in particular for poly- and perfluoroalkyl substances (PFASs) at the former firefighter training site.
- 6- Updated Phase I ESA of the entire airport site.
- 7- Monitoring of the groundwater in the north-east sector of the airport site (backfilled with treated soil).
- 8- Complementary soil characterization on parcel R-8-1.
- 9- Parcel R-11-8: contaminated soil remediation near the above-ground tanks, if need be.

For bidding purposes, PWGSC anticipates work of the scope described in the following paragraphs. Note that the number of trenches, samples and chemical analyses specified in the cost breakdown has been estimated for information purposes only, and will be adjusted on the basis of field observations and measurements, with the prior approval of PWGSC. The volumes of soil to be disposed of are also estimates, which will be adjusted to the actual volumes upon receipt of proof of disposal.

### **3.1.2 Guidelines/criteria for comparison of analysis results**

All samples taken under this mandate must be sent to an accredited laboratory and analyzed in accordance with the methods prescribed by the bodies responsible for establishing the quality guidelines/criteria (CCME, MDDELCC, Environment and Climate Change Canada) and described in detail in section 5.0 of this document. The Contractor must ensure that the precision of the laboratory equipment selected is accurate enough to determine whether applicable federal guidelines (low-level detection limits) and provincial criteria are met. The Contractor must obtain and interpret the results of the analyses.

All results of soil sample chemical analyses must be compared to the following criteria and recommendations (remediation objectives):

#### **Village**

- B and  $B_{ecotox}$  criteria of the MDDELCC's *Guide d'intervention*
- CCME guidelines (for residential/parkland use)
- PHC CWS standards (for residential/parkland use)

#### **Airport**

- C et  $C_{ecotox}$  criteria of the MDDELCC's *Guide d'intervention*
- CCME guidelines (for residential/parkland use)
- PHC CWS standards (for residential/parkland use)
- *Interim Advice to Federal Custodian Departments for the Management of Federal Contaminated Sites containing Perfluorooctane Sulfonate (PFOS) and Other Per- and Polyfluoroalkyl Substances (PFAS)*, Federal Contaminated Sites Action Plan (FCSAP), version 1.4.1, April 2018

As regards groundwater, the comparison criteria are:

- The criteria of the MDDELCC 's *Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés*
- *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*
- *Interim Advice to Federal Custodian Departments for the Management of Federal Contaminated Sites Containing Perfluorooctane Sulfonate (PFOS)*, Contaminated Sites Action Plan (PASCf), version 1.4.1, April 2018

Note that the Contractor will have to update the comparisons of historical results (soil and groundwater) by using the most recent guidelines/criteria in its interpretation.

The work required for each sector is specified in the following paragraphs. Maps and sketches are provided in Appendix A.



### 3.2 **Environmental remediation**

The Contractor selected to carry out the remediation work for the various parcels will be required to perform, at minimum, the following tasks:

- Applying for and obtaining, from federal, provincial and regional organizations, all permits or authorizations required to carry out the remediation work including, as applicable, clearing permits, permits to re-route traffic, excavation permits, and permits for sewer disposal in the Village of Kuujjuaq or Kativik Regional Government (KRG);
- Locating underground infrastructure using the services of Info-Excavation and a specialized company, as required, as well as the information provided by the site manager (PWGSC and TC);
- Locating, in the field, the area to remediate;
- Securing work and excavation areas by means of temporary fences or other barriers, and controlling access to work areas at all times;
- Using signage if one or more roads must be closed (such as Naalavvik Street);
- Digging additional test trenches and taking samples;
- Where applicable, temporarily relocating tanks in order to access the contaminated soil, and safely putting them back in place after the work is completed. During the work, ensuring a continuous supply of heating oil to the buildings concerned;
- Excavating, segregating, temporarily piling as necessary, loading, transporting and disposing of non-compliant soil;
- Taking samples from excavation bottoms and walls;
- Supporting, preserving, securing and restoring infrastructure that may be affected during the work;
- Over-excavating if the results of the chemical analyses of the excavation bottom and wall samples indicate values exceeding the remediation objectives;
- Developing and maintaining access roads and paths for trucks and machinery;
- As applicable, tree clearing to access areas requiring remediation;
- Backfilling the excavation using clean, segregated excavated soil, contamination-free borrow materials and/or topsoil, ensuring proper compacting of backfill materials (in layers of a maximum thickness of 30 cm);
- Managing accumulated water in excavations and water seepage from saturated excavated materials, as required, by pumping and temporary storage in a settling pond while awaiting analysis results, disposing in the municipal sewer system if the results permit, or arranging recovery by a specialized firm;
- Grading the ground at the locations affected by the work;

- Cleaning up of all waste, materials and installations as the work progresses and before leaving the site, and disposing of waste in accordance with standards in effect. Restoring the site after the work is completed;
- Monitoring the quantities of contaminated soil and residual materials excavated and disposed of, and compiling and providing scale tickets for the residual materials and contaminated soil, for invoicing;
- Defining and applying a worker health and safety program for the full duration of the work at the site;
- Defining and applying an environmental emergency plan, including spill response;
- Producing a weekly work status report, including work done and quantities involved, expenses incurred, the quantities excavated and disposed of, the budget projected going forward, the percentage of completion, and an updated schedule;
- Participating in the work site meetings with all the parties involved in carrying out the work. The meetings will generally be held weekly, but the frequency could vary depending on the particular challenges encountered during the work.

The more detailed work required for each parcel is described in the following paragraphs.

### **3.2.1 Environmental remediation and post-remediation environmental monitoring of groundwater – Parcel R-14**

As stated in section 2.5, contaminated soil was excavated on this parcel in 2003 and 2014. In 2003, the work had to be stopped in order to preserve the integrity of the existing tank and the building. The excavation walls toward the building, toward the tank and toward the side opposite from the tank revealed HPC C<sub>10</sub>-C<sub>50</sub> concentrations of 5,400 mg/kg, 11,000 mg/kg and 2,000 mg/kg, respectively. In 2014, a total of 87.17 mt was excavated and disposed of at an authorized site. Additional characterizations were then carried out to determine the extent of the contamination. The volume of soil still on the site with concentrations exceeding the federal guidelines (for residential/parkland use) has been estimated at approximately 341 m<sup>3</sup>, and 264 m<sup>3</sup> for soil with contamination exceeding MDDELCC criterion B (Stavibel, 2017). Three groundwater monitoring wells were also installed in 2014.

The purpose of the remediation is to excavate and dispose of, off site, soil with contamination exceeding the remediation objectives, specifically:

- B and B<sub>ecotox</sub> criteria of the MDDELCC's *Guide d'intervention*
- CCME guidelines (for residential/parkland use)
- PHC CWS standards (for residential/parkland use)

As stated above, prior to the remediation work as such, complementary characterization of the soil will be required, in order to direct the work under this mandate more precisely. This will include:

- Digging 2 nearly 3 m deep, with continuous soil sampling;
- Chemical analysis of four (4) samples: PHC C<sub>10</sub>-C<sub>50</sub>, PAH, MAH, metals and PHC F1–F4. The results of these analyses must be provided within 24 hours so that remediation work may begin as soon as possible.

For bidding purposes, the volume of soil to be excavated and disposed of is estimated at 425 m<sup>3</sup>. It should be possible to dispose of all of the soil at the local soil treatment centre. However, for bidding purposes and in the event that some of the soil is not accepted at the Kuujuaq soil treatment facility (soil with mixed contamination exceeding the stipulated limits of both the *Quebec Regulation Respecting the Burial of Contaminated Soil* for petroleum hydrocarbons and criterion B for metals), the volume of soil requiring transportation off site by water has been estimated at 10 m<sup>3</sup>.

The excavation walls and bottom will have to be sampled in accordance with the guides listed in section 4.0 of this document.

The number of soil samples to submit for chemical analysis is estimated at 25, and the analytical parameters selected are PHC C<sub>10</sub>-C<sub>50</sub>, PAH, PHC F1–F4, BTEX and metals. Results of these analyses must be provided within 24 hours so that the excavation can be backfilled as soon as possible.

Following the remediation work and depending on the wells that could be recovered, one (1) or two (2) groundwater monitoring wells will have to be installed in the remediated area. A minimum of three (3) monitoring wells, at least one of which must be in the centre of the remediation area and one of which must be downstream of it, must be installed. Prepacked wells will have to be installed in trenches dug as deep as possible, or in the excavation itself.

The wells must be developed or purged and sampled.

The Contractor must verify whether there is a free phase and measure water levels in the monitoring wells in order to establish and map piezometry and groundwater flow directions. The Contractor must take into account, in its analysis, the fact that the work site is in an environment where the presence of permafrost influences the groundwater table.

The groundwater samples taken (3 samples + 1 QC) must be analyzed for the following:

- PHC C<sub>10</sub>-C<sub>50</sub>
- PHC fractions F1 and F2
- PAHs;
- MAHs;

- Dissolved metals (As, Ag, Ba, Cd, Co, Cr, Cu, Sn, Mn, Mo, Ni, Se, Pb and Zn).

The Contractor will have to make recommendations to determine whether post-remediation environmental monitoring is required.

### **3.2.2 Temporary relocation of two above-ground tanks and environmental remediation – Parcel R-1-3**

As stated in section 2.1, parcel R-1-3 is used by the hospital and is the site of buildings 909A, 909B (warehouse) and 912 (residence) and a shed. The results of the analyses indicated that soil concentrations exceeded CCME recommendations for residential use at the soil's surface (between 0.0 and 0.5 meters (minimum) deep at the base of the tank near the warehouse and between 0.0 and 0.2 meters deep at the base of the tank near one of the residences).

The objective is to temporarily relocate the tanks in order to access the contaminated soil, and to excavate and remove all soil with a contamination level higher than the remediation objectives:

- B and  $B_{ecotox}$  criteria of the MDDELCC's *Guide d'intervention*
- The CCME's Recommended Canadian Soil Quality Guidelines (hereafter referred to as the CCME Guidelines) for residential/parkland use
- Canada-wide Standard for Petroleum Hydrocarbons (PHC, CWS) in soil (CCME) (hereafter referred to as the PHC Standards) for residential/park use

Throughout the course of the work, the Contractor must ensure a continuous supply of heating oil to the buildings (temporary connection). The work pertaining to the petroleum equipment must be carried out in accordance with the applicable standards and legislation, listed in section 4.0.

The tanks' characteristics are as follows:

- Warehouse
  - Above ground, steel
  - 1136-litre capacity
  - Year: 2000
  - Contents: heating oil
  - Location: on a small bank at the end of the building
- Residence
  - Above ground, steel
  - 2270-litre capacity approximately
  - Year: unknown

- Contents: heating oil
- Location: at the corner of one of the residential buildings

The size of the area affected is unknown, but in all likelihood it is limited to the area around the tank filling zone, and the depth of the contamination is approximate. For bid purposes, the affected area for the two tanks has been estimated at 20 m<sup>2</sup>, and the volume of soil to excavate and remove is estimated at 20 m<sup>3</sup>.

The excavation walls and floor should be sampled in accordance with the guides listed in section 4.0 of this document.

The number of soil samples to submit for chemical analysis is estimated at 5, and the analytical parameters selected are PH C<sub>10</sub>-C<sub>50</sub>, PAH, PHC F1-F4 and BTEX. Results of the analyses must be provided within 24 hours so that the excavation can be backfilled as soon as possible.

### **3.2.3 Temporarily relocation of an above-ground tank and environmental remediation – Parcel R-6-1**

As stated in section 2.2, parcel R-6-1 is the site of Building 601 (Radio-Canada). The results of the analyses indicated exceedances of the CCME recommendations for residential use in the soil near the surface in the south excavation wall (3,160 mg/kg at depths of between 0.0 and 1.0 metres), against the tank.

The objective is to temporarily relocate the tanks in order to access the contaminated soil and to excavate and remove all soil with a contamination level exceeding the remediation objective:

- B and B<sub>ECOTOX</sub> criteria of the MDDELCC's *Guide d'intervention*
- CCME Guidelines
- PHC Standards for residential/parkland use

Throughout the course of the work, the Contractor must ensure a continuous supply of heating oil to the buildings (temporary connection). The work pertaining to the petroleum equipment must be carried out in accordance with the applicable standards and legislation, listed in section 4.0.

The tanks' characteristics are as follows:

- Above ground, double stainless steel walls
- 4540-litre capacity, 1,270 mm in diameter
- Year: 2003
- Contents: heating oil



- Location: behind building

The size of the area affected is unknown, and the depth of the contamination is approximate. For bid purposes, the affected area has been estimated at 15 m<sup>2</sup>, and the volume of soil to excavate and remove is estimated at 20 m<sup>3</sup>. The excavation will stop at the building and an impermeable membrane will be placed on the sidewalls with non-compliant results, where applicable.

The walls and bottom of the excavation should be sampled in accordance with the guides listed in section 4.0 of this document.

The number of soil samples to be submitted for chemical analysis is estimated at 5, and the analytical parameters selected are PH C<sub>10</sub>-C<sub>50</sub>, PAH, PHC F1-F4 and BTEX. Results of the analyses must be provided within 24 hours so that the excavation can be backfilled as soon as possible.

### ***3.2.4 Visual inspection of the building in the footprint of the contaminated soil – Parcel R-8-1***

As indicated in section 2.3, parcel R-8-1 is the site of a building (store) identified as number 1030. The building is not owned by TC.

In 2006, the soil was decontaminated (Nunatech Inc., 2006), but the digging was interrupted near the building there at the time and a tank. PHC C<sub>10</sub>-C<sub>50</sub> concentrations measured in walls EW-1, WW-1, NW-1, SW-2 and WW-2 did not meet the site use criteria.

Soil contaminated with PH C<sub>10</sub>-C<sub>50</sub> in the B–C to > D range is still present in the parcel (Nunatech Inc., 2006).

An extension was built, and a survey conducted in September 2017 confirmed the construction of the extension over the suspected enclave of contaminated soil.

The objective is to carry out a visual inspection of the building in the area of the contaminated soil enclave and, if possible, to conduct an additional soil characterization.

The work required is as follows:

- Visual inspection of the building (interior and exterior) in the sector of the suspected enclave of contaminated soil to evaluate the possibility of testing the surface (possibly from the interior) to determine the extent of the contamination.

### **3.3 Visual inspection and additional characterization work – Parcel R-11-8**

The work required for this parcel is detailed in the following paragraphs.

As described in section 2.4, parcel R-11-8 is the site of buildings T-2 and 2A (rehabilitation centre and child care centre), which are TC property. Before the above-ground tank adjacent to the rehabilitation centre was replaced in 2013, soil with a concentration exceeding criterion C was excavated at the site of the new tank. The soil in the resulting excavation revealed concentrations below MDELCC criterion A, except for the south sidewall, which revealed concentrations in the B–C range (3,500 mg/kg). This wall was against the building entrance (stairs). The new tank, on a concrete slab, is therefore at the site of the old excavation, and the B–C wall is probably between the tank and the building entrance.

The objective is to carry out a visual inspection of the two above-ground tanks on the parcel (daycare and rehabilitation centre) and carry out additional soil characterization.

The work required for each sector is as follows:

➤ **Child care centre**

- Visual inspection of the tank
- Manual sampling of surface soil if there are spots (about 0.2 m deep)
- Chemical analyses of 4 samples: PH C<sub>10</sub>-C<sub>50</sub>, PAH, MAH, PHC F1–F4

➤ **Rehabilitation centre**

- Visual inspection of the tank
- Manual sampling of surface soil from the non-compliant and/or oil-stained side walls, as applicable (approximately 0.3 m deep)
- Chemical analyses of 4 samples: PH C<sub>10</sub>-C<sub>50</sub>, HAH, MAH, PHC F1–F4

Standard processing timeframes will apply to all sample analyses.

### **3.4 Optional work**

Depending on client funds availability funds and on-site observations, the following optional work may be carried out. This work will not begin without the written authorization of the PWGSC Representative.

### **3.4.1 Characterization of soil and groundwater for PFASs – Former firefighter training site**

As indicated previously (section 2.6.1), additional soil characterization and groundwater monitoring on the former firefighter training site are required under this mandate. This work would include:

- Analysis of prior characterization results based on Interim Advice to Federal Custodian Departments for the Management of Federal Contaminated Sites Containing Perfluorooctane Sulfonate (PFOS) and Other Per- and Polyfluoroalkyl and Substances (PFAS) of the Federal Contaminated Sites Action Plan (FCSAP), Version 1.4.1, published in April 2018;
- Establishment of a complementary soil and groundwater characterization plan;
- Digging of approximately 6 trenches of 3 metres deep, with continuous soil sampling;
- Chemical analysis of 18 soil samples: PH C<sub>10</sub>-C<sub>50</sub>, PAH, MAH, PHC F1–F4, PFASs (23 compounds, long list);
- Around three (3) groundwater monitoring wells will have to be installed. Prepacked wells will have to be installed in trenches dug as deep as possible, or in the excavation itself.
- Liquid surveys, purging and sampling of the five (5) existent monitoring wells and of the three (3) new monitoring wells.

The Contractor must verify whether there is a free phase and measure water levels in the monitoring wells located on the site in order to establish and map piezometry according to the various hydrostratigraphic units encountered (as applicable). The Contractor must take into account, in its analysis, the fact that the groundwater table is affected by permafrost.

The groundwater samples taken (5 samples + 1 QC) must be analyzed for the following:

- PH C<sub>10</sub>-C<sub>50</sub>
- PHC fractions F1 and F2
- MAHs
- PAHs
- PFASs (23 compounds, long list)
- Total and dissolved organic carbon, alkalinity, nitrate, sulfate, iron et manganese

Standard processing timeframes will apply to all sample analyses.

The Contractor must carry out the work and interpret the results according to the latest reference works and interim recommendations, listed in section 4.0.

The Contractor will have to make recommendations to determine whether additional work and environmental monitoring are required (in particular according to the Guidelines for Site Evaluation for Poly and Perfluoroalkylated Substances (PFAs), Arcadis, March 2017), and propose the terms (frequency, analytical parameters, number of wells, etc.).

### **3.4.2 Update of a Phase I ESA and soil characterization – Airport site**

The purpose of a Phase I ESA is to identify environmental risks (potential and actual) on the airport site resulting from current and/or past activities. The study should use nomenclature used (APEC) in the Phase I ESA carried out in 2010 (Stantec, 2010). The ESA will also serve make recommendations for corrective measures to reduce and/or eliminate the negative environmental impacts in the at-risk sectors.

### **3.4.3 Environmental monitoring – Sector backfilled with treated soil**

The purpose of the water quality monitoring is to verify and document the impact of soil treatment and soil grading on the sector's groundwater. This work includes:

- Liquid surveys, purging and sampling of the nine (9) monitoring wells located in the sector backfilled with treated soil.

The Contractor must verify whether there is a free phase and measure water levels in the monitoring wells located on the site in order to establish and map piezometry according to the various hydrostatigraphic units encountered (as applicable). As mentioned in Section 2.6.2, four (4) wells (PO-14-01, PO-14-02, PO-14-03 and PO-12-02) on the nine (9) wells installed were proved dry during all campaigns. The Contractor will have to analyze the construction of these wells according to the hydrogeological conditions of the site over time and provide some answers as to why the wells have been dry so far. The Contractor must take into account, in its analysis, the fact that the groundwater table is affected by permafrost.

The groundwater samples taken (9 samples + 1 QC) must be analyzed for the following:

- PHC C<sub>10</sub>-C<sub>50</sub>
- PHC fractions F1 and F2
- MAHs
- PAHs

Standard processing timeframes will apply to all sample analyses.

The Contractor will have to make recommendations as to the next monitoring steps, including whether such are necessary.

### **3.4.4 Complementary environmental characterization – Parcel R-8-1**

As indicated in sections 2.3 and 3.2.4, parcel R-8-1 is the site of a building (store) identified as number 1030, which is not owned by TC.

Soil decontamination was carried out in 2006 (Nunatech Inc., 2006), but the excavation was interrupted near the building there at the time and a tank. The PHC C<sub>10</sub>-C<sub>50</sub> concentrations measured in excavation walls EW-1, WW-1, NW-1, SW-2 and WW-2 did not meet the site use criteria.

Soil contaminated with PHC C<sub>10</sub>-C<sub>50</sub> in the B–C to > D range is still present on this parcel (Nunatech Inc., 2006).

An extension was built, and a survey conducted in September 2017 confirms that the extension is built over the presumed enclave of contaminated soil.

Following the visual inspection (interior and exterior) of the building described in section 3.2.4, additional soil characterization may be carried out, if possible.

The work required is as follows:

- Digging of 2 trenches approximately 2 meters deep, as applicable, with continuous soil sampling
- Manual sampling of surface soil, as applicable (approximately 0.3 m deep)
- Chemical analysis of 8 samples: PH C<sub>10</sub>-C<sub>50</sub>, PAH, MAH, PHC F1–F4

Standard processing timeframes will apply to all sample analyses.

### **3.4.5 Environmental remediation – Parcel R-11-8**

As mentioned in Section 3.2.5, a visual inspection of the two above ground tanks on Parcel R-11-8 will take place as part of this work, along with a complementary soil characterization. In the event that the complementary characterization identify contaminated soils, and if these soils are reachable without risk for the integrity of the tanks, the present work would consist of excavation, transportation and disposal of soils with contamination level exceeding the remediation objective:

- B and B<sub>ECOTOX</sub> criteria of the MDDELCC's *Guide d'intervention*
- CCME Guidelines
- PHC Standards for residential/parkland use

The size of the area affected is unknown, but in all likelihood it is limited to the area around the tank filling zone, and the depth of the contamination is approximate. For bid



purposes, the affected area for the two tanks has been estimated at 10 m<sup>2</sup>, and the volume of soil to excavate and remove is estimated at 10 m<sup>3</sup>.

The excavation walls and floor should be sampled in accordance with the guides listed in section 4.0 of this document.

The number of soil samples to submit for chemical analysis is estimated at 5, and the analytical parameters selected are PH C10-C50, PAH, PHC F1-F4 and BTEX. Results of the analyses must be provided within 24 hours so that the excavation can be backfilled as soon as possible.

## 4.0 REFERENCES

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The Contractor must carry out the work in accordance with the applicable acts, regulations, codes, guides and federal, provincial and municipal standards.

PWGSC wishes to draw the Contractor's attention to the very recent (February and March 2017) production of the following references:

- Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guidance, Transport Canada, February 2017;
- Guidance for Investigating and Managing the Impacts of Per- and Polyfluoroalkyl Substances (PFAS), Arcadis, March 2017;
- Interim advice to Federal Custodian Departments for the Management of Federal Contaminated Sites Containing Perfluorooctane Sulfonate (PFOS) and other Per- and Polyfluoroalkyl Substances (PFAS), Federal Contaminated Sites Action Plan (FCSAP), Version 1.4.1, April 2018;

PWGS wishes to draw the Contractor's attention to the CCME's recently published guide for site characterization, Quebec's *Soil Protection and Rehabilitation of Contaminated Sites Policy*, the implementation of which is immediate following publication, and the following references:

- Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment (CCME, 2016)
  - o Volume 1: Guidance Manual
  - o Volume 2: Checklist
  - o Volume 3: Suggested Operating Procedures
  - o Volume 4: Analytical Methods
- BEAULIEU, Michel. 2016. Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés. Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques, ISBN 978-2-550-76171-6, 210 p.

Consideration must be given to the following orientation documentation, including but not limited to:

- *Canadian Environmental Protection Act*;
- Canada Occupational Health and Safety Regulations part X et XIV;
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*;
- Canadian Environmental Quality Guidelines;
- Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (CCME);
- Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil - Technical Supplement (CCME);

- Canadian Drinking Water Guidelines (Health Canada);
- Federal approach to contaminated sites;
- Phase I Environmental Site Assessment, CSA-Z768-F01 (R2006);
- Phase II Environmental Site Assessment, CSA-Z769-F00 (R2008);
- Federal Contaminated Sites Action Plan (FCSAP): Guidance for Site Closure Tool for Federal Contaminated Sites. July 2012;
- Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites, Volume I: Main Report (CCME, 1993);
- Guidance Manual on Sampling, Analysis, and Data Management for Contaminated sites, Volume II: analytical Method Summaries (CCME, 1993);
- *Environment Quality Act*;
- *Land Protection and Rehabilitation Regulation*;
- *Regulation respecting the burial of contaminated soils*;
- *Regulation respecting contaminated soil storage and contaminated soil transfer stations*;
- *Regulation respecting hazardous materials*;
- *Regulation respecting the landfilling and incineration of residual materials*;
- *Act respecting occupational health and safety (R.S.Q., chapter S-2.1)*;
- *Regulation respecting occupational health and safety, S-2.1, r.13*;
- *Safety Code for the construction industry, S-2.1, r.4*;
- Politique de protection des sols et de réhabilitation des terrains contaminés (MDDELCC) (Soil Protection and Contaminated Sites Rehabilitation Policy);
- Guide de caractérisation des terrains (MDDELCC) (Site Characterization Guide);
- Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, volumes 1-4;
- Guide d'échantillonnage à des fins d'analyses environnementales, Cahier 1 Généralités (CEAEQ) (Environmental analysis sampling guide, Book 1 –General);
- Sampling Guide for Environmental Analysis. Booklet 3 -Groundwater sampling (CEAEQ) updated 2012;
- Guide d'échantillonnage à des fins d'analyses environnementales, Cahier 5 - Échantillonnage des sols (CEAEQ) (Environmental analysis sampling guide, Book 5 -Soil sampling);
- Guide d'échantillonnage à des fins d'analyses environnementales, Cahier 8 - Échantillonnage des matières dangereuses (CEAEQ) (Environmental analysis sampling guide, Book 8 - hazardous materials sampling);
- Mode de conservation pour l'échantillonnage des sols (CEAEQ) (Preservation methods for soil sampling);

- Mode de conservation pour l'échantillonnage des eaux souterraines (CEAEQ) (Preservation methods for groundwater sampling);
- Liste des méthodes suggérées pour la réalisation des analyses de laboratoire (CEAEQ) (List of suggested methods for carrying out laboratory analyses);
- Inventaire des lieux d'élimination de résidus industriels Gerled, (MDDELCC);
- Lignes directrices sur l'évaluation des teneurs de fond naturelles dans les sols (MDDELCC) (Assessment Guide of Natural Soil Background Values);
- Répertoire des terrains contaminés, (MDDELCC);
- Répertoire des dépôts de sols et de résidus industriels, (MDDELCC);
- Liste des centres autorisés de traitement de sols contaminés, (MDDELCC);
- Liste des lieux autorisés d'enfouissement de sols contaminés, (MDDELCC);
- Lignes directrices relatives à la gestion de béton, de brique et d'asphalte issus des travaux de construction et de démolition et des résidus du secteur de la pierre de taille (MDDELCC);
- La gestion des matériaux de démantèlement - Guide de bonnes pratiques (MDDELCC) (Guide to Sound Practices in Managing Dismantling Material);
- Guide de valorisation des matières résiduelles inorganiques non dangereuses de source industrielle comme matériaux de construction, (MDDELCC);
- Workplace Hazardous Materials Information System (WHMIS);
- Règlement municipal applicable encadrant les rejets à l'égout ou l'environnement.

In the event of omissions or contradiction between these requirements, the most stringent requirements will apply.

The Contractor must obtain the above reference documents and all necessary work permits, at its own expense, from the relevant federal, provincial and municipal authorities.



## 5.0 METHODOLOGY

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The Contractor will act as a representative of TC and PWGSC. All decisions necessary to effectively carry out the work as well as all decisions that have an impact on the project budget or timetable must be made in close collaboration with TC and PWGSC.

### 5.1 Start-up meeting

Following the awarding of the contract, a start-up meeting with the key project participants will be held at TC's offices in Dorval (PWGSC, Transport Canada, technician and Contractor's project manager). TC and PWGSC requirements and expectations will be clarified at this meeting. The meeting may be held by telephone if the PWGSC representative determines that travel by the Contractor is not required. The Contractor will prepare the minutes of the meeting and submit them to the participants for comments and approval.

### 5.2 Work plan

Following the awarding of the contract, the Contractor will send to PWGSC a work plan for the remediation, characterization and other work, along with a schedule and a picture of the proposed locations for the excavation and other boring (proposed test trenches, monitoring wells). The work plan will include a methodology for managing soils and temporarily relocating aboveground tanks. Work cannot begin until PWGSC has approved the work plan. Locations will be confirmed on site at the beginning of the work by a PWGSC or TC representative.

### 5.3 Site access and work schedule

The Contractor must have its own transportation, without support from PWGSC or Transport Canada, and pay all travel costs. PWGSC must be informed of the date of commencement of the work as soon as possible so that a Transport Canada representative can notify the occupants and prepare site access.

For the sector located on the airport site (backfilled sector), access will be granted by a representative of the airport, and employees will be accompanied at all times by an escort designated by TC or the Kativik Regional Government (KRG). The Contractor must respect the authority of the person in charge of site access. The Contractor may not, at any time, approach the operational areas of the airport or enter the air side, unless escorted by a representative of the airport.

TC / KRG will provide the necessary escorts while the work is being carried out. A representative of TC or KRG, or an authorized agent, will be on site at all times to coordinate activities and communicate with the Nav Canada flight service station (FSS) during intervention in the restricted area. All persons or vehicles entering a restricted area

of the airport must be escorted. The Contractor, its employees and sub-contractors shall comply with the escort's instructions immediately and at all times.

The Contractor's work schedule must be confirmed with TC before any field work is carried out. Work in the sector located on the airport site must be carried out during normal working hours. If the Contractor wishes to work outside those hours, the Contractor must notify the PWGSC representative as soon as possible and cover the cost of an escort (90\$/h) for the performance of the work.

#### **5.4 Location of utilities**

The Contractor will be responsible for locating underground utilities (Info-Excavation, municipality, etc.) prior to the start of the work, if applicable.

The Contractor will be responsible for any damage to underground utilities.

#### **5.5 Equipment and materials**

The Contractor must provide all the equipment and materials required to perform the work and must ensure that this equipment is in proper working order.

The Contractor will provide all the equipment required for the excavation and separation of materials, allowing for ongoing soil sampling and detailed description of the soil strata found.

#### **5.6 Soil samples**

Soil samples must be taken in accordance with the program described in section 3.0 of this document, and with the sampling and sample preservation methodology set out in the guides mentioned in section 4.0, particularly the "Guide d'échantillonnage sur le terrain de substances perfluoroalkylées et polyfluoroalkylées (PFAS), February 2017" and the "Directives pour l'évaluation des sites pour les substances poly et perfluoroalkylées (PFA), Arcadis, March 2017" for work on the former firefighter training site.

The methodology for soil sampling must take into account, but not be limited to, the stratigraphy encountered, organoleptic indicators of contamination, and stratigraphic unit thickness (stratigraphic units sampled separately, maximum thickness represented by a 1.0-metre sample for trenches and a 0.3-metre sample for manual surface sampling).

#### **5.7 Groundwater sampling**

Groundwater samples must be taken in accordance with the sampling and sample preservation methodology set out in the above-mentioned guides. For this project, the **low-flow sampling method** is not required, but is encouraged if feasible.

Groundwater samples submitted for metal analysis must be filtered on-site.

### **5.8 Management of purge and wash water**

Purge and instrument wash water cannot be disposed of without being treated. It must be stored temporarily in barrels and managed in accordance with the analysis results obtained. The water will be disposed of if it meets applicable quality standards, treated (on or off site) or disposed of off site. In the proposed price, the Contractor must make provision for the chemical analysis associated with the characterization of the water, and for treatment of the water on site or disposal off site. The Contractor must also provide disposal forms for off-site management.

### **5.9 Sample preservation and transportation**

The sample preservation methodology must adhere to the guides listed in section 4.0. The Contractor must ensure that the integrity and quality of the samples are preserved during transportation to the laboratory.

The Contractor must account for the fact that the site is in a remote region, requiring air transport for the samples, and take all necessary measures to comply with preservation times. As set out in section 3.0, some analyses must be performed within particularly small timeframes (24 hours).

### **5.10 Temporary relocation of tanks**

The Contractor must temporarily relocate the aboveground tanks (R-3-1 and R-6-1) to access the contaminated soil. Service to associated buildings must be maintained throughout the work. The work must be performed in accordance with the technical directive set out in Appendix B and with applicable laws and regulations, according to the characteristics and contents of the petroleum equipment. The Contractor must take the necessary means to preserve the integrity of the petroleum equipment, and note that the equipment is full to capacity. The Contractor must submit to PWGSC, at least ten (10) business days before the commencement of the work associated with the tanks, a detailed work plan, including methodology and a health and safety plan. The work may begin when PWGSC has approved the work plan.

The Contractor is responsible for and must ensure the stability of the ground when the tanks are put back in place following the soil remediation work.

### **5.11 Excavation**

The Contractor must carry out selective excavations of the materials in place according to the parcels and depths determined in section 3.0 of this document, based on the analysis

results obtained and the organoleptic indicators of contamination observed in the field, in accordance with the nature of the materials or instructions from the Departmental Representative. The Contractor must consider the fact that the quantities of materials to be excavated may be different from those set out in the bid form. In addition, further excavation may be required to meet the remediation objectives with respect to bottoms and sidewalls.

#### **5.12 Management of excavated contaminated soil**

The contaminated soil waste generated by the remediation work in the parcels involved must be excavated and simultaneously loaded onto trucks, then disposed of off site in an authorized location. Some surface soils or equivalent-quality soils to be sampled may be piled temporarily.

The Contractor must ensure that the soils are transported in a closed container or a leak-proof dump body equipped with a tarp which completely covers the top of the dump body and the load. The Contractor must also ensure that the procedure for transporting contaminated soils described in sections 17 and 18 of the Transportation of Dangerous Substances Regulations (R.Q., c. C-24.2, r.4.2.1) is followed by the sub-contractor.

If the soil is not accepted at the local treatment centre, the Contractor must have the soil transported by boat to be disposed of in an authorized location. The soil must be placed in leak-proof containers identified in accordance with the applicable standards and regulations.

#### **5.13 Management of water in the excavation**

The Contractor shall take all possible measures, if necessary, to minimize the volumes of water to be managed during excavation work. However, during periods of precipitation, excavation pits may need to be drained and kept dry. In this case, the Contractor must pump any water accumulated in the excavation in order to continue the work.

The Contractor must recover, store in a settling tank and properly manage the water accumulated in the excavation according to the results of chemical analyzes obtained.

The Contractor will take water samples for analysis so that he can plan the most appropriate management mode (surface discharge, on-site treatment or off-site disposal). The planned water storage period is three to five business days and may vary depending on the time required to obtain chemical analysis results.

For safety reasons, work should be stopped during periods of intense precipitation (torrential rain or thunderstorm).



#### **5.14 Backfilling, compacting and grading**

The Contractor may backfill the excavations generated by the optional remediation work only after having received the results of the bottom and sidewall analysis, confirming the achievement of the remediation objectives, and having obtained the approval of the Departmental Representative. The Contractor must provide enough waterproof polyethylene protective membranes to cover the excavation sidewalls if the Departmental Representative requests, for safety reasons, that the excavations be backfilled before the analysis results are obtained, or if contaminated soil must be left on site when the work is completed (for example, the presence of an infrastructure preventing safe excavation).

The backfill materials required to fill the excavations and reach the initial level must be made up of clean borrow material (with concentrations below MDDEP's A criteria, the CCME's residential/parkland uses criteria and HCP Standards). The Contractor will be responsible for demonstrating the environmental quality of material taken from backfill (analysis certificate) and planning for the cost. Borrow material must not be putrescible, nor can it contain more than 2% organic matter; its particle size and geotechnical properties must be accepted by PWGSC.

The soils used for the backfilling of the excavations must be compacted by layers of 30 cm without a compaction test. Backfill must be sufficiently compacted to ensure the cohesion of the materials and minimize potential settlement.

The Contractor must perform a rough grade according to levels, profiles and contours, allowing for surface treatment, as indicated.

#### **5.15 Quality assurance and quality control**

Throughout all steps of the project, the Contractor must implement a quality assurance/quality control (QA/QC) program designed to ensure the quality and reliability of the data obtained. The program must be applied to all stages of the project: soil characterization, groundwater monitoring and environmental remediation, as well as field sampling and laboratory work. It must include duplicate sampling for quality control, with at least 10% of the samples submitted for chemical analyses duplicated for each parameter.

#### **5.16 Surveying**

The location of the trenches and the dimensions of the excavations must be surveyed and levelled following the work with a minimum accuracy of 1 metre (X, Y). The geodetic coordinates of each point must be transmitted in MTM-NAD 83.

Landmarks such as buildings, posts, etc. must be surveyed at the same time as the environmental work surveying is conducted to ensure that reliable figures are included in the environmental reports.

### **5.17 Site restoration**

After the work, the site must be restored to its original condition, to the satisfaction of the occupants, on the same day as the work.

All excess soil and liquid produced during the work must be managed off-site by the Contractor in accordance with the applicable regulations. The Contractor will be responsible for cleaning the site as the work progresses. No waste may be left at the site.

### **5.18 Work monitoring**

The Contractor must keep PWGSC informed of the progress of the field work through weekly reports (minimum). These reports will include work and quantities completed, budget incurred, projected quantities and budget, progress percentage and schedule updates. Daily site reports must be prepared as well, and must be provided to PWGSC upon request. As needed, short weekly telephone conferences may be planned for work monitoring. The Contractor must be able to provide, upon request, an up-to-date report on the amount of residual materials and soil on site and/or off site.

The Contractor must notify PWGSC in writing when 75% of a quantity estimated in the order is reached. No quantities exceeding the estimates may be invoiced without written approval by PWGSC.

Once the work has been completed, the Contractor will compile and submit to PWGSC supporting documents that attest to the actual quantities for invoicing purposes. Failure to provide supporting documents will result in the associated costs being rejected. Section 9.0 provides further details on the basis of payment for unit price items.

### **5.19 Phase I environmental site assessment update**

The Phase I ESA must be updated in accordance with the requirements of CSA standard Z768-01 and the Site Characterization Guide (MDDEP). The study must include at least the following steps:

#### **Documentary and historical research**

The following is a partial list of documents to be verified and analyzed:

- Aerial photographs (at least one per decade);
- Fire insurance plans, which are available at the Bibliothèque Nationale du Québec;
- Land-use plans/maps, which are available at the Bibliothèque Nationale du Québec;

- Access to information requests to the municipality, the Régie du bâtiment du Québec, and the Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs du Québec (PWGSC will take care of access requests to federal entities);
- Request for fire insurance plans and inspection report;
- Inventory of soil and industrial waste disposal sites (MDDEP);
- Inventory of contaminated sites (MDDEP);
- MDDEP hydrogeologic information system (HIS);
- Building Index, Ministère des Ressources naturelles et de la Faune du Québec (MRNF) online land registry;
- Lovell's Montreal Directory (not applicable);
- Geological, hydrogeological and topographical maps;
- Zoning plan and permitted uses for the site in question and neighbouring properties;
- Documents provided by PWGSC (location certificate, site photographs, recent aerial photographs).

### **Site visit**

A site visit must be carried out to check all of the elements identified by CSA standard Z768-01 and the Site Characterization Guide (MDDEP). The site visit must be carried out in the presence of an airport representative, and employees will be accompanied at all times by an escort designated by TC or the Kativik Regional Government (KRG) (see section 5.3).

At a minimum, the Contractor's representative must wear safety glasses, safety boots, a hard hat and gloves.

Photographs must be taken of the general appearance of the site, neighbouring properties and elements presenting environmental risks (potential and actual).

### **Interviews**

To corroborate or complete the information obtained from the research and the site visit, interviews must be conducted. At a minimum, interviews must be conducted with a TC representative and a PWGSC representative.

## 6.0 ENVIRONMENTAL PROTECTION

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The environmental work must be carried out with due regard for the surrounding environment. The Contractor must not, under any pretext, carry out work, operate machinery, store or dispose of materials or liquids in a nearby watercourse.

This document describes measures to mitigate the environmental impacts as well as best practices applicable to environmental remediation work. Several of these measures or practices are indicated in the preceding subsections of this section, but the following is an additional, non-exhaustive list:

- Do not perform machinery maintenance on the project site;
- Turn off the motors of equipment, machinery and vehicles when not in use;
- Ensure that machinery used is in good condition, conduct maintenance in appropriate locations, and use machinery so as to minimize the risk of accidents or breakages. Before the commencement of the work, the Contractor must submit to the Departmental Representative a certificate of mechanical inspection for each piece of machinery used on the site;
- Waste generated by the work must be disposed of appropriately, and cannot be buried or incinerated on site;
- Perform the work on weekdays between 7:00 a.m. and 5:00 p.m.;
- Transport contaminated materials in leak-proof trucks to prevent dripping during transport;
- Contaminated materials must be covered with a tarp during transport to prevent harmful dust from getting into the environment;
- Adopt work methods that minimize dust emissions;
- If applicable, the speed limit on unpaved roadways will be 10 km/hr;
- Keep access roads clean;
- If necessary, water or dust suppressants will be used on unpaved roads to limit the generation of dust by passing trucks. If dust suppressants are used, they must be certified as meeting the standards of the Bureau de normalisation du Québec (BNQ);
- No excavation work is to be carried out near drainage ditches or watercourses during periods of heavy rain;
- Prior to their departure, trucks will be inspected, then cleaned if necessary, as will power shovels and all other machinery that are moved between areas. Manoeuvring areas will also be inspected and cleaned upon completion of the work;



- Do not perform maintenance or refuelling of machinery within 60 m of any watercourse, wetland, bank or any other aquatic environment. In addition, maintenance and refuelling must be performed on an impermeable surface;
- Do not store gasoline, oil, hazardous material or other contaminating substances less than 60 m from a water body, a wetland, the banks of a river or stream, or any other aquatic environment;
- Do not park vehicles within 60 m of any watercourse, wetland, bank or any other aquatic environment. The same applies for all temporary installations (toilet, worksite facility, etc.);
- The Contractor must comply with the applicable regulations concerning the handling, disposal and transportation of hazardous materials;
- The Contractor must prepare an environmental emergency response plan (EERP). The EERP must be available on site and communicated to all employees;
- Have on hand at all times a spill response kit to deal with any accidental spills of hazardous materials as well as leak-proof containers to contain leaks. Employees on the worksite must have required spill response training;
- Take all necessary actions to stop an accidental spill and quickly contain the substance spilled, then recover and dispose of the substance and contaminated soils, and restore the site;
- Water contaminated by an accidental spill must be contained and recovered or managed directly by a specialized environmental services company;
- All spills on the site must be reported. Report the incident as soon as possible to the responsible authorities as well as to the PWGSC representative and the TC environmental officer responsible for the site. Contact the Environment Canada emergency service (1-866-283-2333) and Urgence Environnement du Québec (1-866-694-5454);
- Dispose of waste in accordance with the standards in effect. No burning is permitted.

## 7.0 HEALTH AND SAFETY

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The Contractor must take known data into account.

The Contractor is responsible for its personnel, its construction vehicles and its sub-contractors participating in the project.

The successful Contractor must carry out the work in accordance with the applicable federal, provincial and municipal acts, regulations, codes, guides and standards.

To protect users and workers of the sites in question, safety measures such as signs, tape and fences must be used to delineate the area undergoing work.

In addition, in accepting this contract, the Contractor agrees to assume all of the responsibilities that normally fall to the prime contractor and the work site supervisor. Before beginning the work, the Contractor must, in particular:

- Regardless of the number of workers assigned to the site, send the PWSCG Departmental Representative a safe work plan (**health and safety plan specific to the work to be carried out**) and a mechanical inspection certificate for the machinery used at the site;
- A general health and safety plan outlining aspects that are irrelevant to the study site will be considered inadequate;
- This plan must indicate the measures that will be taken on and in the vicinity of the work sites to protect the health and safety of its personnel and of the public;
- Ensure that workers have received the training and information needed to perform the work safely and that all tools and protective equipment required are available, comply with the applicable standards, acts and regulations, and are in use;
- Always comply with the *Quebec Act Respecting Occupational Health and Safety* and *Safety Code for the construction industry*;
- Notify workers that they have the right to refuse to perform any work that involves a danger to their health or safety; and
- Delineate and block off the work area and control access to the site.

In the event of an unforeseen incident, the consultant must take all necessary measures, including stopping the work, to protect the health and safety of the workers and the public, and must immediately contact the PWSCG Departmental Representative.

A TC representative will notify site occupants of the work location before the start of the work.

Contractor employees retained to perform this mandate shall comply with TC's security requirements. They shall be accompanied at all times (see section 5.3) by a

representative of TC or KRG when travelling within the federal restricted access zones (e.g. Kuujuaq Airport, TC office).

The Contractor will be responsible for signage, if required, during field work. For example, to protect users and workers using the site, safety measures such as signs, tape and fences must be used to delineate the sector undergoing work.

## 8.0 DELIVERABLES

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For this project, the Contractor is required to provide the following deliverables. Comments by PWGSC and TC must be integrated into the final versions.

### 8.1 Work plan including schedule

The Contractor must send to PWGSC a work plan for the remediation, characterization and other work, along with a schedule and a picture of the proposed locations for the excavation and other boring (proposed test trenches, monitoring wells). The work plan must include a methodology for managing soils and temporarily relocating aboveground tanks.

The plan must be submitted to PWGSC in the days following the awarding of the contract. The plan must be approved by PWGSC or TC before work begins. Any modifications made in response to conditions encountered in the field must be communicated to and approved by the Departmental Representative before the work is carried out.

### 8.2 Health and safety plan and environmental emergency response plan

A week before the commencement of the work, the Contractor must present its health and safety plan specific to the activities to be carried out during the work for approval by PWGSC. The Contractor must also provide the supporting documents concerning the applicable accreditations and proof of training.

The environmental emergency response plan must describe the means planned and available in the event of an oil spill. Refer to section 6.0.

### 8.3 Environmental work reports

One report for each sector of the Village must be produced as part of this mandate.

For work on the airport site, separate reports must also be produced for the following optional work:

- Complementary environmental soil characterization and groundwater monitoring on the former firefighter training site;
- Phase I ESA, airport site;
- Groundwater monitoring, north-east sector of the airport site.

Please note that the preliminary cost estimate associated with the remediation of the sites characterized within this mandate will require a separate letter (soil decontamination).

Reports must be prepared in accordance with the minimum specifications described below.

### **Characterization and/or remediation**

Executive summary (in French and English)



## Introduction

### Site description

- Description of environmental issues.

### Work description

#### Methodology and description of work

- Location of utilities and underground infrastructure;
- Health and safety;
- Characterization plan;
- Sampling methodologies for soil and groundwater and sample nomenclature;
- Test trenches;
- Excavation and segregation work;
- Management of excavated materials;
- Water management (if applicable);
- Sampling of excavation bottoms and sidewalls;
- Backfilling, compacting and levelling of excavations;
- Analytical program;
- Quality assurance and quality control program (QA/QC);
- Levelling and surveying.

#### Physical characteristics of the sector

- Stratigraphy, geology;
- Hydrogeology;
- Indicators of contamination;

#### Analytical results

- Evaluation criteria;
- Soil quality;
- Groundwater quality;
- Soil quality in excavation bottoms and sidewalls;
- QA/QC program results.

#### Results interpretation

- Extent of soil contamination in relation to various contamination levels (on a provincial and federal level);
- Estimated volumes of contaminated soil (on a provincial and federal level).

### Balance of quantities

- Materials excavated and disposed of off site;
- Borrow materials.

### Conclusions and recommendations

### References

### Tables

At a minimum, the report must include compilation tables of analysis results for soil and groundwater samples in comparison to applicable criteria or recommendations (see section 3.1.2).

Any exceedances of applicable criteria or recommendations must be clearly indicated in the tables.

The report must also include a summary table of the volumes of soil excavated and sent for disposal, imported materials, and backfill materials.

### Figures

At a minimum, the report must include:

- a general site map;
- a figure showing the characterization plan;
- one figure per parcel indicating the locations of the boring and/or the locations and limits of the excavations;
- a figure indicating the locations of the monitoring wells and a piezometric map;
- a figure indicating the locations of the samples taken, and a map showing schematic representation of the analytical results obtained from samples collected and analyzed within the framework of this mandate;
- a map indicating the extent of soil contamination/residual materials (as applicable) and a scale map showing the spatial locations of these volumes.

### Appendices

At a minimum, the report must include:

- boring/trench reports;
- site photographs;
- weigh slips and disposal slips;
- compilation of quantities of contaminated soil disposed of;
- certificates of authorization for sites approved by MDDELCC for soil disposal;
- certificates of analysis;
- quality control.

## **Groundwater quality monitoring**

### Executive summary (in French and English)

#### Introduction

#### Site description

- Background;
- Description of environmental issues.

#### Methodology

- Health and safety;
- Sampling methodologies;
- Analytical program;
- Quality assurance and quality control program;
- Levelling and surveying.

#### Physical characteristics of the sector

- Hydrogeology.

#### Analytical results

- Evaluation criteria;
- Groundwater quality;
- QA/QC program results.

#### Results interpretation

#### Conclusions and recommendations

#### References

Figures – At a minimum, the report must include a general site map, a figure indicating the locations of the monitoring wells, a piezometric map, a map/maps showing schematic representation of the analytical results obtained, and a scale map showing the scope of the problem(s) identified, as applicable.

Tables – At a minimum, the report must include compilation tables of analysis results for groundwater samples, including a summary table of previous results, in comparison to the criteria set out in section 3.1.2 of this document. Any exceedances of applicable criteria or

recommendations must be clearly indicated in the tables. A table presenting the results of the quality control program must also be provided.

Appendices – a photographic report and analysis and quality control certificates must be provided.

## **Phase I ESA update**

Executive summary (in French and English)

Site description

Methodology

Documentary and historical research

Site visit

Interviews

Conclusions and recommendations

References

Figures – General location map, a map showing the evolution of the site and a map showing a schematic representation of the environmental hazards (potential and actual) identified.

Appendices – All documents obtained during documentary and historical research, photographs of the site in question and neighbouring properties (including elements presenting environmental risks).

## **8.4 Reproduction of reports**

The reproduction of the reports will be carried out as follows:

- A complete preliminary version in \*.pdf and native file (\*.docx, \*.xlsx) format. Deliverables will be submitted to PWGSC and TC for comments.
- A complete final electronic version of the report must be approved by PWGSC before paper copies are issued.
- One (1) copy, front and back, of the complete final version, and two (2) copies on CD. These final versions must include the comments provided by PWGSC and TC. Each CD must include a version in \*.pdf format and another version in native file format (MS 2003, Word, Autocad, Excel, \*.jpeg, shapefile, etc.). Each paper copy must be signed by the Contractor. The Contractor must verify the quality of the written French before submitting the paper and electronic documents.



The reports must be written in French (except for the executive summary in French and English). All photographs and figures in the reports must be in colour. All drawings by the Contractor must be computer-aided drawings (CADs).

All materials (maps, photographs, plans, etc.) acquired as part of this mandate will remain the property of PWGSC and must be submitted with the final report.

## 9.0 CONTRACT TERMS

### 9.1 Work schedule

Field work must begin as soon as possible (by August 2018) and be completed by September 30, 2018.

Field work must be coordinated with PWGSC and TC. Upon contract award, the Contractor must check the availability of the equipment required to perform the work and make agreements with possible sub-contractors, if applicable.

The following table presents a projected schedule for the project. The order in which the activities are carried out can be modified if necessary.

Tasks	Deliverable (version)	Projected timeframe
<b>2018-2019 FISCAL YEAR</b>		
<b>Start date</b>		<b>X</b>
Contractor bid review		X + 1 week
Contract award and issuance process and supply follow-up		X + 3 weeks
Work planning (including health and safety plan)		X + 5 weeks
Mobilization and performance of field work		X + 11 weeks
Preparation and submission of the work report	preliminary	X + 17 weeks
Review of the preliminary version of the report by PWGSC / TC		X + 20 weeks
Preparation and submission of the final work report	final	X + 22 weeks

Note:

**X** corresponds to the date of receipt of the bid

Any changes to the schedule must receive prior approval from PWGSC. If one or more optional activities are not carried out, the number of weeks allotted to those activities will be removed from the schedule.

### 9.2 Service proposal content

The Contractor's service proposal must take into account all of the work set out in the contract. For bid purposes, the scope of the work has been estimated and is set out in section 3.0 of this document, while the recommended methodology is set out in section 5.0. The proposal must include a technical proposal and a financial proposal.

Note that the following considerations should be considered when preparing your service offer:

- Depending on field observations, volumes, depth and level of contamination may differ;
- The work must be carried out in accordance with applicable laws and regulations and take into account the environmental protection and Health & Safety measures outlined in sections 6.0 and 7.0 of this document.

The proposal must include a technical proposal and a financial proposal. The following sections describes lumps sum and unit price work cost items.

### **9.2.1 Lump sum work (section B1-1 and B2-1)**

Work that is not listed in the unit price schedule is subject to a lump sum arrangement. The lump sum price to be submitted is divided into two categories: general items that apply to all sectors (section 1.1 of the basis of payment), and items specific to each sector (section 1.2 of the basis of payment). The lump sum cost items are set out in the following sections.

#### *9.2.1.1 Work site organization and project monitoring (items B1-1.1, B2-1.1 à B2-1.5)*

This cost item includes all elements in the request for proposals for which payment is not provided for in another element. In particular, this item includes the following, without limitation:

- Site mobilization and demobilization and related work (site trailer, washrooms, generator, machinery, equipment, etc.);
- All health and safety-related matters, including ensuring the safety of the excavation sites by installing fences;
- Fees and expenses related to work site meetings;
- Fees and expenses related to project management and monitoring;
- Living expenses for the Contractor's personnel and sub-contractors;
- The Contractor's communication expenses;
- The location of underground utilities;
- The costs associated with the machinery and personnel required for the collection of excavation bottom and sidewall samples and during characterizations of the soil in piles and trenches;

- The equipment and personnel required to carry out surveying work;
- Snow clearing, watering for dust control and general maintenance of the site and access routes, as needed;
- Keeping excavations dry and managing water in all sectors with separate items for water management;
- Expenses related to the application of the measures set out in section 6.0, if not specified in other items;
- Expenses incurred to obtain the permits or authorizations required to carry out the work;
- Limited clearing to access certain areas;
- Temporary dismantling and reinstallation of fences;
- Final site cleaning.

#### 9.2.1.2 *Deliverables (item B1-1.2, B2-1.1 à B2-1.5)*

This cost item includes the production of the deliverables set out in section 8.0 of this document, namely the work plan, the health and safety plan, the environmental emergency plan as well as the environmental work reports. The deliverables may be submitted in electronic format, except for the environmental work reports, of which a paper copy is required.

#### 9.2.1.3 *Above-ground tanks temporary dismantling (item B1-1.3)*

This item includes all costs associated with the support, preservation, transfer and filtration of petroleum products, the maintenance of buildings heating, petroleum equipment temporary relocation, leveling and soil stabilization, reinstallation of the above-ground tanks (and their associated piping) that have to be moved in order to carry out the remediation work.

Any damage to existing facilities or infrastructures must be corrected at the Contractor's cost to the satisfaction of PWGSC. The Contractor will be responsible for evaluating the types of measures that will need to be taken and ensuring that the costs are taken into account in its proposal.

#### 9.2.1.4 *Pumping, temporary storage and disposal of water (item B1-1.4)*

This item includes labor and all the equipment needed to manage the water such as the water accumulated in the excavations, as well as the management of the water used for the decontamination of the equipment used in the framework of the present work. This item includes, but is not limited to:

- pumping;



- storage tanks;
- transportation (if required) and disposal or treatment on the site;
- cleaning of equipment used for water management; and
- costs associated with obtaining the required permits and authorizations.

The costs associated with transporting and disposing of water off site at an authorized treatment facility will be subject to unit-rate payment, and need not be considered in this item.

### **9.2.2 Unit price work (section B1-2, B1-3, B2-2, B2-3 of the basis of payment)**

The fees and disbursements of site personnel as well as the expenses related to the field work (unit rates of chemical analyzes for example) will have to be invoiced according to the firm hourly rates and firm unit prices submitted to the proposal. Unit rate items will be reimbursed based on actual quantities with supporting documents.

The quantities presented in the schedule have been derived from the existing information, and represent an estimate for bidding purposes. The quantities will be adjusted according to the actual work performed following the presentation of supporting documents. PWGSC will only pay actual expenses.

#### *9.2.2.1 Field staff fees (items B1-2.1a)b), B1-2.2a)b), B2-2.1a)b), B2-2.2a)b)*

Rates for field staff should be presented on an hourly basis. Fees that will be reimbursed on an hourly basis include field work and exclude transportation time.

All fees related to other tasks performed by field staff but which are assimilated to office tasks (preparation, coordination, etc.) are not included in this item and must be included in the corresponding lump-sum items.

#### *9.2.2.2 Excavator operation time (items B1-3.2, B2-3.2)*

This item includes the costs related to the excavation of the soil, the stockpiling of soil if necessary, the loading of stockpiled soil if necessary, the loading of contaminated soil, the realization of trenches, and backfilling of excavations with clean soils in 30 cm successive layers, compaction and leveling. This item also includes all machinery, equipment and labor, including the supply and placement of waterproof membranes.

This item will be paid on an hourly basis upon presentation of vouchers (daily work order in \$ / h).

#### *9.2.2.3 Truck operation time (items B1-3.3, B2-3.3)*

This item includes costs related to trucking during loading, transportation of contaminated soil to the disposal site, unloading of contaminated soil and borrow material.

This item will be paid on an hourly basis upon presentation of vouchers (daily work order in \$ / h).

#### *9.2.2.4 Contaminated soils off-site disposal (items B1-3.4, B2-3.4)*

This item includes costs related to disposal of contaminated soil at an authorized treatment or disposal site. The unit rate is in \$ / t based on the level of soil contamination (range B-C, C-RESC in petroleum hydrocarbons). This item will be paid upon presentation of vouchers (shipping / weighing slip) in \$ / t.

#### *9.2.2.5 Contaminated soil transport by ship and off-site disposal (items B1-3.5)*

This item includes costs related to transportation by ship and disposal of contaminated soil in an authorized treatment or disposal site. The unit rate is in \$ / t based on the level of soil contamination (range > RESC in petroleum hydrocarbons and > B in metals). This item will be paid upon presentation of vouchers (shipping / weighing slip) in \$ / t.

#### *9.2.2.6 Borrow materials supply (items B1-3.6, B2-3.5)*

This item includes the provision of clean borrow materials (concentrations that are below MDDELCC A-criteria and below CCME standards and residential use criteria and HCP Standards). It is the responsibility of the Contractor to demonstrate the environmental quality of materials from the borrow pit (certificate of analysis in support) and to forecast the costs. Borrow materials must not be putrescible or contain more than 2% organic matter, while their grain size and geotechnical property must be accepted by PWGSC.

This item will be paid upon presentation of supporting documents (transportation ticket) and will be paid at the volume (m<sup>3</sup>).

#### *9.2.2.7 Groundwater monitoring well supply (items B1-3.7, B2-3.6)*

This item includes the supply of equipment for the installation of prepacked wells. This item will also include the provision of above-ground protection boxes and other equipment required for the installation of groundwater monitoring wells. This item will be paid at the unit \$ / well.

#### *9.2.2.8 Transportation and disposal of water at an authorized treatment site (items B1-3.10, B2-3.8)*

This item will be measured in litres and includes transportation and disposal costs at an authorized water treatment site. Please note that this item will be used as needed. Actual quantities may vary compared to the amounts set out in the payment document.

The item will be paid in litres on the basis of receipts from off-site treatment centres.

#### 9.2.2.9 *Chemical analysis (items B1-3.11 à 3.25, B2-3.9 à 3.26)*

This item will be reimbursed based on the number of chemical analyses performed within a regular period of 5 days or 24 hours. The Contractor shall optimize the time required for the analyzes to minimize costs while not delaying the work. Also, the quantities and analysis times mentioned in Section 3.0 are estimated and may differ depending on the sequence of work and field conditions.

This item will be measured by unit. The unit price will include transportation, storage and cost of testing by a MDDELCC accredited laboratory and all other related work.

## 10.0 DOCUMENTS PROVIDED

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For information purposes, the following documents will be provided to the Contractor after the contract is awarded:

- SNC-Lavalin/AVATAA. Avril 2018. Suivi de la qualité des eaux souterraines – Secteur nord-est du site aéroportuaire de Kuujuaq (Québec). N/Ref. : 649426-0000-4EER-0001\_1
- SNC-Lavalin/AVATAA. Avril 2018. Suivi de la qualité des eaux souterraines – Parcelle R-14, Kuujuaq (Québec). N/Ref. : 649426-0000-4EER-0002\_1
- SNC-Lavalin/AVATAA. Avril 2018. Caractérisation des sols – Parcelle R-1-3, Kuujuaq (Québec). N/Ref. : 649426-0000-4EER-0003\_1
- STAVIBEL/AVATAA. Février 2017. Travaux de caractérisation et de réhabilitation environnementale de terrains excédentaires situés à Kuujuaq (Québec)- Parcelles AR-1, AR-3, C-2, R-1-3, R-1-6, R-6-1, R-7, R-8-1, R-11-1, R-14, R-16-2 et R-16-4 (Québec). N/Ref. : 640348-0000-4EER-0001\_0
- STAVIBEL/AVATAA. Avril 2016. Caractérisation environnementale- Parcelle R-14, rue Naalik Kuujuaq (Québec). N/Ref. : 631207-0000-4EER-0001\_0
- STAVIBEL/AVATAA. Avril 2016. Suivi de la qualité des eaux souterraines - Secteur nord-est du site aéroportuaire de Kuujuaq (Québec). N/Ref. : 631207-0000-4EER-0002\_0
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In addition to these reports, additional georeferenced orthophotography for the parcels involved will be provided to the Contractor after the contract is awarded.

## 11.0 ADDITIONAL INFORMATION

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### 11.1 Information ownership and confidentiality

Any information received and documents produced in connection with this mandate remain the sole property of PWGSC. All materials (maps, photographs, plans, etc.) received under this mandate remain the property of PWGSC and must be submitted with the final report.

The Contractor may not disclose, reproduce or refer to the documents consulted or produced under this project without the explicit prior written consent of PWGSC. This condition applies to all document formats, including electronic versions. PWGSC reserves the right to use the documents produced by the Contractor as it deems appropriate.

## **APPENDIX A**

### **SITE MAPS AND LOCATIONS**