Updated Remedial Action Plan, Coral Harbour Site, Nunavut

Final Report

March 31, 2022

Prepared for:

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Public Services and Procurement Canada

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Public Services and Procurement Canada (PSPC) on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to prepare an Updated Remedial Action Plan (Updated RAP; the Project) and provide environmental consulting services for the former military base located in Coral Harbour, Nunavut (the Site). The requirements of the Project are detailed in the Terms of Reference (TOR) dated May 26, 2021, along with Stantec's Response to the TOR, dated July 28, 2021.

The Site is located approximately 10 kilometres (km) northwest of the Hamlet of Coral Harbour, Nunavut, on Southampton Island. The former military base in Coral Harbour was used as a staging location by Canadian and American forces during the construction of the Distant Early Warning (DEW) Line in Northern Canada during the Second World War and for various other northern projects. The Site was active from the 1940s until the 1970s and the on-site infrastructure included an airstrip, hospital, and housing for military personnel. When the Site was decommissioned in the 1970s, most buildings were decommissioned, some waste materials were buried on site and remaining equipment and waste was abandoned.

There are several Areas of Environmental Concern (AEC) at the Site that are a result of historical on-site activities. The Updated RAP addresses AEC 1, AEC 2, AEC 3, AEC 4, and AEC 6.

Significant components at the Site include:

- Barrel caches containing approximately 2,800 barrels with unknown contents
- Surficial staining of soil around barrel caches
- Significant surface debris, including non-hazardous and hazardous waste materials
- One tank farm, consisting of seven vertical and one horizontal aboveground storage tanks (ASTs) of varying capacities with an estimated total capacity of 355,870 US gallons
- Existing waste disposal areas including buried debris, and consolidated and unconsolidated surface debris
- Wooden sheds, former maintenance building, and dilapidated structure
- A minimum of 19 heavy equipment items

The goal of the Updated RAP is to provide an objective-based approach to guide remedial activities at the Site. The objective of the proposed Site remedial activities is to reduce human health and environmental liabilities by consolidation and disposing of wastes and mitigating risks associated with the physical hazards currently present.

The proposed remediation approaches were developed following the completion of the Human Health and Ecological Risk Assessment (HHERA) that was completed by Stantec in 2020 and updated in 2021 and incorporate the conclusions and recommendations that were drawn in those reports. The Updated RAP takes the new and updated findings and recommendations from the Supplemental Assessment (SA) Technical Memo (Stantec 2022b) and the HHERA Update (Stantec 2022c). The Updated RAP focuses primarily on addressing the risks identified in the HHERA while proposing solutions that are expected to be viewed positively by the community. The proposed approach factors in affordability, feasibility, technical effectiveness and industry best practices.

The Updated RAP provides a detailed review of the selected remedial options and describes disposal methods (remedial action) for each category/component of waste. A summary of the recommended remedial options is provided in the table below.

Table ES-1 Summary of Proposed Remedial Approaches

Category/ Component	Estimated Area/Volume	Recommended Approaches
Non-Hazardous Waste (NHW)		
Empty Barrels	353 cu.m. compacted	To be emptied, cleaned, crushed, and disposed of in a non-hazardous waste (NHW) facility constructed at the Site
Infrastructure (tank farm, wooden sheds, empty tanks, dilapidated building, concrete anchor and former maintenance building)	Minimum 400 cu.m. compacted	To be dismantled, incinerated, or compacted and disposed of in on-site NHW facility. Tank farm will require an assessment prior to remedial program to determine if/what contents are present and if the paint on tanks is amended paint. Note bare wooden materials will be segregated and incinerated on-site.
Buried Debris	332 cu.m.	Classification of the solid waste disposal areas (WDAs) in accordance with the Abandoned Military Site Remediation Protocol (AMSRP) (INAC 2009) to designate each as a Class A, B or C and determine the appropriate remedial action prior to the remedial program. Disposal of NHW in on-site NHW facility.
Surface Debris (consolidated and unconsolidated)	770 cu.m. compacted	To be collected, segregated, compacted and disposed of in on-site NHW facility. Note bare wooden materials will be segregated and incinerated on-site.
Soil		
Contaminated Soil (PHC) – Type A (non-mobile PHCs)	20 cu.m.	Contaminated soil (Type A – PHC) to be excavated to an assumed depth of 0.5 m at AEC 3 and disposed of in on-site NHW facility. Confirmatory soil sampling to be completed for the walls of the excavation. Excavated areas to be backfilled with borrow material and regraded to match surrounding topography. Contaminated soil may be used as intermediate fill in NHW facility.

Table ES-1 Summary of Proposed Remedial Approaches

Category/ Component	Estimated Area/Volume	Recommended Approaches
Contaminated Soil (PHC) – Type B (mobile PHCs)	300 cu.m.	Contaminated soil (Type B – PHC) to be excavated to an assumed depth of 1.0 m at AEC 6. Confirmatory soil sampling to be completed for the walls of the excavation. Excavated areas to be backfilled with borrow material and regraded to match surrounding topography. Soil will be bagged for off-site disposal in southern Canada. However, because the recommended additional assessment of the Community Identified Additional Areas (CIAAs) may identify additional Type B soil, deferring excavation and disposal of the 300 cu.m. of Type B identified at AEC 6 should be considered until the results of the additional assessment are available.
Surficial Staining	2,167 cu.m.	Areas of surficial staining to be excavated to an assumed depth of 0.5 m and disposed of in on-site NHW facility. Excavated areas to be filled with borrow material and regraded to match surrounding topography.
Hazardous Waste (HW)		
Asbestos	Minimum 13 cu.m.	Abate, double bag and dispose of in the on-site NHW facility.
Poorly adhered lead amended paint	Minimum 30 sq.m.	Partial abatement on-site of poorly adhered paint and disposal of removed paint at off-site hazardous waste facility (southern Canada). Remaining substrate will be disposed of in on-site NHW facility.
Batteries	Expected maximum of <10 cu.m.	Removal from vehicles and equipment, if present, and disposal at a registered off-site hazardous waste facility (southern Canada).
Aqueous Liquids	Unknown	To be consolidated, sampled, and disposed of pending the criteria that they meet. Liquids that meet the incineration criteria will be incinerated on-site, liquids that meet the wastewater discharge criteria will be discharged and liquids that do not meet the incineration or wastewater discharge criteria will be disposed of off-site (southern Canada).
Liquid Petroleum Products	265,255 L	To be consolidated, sampled, and disposed of pending the criteria that they meet. Liquids that meet the incineration criteria will be incinerated on-site, liquids that meet the wastewater discharge criteria will be discharged and liquids that do not meet the incineration or wastewater discharge criteria will be disposed of at an off-site hazardous waste facility (southern Canada).
Buried Debris	Unknown	Classification of the WDAs in accordance with the AMSRP to designate each as a Class A, B or C and determine the appropriate remedial action prior to the remedial program. Dispose of as HW if indicated by results.

The statements made in this Executive Summary text are subject to the limitations included in Section 10.0 and are to be read in conjunction with the remainder of this report.

Abbreviations

ACM	Asbestos Containing Material
AHJ	Authorities Having Jurisdiction
AIA	Archeological Impact Assessment
AMSRP	Abandoned Military Site Remediation Protocol
AEC	Area of Environmental Concern
APEC	Area of Potential Environmental Concern
AST	Aboveground Storage Tank
BDA	Buried Debris Area
CBMHW	Cross-border Movement of Hazardous Waste
CCEA	Canadian Council of Ecological Areas
CCME	Canadian Council of Ministers of the Environment
CDA	Consolidated Debris Area
CEQG	Canadian Environmental Quality Guidelines
CIAA	Community Identified Additional Area
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
cu.m.	Cubic Metre
COC	Contaminant of Concern
COPC	Chemicals of Potential Concern
CWS	Canada Wide Standards
DEW	Distant Early Warning
DMF	Decision-Making Framework
DOE-GN	Department of Environment-Government of Nunavut
ECCC	Environment and Climate Change Canada
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
F	Fraction
FCSAP	Federal Contaminated Sites Action Plan
FY	Fiscal Year
GC	Government of Canada
GMD	Granular Material Deposit
GNWT	Government of Northwest Territories
GNU	Government of Nunavut
GSC	Geological Survey of Canada
HDPE	High-Density Polyethylene
HHERA	Human Health and Ecological Risk Assessment
HW	Hazardous Waste
INAC	Indian and Northern Affairs Canada
km	kilometre

LTU	Land Treatment Unit
LW	Liquid Waste
m	metre
mbgs	metres below ground surface
NAPL	Non-aqueous Phase Liquid
NHW	Non-Hazardous Waste
NU	Nunavut
ODS	Ozone-depleting Substances
PACM	Presumed Asbestos Containing Material
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PHC	Petroleum Hydrocarbon
POL	Petroleum, Oil, and Lubricants
PSPC	Public Services and Procurement Canada
RAP	Remedial Action Plan
ROA	Remedial Options Analysis
SA	Supplemental Assessment
SQG	Soil Quality Guideline
sq.m.	Square Metre
SSTL	Site-Specific Target Level
SWHA	Site Wide Hazard Assessment
TCLP	Toxicity Characteristic Leaching Procedure
TDG	Transportation of Dangerous Goods
TOR	Terms of Reference
WDA	Waste Disposal Area
WQG	Water Quality Guideline
WSCC	Worker’s Safety and Compensation Commission

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Public Services and Procurement Canada (PSPC) on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to update the Remedial Action Plan (Updated RAP; the Project) and provide environmental consulting services for the former military base located in Coral Harbour, Nunavut (NU) (the Site). The requirements of the Project are detailed in the Terms of Reference (TOR) dated May 26, 2021, along with Stantec's Response to the TOR, dated July 28, 2021.

1.1 OBJECTIVE

The objective of the Project is to support the future detailed design and tender phase of a Remediation Program to effectively remediate the Site to reduce environmental risks to human and ecological receptors, in the short and long-term. This Updated RAP was prepared with the intent of serving as an update to the previous RAP (dated March 26, 2021) and should replace the previous version as it includes new and updated information.

This report presents the proposed RAP for the Site that was developed based upon the results and findings of the Phase III Environmental Site Assessment (ESA) (Stantec 2021a) and associated Supplemental Assessment (SA) Technical Memo (Stantec 2022b) and the Human Health and Ecological Risk Assessment (HHERA) (Stantec 2021b) and associated HHERA Update (Stantec 2022c) that were completed for the Site. The purpose of this Updated RAP is to identify remedial activities that will be undertaken to address areas of environmental concern (AECs) that were identified in the previous reports. The Updated RAP provides guidance for addressing environmental impacts in soil, and hazardous and non-hazardous materials present as a result of the previous use of the Site.

2.0 SITE DESCRIPTION

2.1 SITE FEATURES

The Site is located approximately 10 kilometres (km) northwest of the Hamlet of Coral Harbour, NU, on Southampton Island (Figure 1, Appendix A). The former military base in Coral Harbour was used as a staging location by Canadian and American forces during the construction of the Distant Early Warning (DEW) Line in Northern Canada during the Second World War and for various other northern projects. The Site was active from the 1940s until the 1970s and the on-site infrastructure included an airstrip, hospital, and housing for military personnel. When the Site was decommissioned in the 1970s, most buildings were decommissioned, some waste materials were buried on site and remaining equipment and waste was abandoned.

According to previous preliminary assessments at the Site (refer to Section 3.1), several environmental concerns including physical hazards related to unconsolidated surface debris and aged structures, and environmental impacts associated with soil contamination, remain on-site.

The Site consists of 16 separate areas of potential concern (APEC)/AECs which included the original 5 AECs from previous studies and the newly identified Community Identified Additional Areas (CIAAs) as described in Table 2-1. The locations of the original 5 AECs included in the RAP are shown in Figure 1, Appendix A.

Table 2-1 APEC / AEC Summary and Description

AEC/APEC	Description of APEC/AEC
AEC 1 – Tar Barrels	AEC 1 is located approximately 550 metres (m) northwest of the municipal airport building. (WESA 2012) reported observing approximately 150 full and partially full barrels of tar stacked in a single cache. Several of the barrels had leaked and tar was observed on the ground surface.
AEC 2 – Full Barrels	AEC 2 is located approximately 350 m north of the municipal airport building. (WESA 2012) reported that the area contained approximately 900 full barrels containing oils, fuel and unknown liquids in a single cache. Several of the barrels were leaking non-aqueous liquids.
AEC 3 – Barrel Cache	AEC 3 is located approximately 2.25 km northeast of the municipal airport building. (WESA 2012) reported that the barrel cache area contained approximately 1,000 barrels stacked in a single cache. Multiple barrels were observed to be leaking and staining was visible in the vicinity of the barrels.
AEC 4 – Former Army Base	AEC 4 is located approximately 1.9 km southeast of the municipal airport building. The former base area was the location of several buildings including a hospital, equipment storage, personnel housing and work areas. The buildings and equipment have been removed and the area has been regraded with fill material (EarthTech 2008).
APEC 5 – Vehicle Dump	The vehicle dump is located approximately 3 km north of the Hamlet of Coral Harbour (the Hamlet). The origin and history of the vehicle dump is unknown. Various types of surface debris were reported as present in the area including discarded snowmobiles, wood and metal barrels, scrap metal, tires, fuel tanks, heavy equipment and more than 100 derelict vehicles (EarthTech 2008).
AEC 6 – Former Airport Debris	This AEC is located approximately 400 m southeast of AEC 2 and 200 m east of the current airport. The area has been cleared and buildings have been removed with the exception of seven large aboveground storage tanks (ASTs). ASTs were reported as potentially empty (EarthTech 2008).
APEC 7 - Municipal Landfills	(WESA 2012) reported that this APEC contains two former municipal landfills located 3 km north of the Hamlet. The origin and history, including the types and volume of waste in the landfills are unknown. No known historical analytical data are available.
APEC 8 - Contaminated Soil Landfill	APEC 8 contains a Contaminated Soil Landfill east of AEC 2 that was reportedly engineered and constructed for the disposal of polychlorinated biphenyl (PCB) impacted soil. The origin and history are unknown. No known historical analytical data are available for APEC 8.
APEC 9 – Creek Drums Area	APEC 9 is located approximately 900 m southwest of AEC 4. The Creek Drums Area consists of an area that historically had a bridge and/or roadway crossing over the creek in this area, although it no longer remains (Stantec 2022b). Unconsolidated surface debris including crushed barrels was observed in the immediate vicinity. No known historical analytical data are available for APEC 9.

Table 2-1 APEC / AEC Summary and Description

AEC/APEC	Description of APEC/AEC
AEC 10 – Former Tank Farm Area	AEC 10 is located approximately 5 km south of AEC 4, adjacent to South Bay and was formerly used for fuel storage. The Former Tank Farm contains a leveled gravel pad with some unconsolidated surface debris. The decommissioning date and methodology of the former tank farm are unknown. Preliminary soil sampling indicates petroleum hydrocarbon (PHC) and polycyclic aromatic hydrocarbon (PAHs) impacts in soil.
APEC 11 – Fossil Creek Bridge Area	APEC 11 is located approximately 400 m west of Coral Harbour Airport Road, adjacent to AEC 4. The Fossil Creek Bridge Area consists of a former bridge crossing Fossil Creek. Remnants of the bridge structure along with unconsolidated metal debris remain in this area. No known historical analytical data are available for APEC 11.
APEC 12 – Gravel Pit Area	APEC 12 is located approximately 4 km southeast of AEC 4, adjacent to Coral Harbour Airport Road. This area consists of a gravel quarry that has been actively mined since at least 1952 (Stantec 2022b). Barrels and ground staining were observed in APEC 12. No known historical analytical data are available for APEC 12.
APEC 13 – Unnamed Creek Area	APEC 13 is located 750 m east of Coral Harbour Airport Road, north of AEC 4. Partially buried drums and debris were identified adjacent to an unnamed creek in gravel piles. No known historical analytical data are available for APEC 13.
AEC 14 – Traditional Knowledge Area	AEC 14 is located 250 m southwest of the Tank Farm at AEC 6. This area was previously included as an area of AEC 6 (referred to as TK Test Pit Area), however following conversations with members of the community it was determined that this area is more appropriately a CIAA and going forward it will be referenced as a separate location from AEC 6. AEC 14 was reported as an area of known fuel contamination resulting from a historical pipeline that transported diesel fuel from the southern shoreline (west of the Hamlet) to ASTs containing fuel near the current airport location (Stantec 2021a). PHC odours and staining were observed in soil and groundwater/active zone water in historical test pits advanced between AEC 6 and the airport by Sudliq Development Ltd. (based on local knowledge; no documents available for review to substantiate). The 2021 SA field program confirmed the presence of undelineated PHCs and PAHs above generic guidelines in this area.
Additional Barrel Cache Locations	Multiple historic barrel cache locations were identified during an aerial photograph review (Stantec 2022b).The locations of the historic barrel cache locations span across a distance of 9 km from AEC 10 north to AEC 3. Barrels caches are observed in the 1952, 1969 and 1972 aerial photographs and show caches with hundreds to thousands of barrels. No known historical analytical data are available for the Additional Barrel Cache Locations.
Former Pipeline	A former pipeline was identified during an aerial photograph review (Stantec 2022b). One end of the pipeline begins at AEC 10 (Former Tank Farm Area) and extends northwest towards the Airport. The other end of the pipeline was not determined in the aerial photograph review. It is thought that the pipeline was used to transport fuel from the Former Tank Farm to the Base and/or Airport. Earthen piers used for supporting the pipeline were observed near AEC 10. No known historical analytical data are available for the Former Pipeline.

At the time of the 2020 site visit, Stantec personnel confirmed through observations and communication with the Hamlet that APEC 5 (Vehicle Dump, used for large item disposal), APEC 7 (Municipal Landfill, used for municipal landfill material) and APEC 8 (Contaminated Soils Landfill, used for PHC impacted soil), were actively being used by the community for disposal; as such, CIRNAC determined that the assessment of these APECs would not be included in this Project.

During the 2021 Community Meeting, the community identified several additional APECs beyond the original 5 AECs that were assessed, including APEC 9, AEC 10, APEC 11, APEC 12, APEC 13 and AEC 14. Preliminary investigation, including soil sampling, was completed at AEC 10 and AEC 14 to confirm the presence/absence of contaminants of potential concern (COPCs) in several test pits. APEC 9, APEC 11, APEC 12, APEC 13 and AEC 14 were visually assessed by Stantec during the 2021 SA field program following informal discussions with members of the local community to collect additional information to assist CIRNAC in determining the ownership and liability responsibility of the Crown for the CIAAs. The consultation with members of the community provided valuable information relating to the CIAAs. It was determined through discussions with PSPC/CIRNAC that the assessment of these areas should be included in this Project. Additionally, the former barrel cache locations and former pipeline were identified during the aerial photograph review and analysis in the Supplemental Assessment (Stantec 2022b). Based on the observed activity, location, and time period it was assumed that these areas were likely associated with military/army operations. Details on the field observations, aerial photograph review and recommendations are provided in the SA Technical Memo (Stantec 2022b). As additional assessment is recommended to characterize these areas, they are not considered in the Remedial Options Analysis (ROA).

2.2 CLIMATE

The Territory of Nunavut lies within the Arctic climate zone, with exceptionally cold winters, and cool to cold summers (CCEA 2014). Based on the climate normals from 1981 – 2010 for the Environment and Climate Change Canada (ECCC) weather monitoring station located at the Coral Harbour Airport, the prevailing wind is from the north and the mean annual temperature is -11°C (ECCC 2020). The area has a summer mean temperature of approximately 6.9°C (June, July, and August) and a winter mean temperature of approximately -23.5°C (November, December, January, February, March, April) (ECCC 2020).

Precipitation throughout most of the Territory of Nunavut falls almost entirely as snow, with small quantities of rainfall during the summer months. The average annual precipitation in Coral Harbour ranges from 200-300 mm, with an average rainfall of 163 mm and average snowfall of 141.6 cm (ECCC 2020).

2.3 VEGETATION

The Site is situated within the Southampton Island Plain ecoregion of the Southern Arctic Ecozone (CCEA 2014). Permafrost is continuous across the ecoregion and contains medium ice content with ice wedges. The dominant soil in the ecoregion is static and turbic cryosols, although outcrops of bedrock are common. The ecoregion is characterized by its continuous coverage of low arctic shrub tundra vegetation including dwarf birch (Betula nana), Arctic willow (Salix arctica), northern Labrador tea (Rhododendron tomentosum), avens (Dryas spp.), and dwarf shrubs (Vaccinium spp). Wet sites are typically dominated by willow, sedge (Carex sp.), and mosses (Campbell et al. 2012).

The Site has been heavily modified by historical military use or municipal waste disposal activities and consists primarily of gravel surfaces with minimal vegetation. Where natural vegetation does occur, it tends to be in sparse, isolated clusters of a single species. Arctic draba (Draba corymbosa), mountain aven (Dryas integrifolia), purple saxifrage (Saxifraga oppositifolia), and other species tolerant of disturbed sites and gravel terrain are the dominant ground cover types observed at the Site. AEC 6 is the most densely vegetated, with approximately half of the AEC vegetated by herbaceous ground cover, mosses, and dense stands of willow along an intermittent stream channel that crosses the area.

2.4 WILDLIFE

Wildlife characteristic of the Southampton Island Plain ecoregion where the Site is located includes Arctic hare (Lepus arcticus), Arctic fox (Vulpes lagopus), caribou, ermine (Mustela erminea), polar bear (Ursus maritimus), wolverine (Gulo gulo), and many migratory and resident bird species including waterfowl, songbirds, and raptors (Stantec 2021b).

In general, the lack of natural vegetation within the impacted areas provides limited habitat for most wildlife species. However, some ground nesting species such as arctic tern, horned lark (Eremophila alpestris) and snow bunting (Plectrophenax nivalis) prefer open, disturbed habitats. Remnant natural habitat present at AEC 6 may provide suitable habitat for a variety of ground and shrub nesting birds such as hoary redpoll (Acanthis hornemanni), lapland longspur (Calcarius lapponicus), rock ptarmigan (Lagopus muta) and willow ptarmigan (Lagopus lagopus). No suitable amphibian habitat or reptile hibernacula were observed at the AECs, and fox tracks at AEC 3 were the only wildlife sign observed during the 2020 Stantec site visit (Stantec 2021b).

2.5 SURFICIAL GEOLOGY

As described in Surficial Geology of Canada (GSC 2014), the surficial geology at the Site is composed of glaciomarine and marine deposits deposited from meltwater and floating ice, in marine waters, during deglaciation and subsequent regression. The overburden at the Site consists of sand, gravel and finer sediment, thin to discontinuous sediment veneer and residual lag developed during marine submergence and includes areas of washed till and bedrock (GSC 2014).

2.6 TOPOGRAPHY AND DRAINAGE

Based on Site observations, regional surface drainage (anticipated shallow groundwater flow direction) is dependent on location and appears to be generally to the south towards Hudson’s Bay (Stantec 2021a). As the topography is variable throughout the Site and the surrounding areas, surface water drainage will change depending on the land elevation. Seasonality may impact surface water drainage as well, as there are areas that are seasonally inundated.

3.0 REGULATORY FRAMEWORK

In Canada, guidance documents have been published by various agencies to help maintain, improve, and/or protect environmental quality and human health in the context of contaminated sites. The primary applicable reference guidelines for the RAP include:

- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQGs)
- CCME Canada Wide Standards (CWS) for PHC in Soil
- Federal Contaminated Sites Action Plan (FCSAP) Decision-Making Framework (GC 2018)
- Abandoned Military Site Remediation Protocol (AMSRP) (INAC 2009)
- Various federal and territorial regulations/guidelines related to defining waste streams and transportation and disposal of wastes (refer to Table 3-1)

3.1 CCME CEQG

The CCME CEQGs provide limits for contaminants in soil, sediment, water, and tissue. They are intended to maintain, improve, and/or protect environmental quality and human health at contaminated sites in general. These criteria include generic numerical values for assessment and remediation of contaminated sites in the context of agricultural, residential/parkland, commercial, and industrial land uses. Generic numerical guidelines are derived using toxicological data to determine the threshold level to the most sensitive receptor(s). These generic numerical guidelines include:

- Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health
- Sediment Quality Guidelines for the Protection of Aquatic Life
- Water Quality Guidelines (WQG) for the Protection of Aquatic Life
- Water Quality Guidelines for the Protection of Agricultural Water Uses

The latest updates of these guidelines are published on-line through the CCME's website (www.ccme.ca).

Details on the applicable generic numerical guidelines for media assessed to date are provided in the Phase III ESA (Stantec 2021a), HHERA (Stantec 2021b), SA Technical Memo (Stantec 2022b), and the HHERA Update (Stantec 2022c).

3.2 CCME CWS

The CCME has produced the CWS for Petroleum Hydrocarbons (PHC) in Soil (CCME 2008) which provides generic Tier 1 criteria intended to protect environmental quality and human health, reported against four PHC fractions (F1 through F4).

The analytical soil data for PHC were screened against the CCME CWS for direct contact, coarse-grained surface soils on commercial land-use to identify concentrations of PHC that may potentially pose risk to human and ecological receptors.

3.3 FCSAP DECISION MAKING FRAMEWORK

As outlined in the FCSAP Decision-Making Framework (GC 2018), the Decision-Making Framework (DMF) is a roadmap that outlines the specific activities and requirements for addressing federal contaminated sites in Canada. The DMF is a 10-step process guiding federal custodians in all aspects of working with contaminated sites.

In accordance with the FCSAP DMF, remediation or risk management objectives may be developed for a site using a guideline approach where published guidelines are selected as the remediation objectives. Where site conditions, land use, receptors, or exposure pathways differ slightly from those set out for the generic guidelines, modified guidelines may be selected (i.e., site-specific criteria). At “Step 7: Develop Remediation/Risk Management Strategy” of the federal approach, the Project Team has the choice to determine whether a generic guideline (Tier 1) or a risk assessment approach (Tier 3) will be used to establish remedial/risk management objectives.

This Project has adopted a combination of the guideline approach and the risk assessment approach. As further detailed in Section 4.2.3, the regulatory criteria approach for the Project / RAP has evolved with new assessment information and data. Initially the Project team adopted a risk assessment approach for the Site for Step 7 of the DMF. A CCME Tier 3 approach of deriving site-specific target levels (SSTLs) was selected and completed as part of the HHERA (Stantec 2021b). COPCs present in concentrations above generic federal criteria (in soil, surface water, groundwater, and sediment) were determined not to be a risk to human health or the environment and therefore are not carried forward for remedial consideration. The risk assessment approach led to the development of SSTLs for PHC F2 and F3.

However, the Project Team ultimately determined that a guideline approach (i.e., CCME CWS Tier 1 for PHCs in soil) would be used to define PHC impacted soil and remedial targets for the Site; although the risk assessment approach is permissible for Step 7, the Project Team wanted a conservative approach that considered the proximity to the local community and would be accepted by community and regulatory stakeholders.

3.4 ABANDONED MILITARY SITE REMEDIATION PROTOCOL

The AMSRP was developed by CIRNAC (formerly Indian and Northern Affairs Canada [INAC]) in 2009 to provide a consistent approach for site remediation of remote sites that takes into account the site conditions, as well as unique challenges and constraints of remediation in the Arctic environment. The AMSRP approach factors in legal requirements, INAC’s Contaminated Sites Policy and standard environmental practices (INAC 2009) and was used as a guidance document while developing the Updated RAP.

3.5 FEDERAL AND TERRITORIAL GUIDELINES AND REGULATIONS

Table 3-1 summarizes the federal and territorial guidelines and/or regulations referenced and considered under their respective jurisdiction as they relate to handling, transporting, and/or disposing of the Site waste streams.

Table 3-1 Applicable Federal and Territorial Guidelines and Regulations

Authority/Author	Guideline/Regulation/Reference	Version (Year of Publication)	Use
Fuel Systems			
Government of Canada (GC)	Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (GC 2008)	2008, as amended	Decommissioning of on-site (AEC 6) tank farm
Hazardous Waste			
CCME	Canada-Wide Standards for Dioxins and Furans (CCME 2001)	2001	Incineration guidance
CCME	Canada-Wide Standards for Mercury Emissions (CCME 2000)	2000	Incineration guidance
Environment Canada (EC)	Technical Document for Batch Waste Incineration (EC 2010)	2010	Incineration guidance
GC	Transportation of Dangerous Goods (TDG) Act (GC 1992)	1992, as amended	Transportation of hazardous wastes
INAC	Abandoned Military Site Remediation Protocol (INAC 2009)	2008	Organic liquid held within waste drums
Workers' Safety and Compensation Commission (WSCC)	Asbestos Abatement – Code of Practice (WSCC 2018)	2018	Asbestos abatement guidance
Government of Nunavut (GNU)	Environmental Guideline for Waste Asbestos (GNU 2011)	2011	Asbestos abatement guidance
GC	PCB Regulation, SOR/2008-273	2008	PCB storage, handling and disposal requirements
GC	Surface Coating Materials Regulation – Lead (GC 2016)	2016	Lead abatement guidance
GC	Cross-border Movement of Hazardous Waste (CBMHW) and Hazardous Recyclable Material Regulations	2021	Transportation of hazardous wastes
GNU	Environmental Guideline for Waste Lead and Lead Paint (GNU 2014)	2014	Lead abatement guidance
WSCC	Working with Lead Guideline (WSCC 2017)	2017	Lead abatement guidance
GNU	Environmental Guideline for the General Management of Hazardous Waste (GNU 2010)	2010	Disposal requirements for hazardous wastes
GNU	Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities	2011	Analytical requirements for residual ash to determine disposal options
WSCC	Personal Protective Equipment Respiratory Protection (WSCC 2016)	2016	Health and safety requirements for working with silica, asbestos, and abrasive blasting

Table 3-1 Applicable Federal and Territorial Guidelines and Regulations

Authority/Author	Guideline/Regulation/Reference	Version (Year of Publication)	Use
GNU	Environmental Guideline for Used Oil and Waste Fuel (GNU 2012)	2012	Management and disposal requirements for organic liquid waste
Non-Hazardous Waste			
INAC	AMSRP (INAC 2009)	2009	Management and disposal options for non-hazardous waste, including surface and buried debris
GC	Federal Contaminated Sites Action Plan (FCSAP) – Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils	2006	Landfarming ROA and guidance for soil characterization.
General			
WSCC	Camp Set Up and Management	2017	Regulations, hazards, and risks to consider for the set up and management of camps.

4.0 BACKGROUND

4.1 HISTORICAL REPORTS

Over the past 30 years, numerous investigations have been conducted to assess the condition of the Site with respect to existing contamination from the former military operations. The following reports document previous site investigations and assessment activities that have been conducted at the Site since 1991. The reports listed below were provided to Stantec by PSPC and reviewed prior to the preparation of the Updated RAP and supporting activities:

- Phase I/II Environmental Site Assessments, Remote Sites in Nunavut – Coral Harbour. Prepared by EarthTech Canada Inc. for Indian and Northern Affairs Canada, dated March 2008 (EarthTech 2008).
- Integrated Phase I and Phase II Environmental Site Assessment, KW005, Coral Harbour. Prepared by WESA for Aboriginal Affairs and Northern Development Canada, dated February 2012 (WESA 2012).
- Phase III Environmental Site Assessment, Near Airport Site, Coral Harbour, NU. Prepared by Nunami Stantec Limited for Department of Environment, Government of Nunavut (DOE-GN), dated December 15, 2017 (Nunami Stantec 2017a).
- Human Health and Ecological Risk Assessment, Near Airport Site, Coral Harbour, NU. Prepared by Nunami Stantec Limited for DOE-GN, dated December 15, 2017 (Nunami Stantec 2017b).
- Remedial Action Plan, Near Airport Site, Coral Harbour, NU. Prepared by Nunami Stantec Limited for DOE-GN, dated March 9, 2018 (Nunami Stantec 2018).

- Draft Archaeological Overview - Coral Harbour Former Military Base Phase III Environmental Site Assessment and Associated Supporting Work. Prepared by Stantec for PSPC, dated August 13, 2020 (Stantec 2020b).
- Phase III Environmental Site Assessment (ESA), Coral Harbour, Nunavut. Prepared by Stantec for PSPC, dated March 19, 2021 (Stantec 2021a).
- Human Health and Ecological Risk Assessment (HHERA), Various Areas of Potential Environmental Concern, Coral Harbour, Nunavut. Prepared by Stantec for PSPC, dated March 26, 2021 (Stantec 2021b).
- Site Wide Hazard Assessment (SWHA), Coral Harbour, Nunavut. Prepared by Stantec for PSPC, dated March 26, 2021 (Stantec 2021c).
- Remedial Action Plan, Coral Harbour Site, Nunavut. Prepared by Stantec for PSPC, dated March 26, 2021 (Stantec 2021e).
- Archaeological Impact Assessment - Public Report, Coral Harbour Site, Nunavut. Permit Number 2021-22A. Prepared by Stantec for PSPC, dated February 2022, (Stantec 2022a)
- Final Supplemental Assessment (SA) Technical Memo, Coral Harbour Site, Coral Harbour, Nunavut. Prepared by Stantec for PSPC, dated February 15, 2021 (Stantec 2022b).
- Final Human Health and Ecological Risk Assessment Update, Coral Harbour Site, Coral Harbour, Nunavut, dated March 7, 2022, (Stantec 2022c).

Based on the reports listed above, the following sections describe the relevant findings/work complete and conclusions.

4.2 RELEVANT FINDINGS AND CONCLUSIONS

Between fiscal year (FY) 20/21 and FY 21/22, Stantec provided various environmental consulting services and completed multiple assessments for the Coral Harbour Site to support the future remediation. The findings of the 2020 assessments (including Phase III ESA (Stantec 2021a), HHERA (Stantec 2021b), SWHA (Stantec 2021c) and the preliminary RAP (Stantec 2021e)) identified AECs requiring further assessment to provide sufficient information for preparation of the remedial design and specifications.

A 2021 SA field program was conducted to collect additional supporting information. New and updated information and data was presented in the SA Technical Memo (Stantec 2022b) (addendum to the Phase III ESA (Stantec 2021a)), the HHERA Update (Stantec 2022c) (addendum to the HHERA (Stantec 2021b)) and the Archeological Impact Assessment (AIA) (Stantec 2022a). The new and updated information has been used to update the RAP. Detail on the environmental assessments and risk assessment reports is summarized in Section 4.2.1 and Section 4.2.2. Additional information regarding the refinement of applicable regulatory criteria is provided in Section 4.2.3. A summary of the FY20/21 and FY21/22 environmental assessments and conclusions are presented in Table 4-1.

4.2.1 Stantec – Environmental Assessment

4.2.1.1 Stantec – Phase III Environmental Site Assessment, 2020

A Phase III ESA (including a Hazardous and Non-Hazardous Materials Survey and a Borrow Source Assessment) was conducted for the Site in 2020 (Stantec 2021a). The purpose of the Phase III ESA was to delineate previous soil exceedances, characterize COPCs, determine soil volumes that exceeded the generic Tier I guidelines, record quantities of hazardous and non-hazardous materials present at the Site, determine possible locations of borrow materials, review potential landfill locations, and evaluate Site access conditions. The conclusions drawn from the Phase III ESA are provided by individual components (i.e., impacted soil, hazardous materials, etc.) and summarized in Table 4-1.

4.2.1.2 Stantec – SA Technical Memo, 2021

A SA Technical Memo was prepared for the Site in 2021 and included various components to address data gaps from previous reports and gather information to support the preparation of the remedial design and specifications. The SA field program included a contaminated soil supplemental assessment and delineation, hazardous and non-hazardous materials inventory, heavy equipment inventory, demolition assessment and waste survey, borrow source assessment, geotechnical assessment of potential non-hazardous waste (NHW) facility areas, consultation with members of the community, assessment of CIAAs, aerial photographic review, site access evaluation, detailed site survey, and an AIA field study. The conclusions drawn for the SA Technical Memo are provided by individual components (i.e., impacted soil, hazardous materials, etc.) and summarized in Table 4-1.

4.2.2 Stantec – Risk Assessment

4.2.2.1 Human Health and Ecological Risk Assessment, 2021

The purpose of the HHERA that followed the completion of the Phase III ESA was to determine whether identified COPCs were posing unacceptable risks to human and ecological receptors at the Site. Based on the activities conducted during the HHERA, the following conclusions were reached:

- COPC at the Site were generally limited to PHC fraction (F) F1, F2, F3, and F4 impacts in surface soil
- A qualitative assessment of PHC management limits did not identify potential issues related to formation of free phase product, fire and explosive hazards, or aesthetic considerations.
- The presence of hundreds of full and partially full barrels at the Site presents uncertainty in the risk assessment. Future releases from these barrels could result in higher concentrations of COPCs in the environment or increase the area of impacts, either of which may change the conclusions of the HHERA.

Human Health Risk Assessment

- The human activities around each AEC were determined to be self-limiting based on the remote locations and the nature of the Site activities.
- A human health based SSTL for PHC F3 of 51,000 mg/kg was calculated based on a potential exposure to impacted surface soil of a casual visitor to the site (toddler); this SSTL is applicable to each of the five AECs.
- Potential risk from exposure of construction/utility workers to impacted soil may be addressed through risk mitigation/management measures.
- No active remediation is required to address potential risk to human health at the five AECs based on the available data; however, areas of AEC 6 (i.e., visual observations of petroleum impacts at four test pits) required additional assessment to determine potential remedial requirements.

Ecological Risk Assessment

- The AECs at the Site do not provide suitable habitat for ecological receptors.
- While maximum concentrations of some COPCs suggest that very localized effects to vegetation or soil invertebrates are possible, the areas of impact (mostly gravel) and the sparse natural vegetation indicate that the COPC impacts can remain in place without concerns for the larger vegetation / ecological community.
- Based on the results of the 2020 Phase III ESA, the impacted areas at each AEC exceeding Tier 1 guidelines are relatively small in size, ranging in extent from approximately 100 square m (sq.m.) to <10,000 sq.m. Overall, the impacted areas are localized and do not provide habitat of sufficient quantity or quality to support populations of ecological receptors.
- Overall, unacceptable risks from exposure to COPC impacts in soil at AEC 1 and AEC 4 to aquatic receptors in Fossil Creek are not expected as COPC in surface water or sediment were either not detected or were detected below ecological screening guidelines.

4.2.2.2 Human Health and Ecological Risk Assessment Update, 2021

The purpose of the HHERA Update that followed the completion of the SA Technical Memo was to review and screen the results from the SA field work completed at AEC 6 to determine if the initial HHERA completed for AEC 6 required updating. The update to the HHERA followed the same approach and methodology that was used in the initial HHERA (Stantec 2021b). As such, the updated report should be read in association with the initial HHERA (Stantec 2021b).

Based on the activities conducted during the HHERA Update, the following conclusions were reached:

- The receptor/exposure pathway combinations evaluated in the HHERA have not changed based on the results of the SA Technical Memo.

Human Health Risk Assessment

- A human health based SSTL for PHC F2 of 23,000 mg/kg was calculated based on a potential exposure to impacted surface soil of a casual visitor to the site (toddler); this SSTL is applicable to each of the five AECs.
- Potential risk from exposure of construction/utility workers to impacted soil may be addressed through risk mitigation/management measures.
- No active remediation is required to address potential risk to human health at the five AECs based on the available data.

Ecological Risk Assessment

- Although there is the potential for ecological receptors (i.e., plants and soil invertebrates) to be present at AEC 6, AEC 6 does not provide suitable habitat for ecological receptors.
- While maximum concentrations of some COPCs suggest that very localized effects to vegetation or soil invertebrates are possible, the areas of impact (mostly gravel) and the sparse natural vegetation indicate that the COPC impacts can remain in place without concerns for the larger vegetation / ecological community.
- Based on the results of the SA Technical Memo (Stantec 2021), the areas at AEC 6 with concentrations above the ecological screening guidelines are relatively small in size and are not continuous. Overall, the impacted areas are localized and do not provide suitable habitat of sufficient quantity or quality to support populations of ecological receptors.
- While some additional delineation for AEC 6 has been recommended in the SA Technical Memo, all known source areas have been investigated, and thus the maximum concentrations present at AEC 6 have likely been identified and further assessment is not expected to change the conclusions of the HHERA.
- With the exception of the above, the data from the SA Technical Memo does not change the overall conclusions presented in the existing HHERA.

4.2.3 Stantec – Refinement of Regulatory Criteria Approach

The regulatory criteria approach for this Project has evolved with the addition of new information and data throughout the assessment phases of the Project. The initial regulatory criteria that were selected in the Phase III ESA (Stantec 2021a) were the generic CCME guidelines for soil, groundwater, surface water and sediment. These guidelines were used to determine concentrations of COPCs that were above the guidelines. Subsequently, an HHERA was conducted to screen the COPCs above these guidelines that were identified in the Phase III ESA to assess if those concentrations posed unacceptable risk to human and ecological receptors.

The HHERA involved the development of SSTLs for PHC F2 and F3. There were no other COPCs that required SSTLs for the Site; all COPCs were concluded to not pose potential risk to human or ecological receptors. When the preliminary RAP was prepared (March 2021), the remedial targets for the Site were based on the SSTLs for PHCs.

Following the preparation of the SA Technical Memo and HHERA Update, a Project Team decision was made to use a more conservative approach for assessing PHCs. Although SSTLs for PHC F2 and PHC F3 impacted soils were derived through the HHERA, they are higher than the AMSRP Remedial Objective for Hydrocarbon Contaminated Soil; therefore, the Project Team determined it would be more appropriate for the Site given the proximity to the nearby community to apply the CCME CWS Tier 1 for PHCs in soil to define impacted soil and remedial targets. Although the PHC SSTLs derived in the HHERA have not been carried forward, the screening results for the other COPCs that were included in the HHERA are still applicable and were used for the development of the Updated RAP.

For details on the specific regulatory criteria that were applied, refer to Section 3.0.

Table 4-1 Summary of Environmental Assessment Conclusions, Remediation Criteria and Outcomes

Location	Period	Environmental Assessment Overview	Environmental Assessment Conclusion	Remediation Criteria and Outcomes
Impacted Soil				
AEC 1	2020/2021	• The 2020 Phase III ESA field program was conducted to delineate horizontal and vertical impacts that had previously been identified in one area at AEC 1. The field program included sampling of soil, surface water and sediment. • No additional assessment of soil, surface water or sediment was undertaken at AEC 1 in 2021.	• Concentrations of toluene, ethylbenzene, xylenes, PHC F1 to F4 and naphthalene in soil above the guidelines applied in the Phase III ESA have been vertically and horizontally delineated; approximately 40 cu.m. of impacted soil exceed these guidelines. • No further assessment is warranted for soil, sediment, or surface water. • The HHERA concluded that no active remediation is required to address potential risk to human or ecological health.	• Following the refinement of applicable regulatory criteria, PHCs were screened against the CCME CWS to identify if and where PHCs exceed the guideline. • **PHC concentrations were below the CCME CWS and as a result the previously estimated 40 cu.m. of impacted soil does not require remediation.**
AEC 2	2020/2021	• The 2020 Phase III ESA field program was conducted to delineate horizontal and vertical impacts that had previously been identified in two areas at AEC 2: North of Full Barrel Cache and the Full Barrel Cache. The field program included sampling of soil and groundwater/active zone water. • No additional assessment of soil or groundwater / active zone water was undertaken at AEC 2 in 2021.	• PHCs in soil above applicable guidelines have been vertically and horizontally delineated in the area North of Full Barrel Cache; approximately 89 cu.m. of impacted soil in this area exceeds the applicable guideline for PHC F3. • Soils with concentrations of PHC F2 to F4, fluorene, naphthalene and phenanthrene above applicable guidelines have not been vertically or horizontally delineated in the area of the Full Barrel Cache, specifically to the northwest and southwest. The estimated volume of impacted soil is 2,528 cu.m. • Where detected, contaminant of concern (COC) concentrations in the groundwater/active zone water sample did not exceed the applicable guidelines. • The HHERA concluded that soil impacts in the Full Barrel Cache area have not been delineated; however, no active remediation is required to address potential risk to human health or ecological receptors.	• Following the refinement of applicable regulatory criteria, PHCs were screened against the CCME CWS to identify if and where PHCs exceed the guideline. • **PHC concentrations were below the CCME CWS and as a result the previously estimated 2,617 cu.m. of impacted soil does not require remediation.**
AEC 3	2020	• The 2020 Phase III ESA field program was conducted to delineate horizontal and vertical impacts in two areas that had previously been identified at AEC 3: Barrel Cache Area and East of the Access Road. The field program included a soil sampling program. • No additional assessment of soil was undertaken at AEC 3 in 2021.	• Concentrations of toluene above applicable guidelines in soil have been horizontally and vertically delineated in the area East of the Access Road; approximately 100 cu.m. of soil in this area exceeds applicable guidelines. • Due to a discrepancy between the Field Work Plan and the field program, a groundwater/active zone water sample was not collected from 17-MW-12 to determine whether the nitrate exceedance detected in 2017 was reproducible. • In the Barrel Cache Area, delineation of PHC and/or PAH impacts in soil has been achieved (volume of impacted soil estimated at 67 cu.m.) with the exception of PHC, PAH and phenol impacts northwest of the barrel cache. Based on partial delineation in this area, the estimated volume of PHC/PAH/phenol impacted soil in the barrel cache area is 3,170 cu.m. • The HHERA concluded that PHCs, PAHs and/or phenol soil impacts northwest of the Barrel Cache Area are not fully delineated; however, no active remediation is required to address potential risk to human health or ecological receptors.	• Following the refinement of applicable regulatory criteria, PHCs were screened against the CCME CWS to identify if and where PHCs exceed the guideline. • PHC concentrations were above the CCME CWS in one location and as a result, the previously estimated 3,337 cu.m. of impacted soil has been reduced to a volume of 20 cu.m. • **There is 20 cu.m. of PHC impacted soil at AEC 3 that requires remediation.**
AEC 4	2020	• The 2020 Phase III ESA field program was conducted to delineate horizontal and vertical impacts that had previously been identified in two areas at AEC 4: Former Army Base and South of Former Army Base. The field program included sampling of soil, surface water, groundwater/active zone water, and sediment. • No additional assessment of soil, surface water, groundwater/active zone water or sediment was undertaken in 2021.	• Concentrations of PHCs and PAHs in soil above applicable guidelines have been horizontally delineated in the area of the Former Army Base and vertical delineation was assumed at permafrost; approximately 17,849 cu.m. of soil exceeds applicable guidelines. • In the area South of the Former Army Base, concentrations of PHCs and PAHs in soil above applicable guidelines have been horizontally delineated and vertical delineation has been assumed at permafrost; approximately 43,206 cu.m. of soil exceeds applicable guidelines. • No further assessment is warranted for soil, groundwater/active zone water, sediment, or surface water at AEC 4. • The HHERA concluded that active remediation is not required to address potential risk to human health or ecological receptors.	• Following the refinement of applicable regulatory criteria, PHCs were screened against the CCME CWS to identify if and where PHCs exceed the guideline. • **PHC concentrations were below the CCME CWS and as a result the previously estimated 61,055 cu.m. of impacted soil does not require remediation.**
AEC 6	2020/ 2021	• No previous environmental assessment had been completed at AEC 6 prior to 2020. The 2020 field program was a Phase II ESA conducted to identify the presence /absence of COCs and included soil, surface water, groundwater/active zone water and sediment sampling. • The 2021 SA field program was conducted to delineate horizontal and vertical impacts that had been identified in the 2020 Phase II ESA. Soil sampling was conducted in three areas: Debris Pile Near Tank Farm, East Debris Pile and the traditional knowledge (TK) test pits area. • A new AEC (i.e. AEC 14) was created following the SA field program 2021 for the area of the TK Test Pits as it was determined that this was a CIAA (see below).	• 2020 – Horizontal and vertical delineation were not achieved at the Debris Pile Near Tank Farm area; the preliminary estimated volume of PHC and PAH impacted soil is approximately 13,105 cu.m. Horizontal and vertical delineation were not achieved at the East Debris Pile; the preliminary estimated volume of PHC and PAH impacted soil is approximately 485 cu.m.Visual evidence of potential contamination was observed in four TK test pits located south/southwest of the Debris Pile Near Tank Farm area • 2021 – Delineation sampling was primarily completed in all three locations; Debris Pile near the Tank Farm (updated preliminary estimated volume of impacted soil is 10,750 cu.m.) and the East Debris Pile (estimated volume of impacted soil is 150 cu.m.). Concentrations of PHC F3, acenaphthene, fluorene, naphthalene, and phenanthrene exceeded the applicable guidelines in these areas. • The HHERA Update concluded that the data from the SA Field Program does not change the overall conclusions presented in the existing HHERA. No active remediation is required to address potential risk to human or ecological receptors at the five AECs based on the available data.	• Following the refinement of applicable regulatory criteria, PHCs were screened against the CCME CWS to identify if and where PHCs exceed the guideline. PHC concentrations were above the CCME CWS in one location and as a result, the previously estimated 10,900 cu.m. of impacted soil has been reduced to a volume of 300 cu.m. • **There is 300 cu.m. of PHC impacted soil at AEC 6 that requires remediation.**

Table 4-1 Summary of Environmental Assessment Conclusions, Remediation Criteria and Outcomes

Location	Period	Environmental Assessment Overview	Environmental Assessment Conclusion	Remediation Criteria and Outcomes
AEC 10	2021	• The 2021 SA field program included a CIAA that was identified as a potential environmental concern. The field program included excavation and sampling of three test pits to determine the presence/absence of COCs in the soil in the area of and downgradient of the former tank farm.	• Concentrations of PHCs and PAHs in soil above the applied guidelines were identified in the area of and downgradient of the former tank farm. Horizontal and vertical delineation was not achieved. The estimated area of impacted soil exceeding the applicable guidelines is 30,000 sq.m.	• **Additional assessment would be required to delineate soil impacts to generic Tier 1 guidelines and CCME CWS.** • As this AEC requires additional assessment to better understand the presence of military operations, existing waste and debris, and COPCs in soil, groundwater/active zone water, surface water and sediment, it has not been considered in this RAP.
AEC 14	2021	• A new AEC (i.e. AEC 14) was created following the SA field program 2021 for the area of the TK Test Pits as it was determined that this was a CIAA.	• 2021 – Preliminary soil sampling (i.e., Phase II ESA) was completed in the TK Test Pit area where visual evidence of potential contamination had been reported in 2020. Concentrations of PHC F2, acenaphthene, fluorene, naphthalene, and phenanthrene exceeded the applicable guidelines in these areas. The TK Test Pits volume of impacted soil was not calculated as impacts were not delineated. • **TK Test Pits require additional assessment to delineate soil impacts to generic Tier 1 guidelines.**	• **Additional assessment would be required to delineate soil impacts to generic Tier 1 guidelines and CCME CWS.** • As this AEC requires additional assessment to better understand the presence of military operations and COPCs in soil and groundwater/active zone water, it has not been considered in this RAP.
Hazardous Materials[1]				
AEC 1, AEC 2, AEC 3, AEC 4, and AEC 6	2020/ 2021	• A hazardous materials assessment was completed for the Site in 2020. The assessment included sampling of potential asbestos-containing materials (ACMs) and lead amended paints from materials at AEC 3, AEC 4 and/or AEC 6. • The 2021 SA field program included a hazardous materials inventory and additional sampling of potential ACMs, lead and PCB amended paint, drip line soil sampling, non-aqueous phase liquid (NAPL), and barrel samples.	• The buried concrete structure that was identified at AEC 4 was visually assessed. Observations and analytical results indicated that a mix of soil and NAPL was present in the structure; the NAPL meets the Abandoned Military Site Remediation Protocol (AMSRP) Barrel Protocol Criteria for on-site incineration in the buried concrete structure. Approximately 112 cu.m. of NAPL mixed with soil is present in the buried concrete structure. • Approximately 13 cu.m. of ACM and presumed ACM (PACM) was identified at AEC 1, AEC 4 and AEC 6. • Approximately 556 sq.m. of hazardous lead amended paint was identified at the Site associated with painted surfaces at AEC 3 and AEC 6. No amended paints containing PCBs were identified. • Drip line sample results concluded that orange, yellow, green and rust coloured paint at AEC 6 is not likely to be lead or PCB leachate toxic and can be disposed of as NHW material. • Surface soil samples collected near the barrel caches reported concentrations of lead and PCBs below the CCME soil quality guidelines (SQG). Amended paint on the barrels is not likely to be leachable material and can be disposed of as NHW material. • Approximately 269 cu.m. of presumed hazardous materials are associated with the former maintenance building adjacent to AEC 6. • Approximately 265,255 L of hazardous liquid contents from the potential petroleum, oil, and lubricants (POLs) located at AEC 6 and the barrels observed at AEC 1, AEC 2, AEC 3, and AEC 6. • Analytical results from the barrel sampling program identified materials that meet the AMSRP criteria for on-site incineration as well as material that do not and will require off-site disposal.	• Disposition of identified hazardous materials is addressed in this Updated RAP.
Non-Hazardous Materials				
AEC 1, AEC 2, AEC 3, AEC 4, and AEC 6	2020/ 2021	• A non-hazardous waste (NHW) assessment was completed for the Site in 2020. The visual assessment included recording the locations and material compositions of NHW. • The 2021 SA field program included a detailed site survey, heavy equipment inventory and demolition assessment and waste survey.	• Approximately 1,523 cu.m. (compacted) of non-hazardous waste (e.g., unpainted wood debris, concrete, scrap metal, buried debris) was observed at the Site. • The heavy equipment inventory identified 19 pieces of heavy equipment at AEC 6. Several of the pieces have the potential for ACMs, lead batteries, mercury switches and amended paints. • The demolition assessment and waste survey identified six types of structures/infrastructure requiring demolition assessment: four wooden sheds (AEC 3), the buried concrete structure (AEC 4), a dilapidated building (AEC 6), various tanks (AEC 6), former maintenance building (adjacent to AEC 6) and the tank farm and associated infrastructure (AEC 6).	• Disposition of the identified non-hazardous materials is addressed in the Updated RAP.
Existing Waste Disposal Areas (WDA)				
AEC 1, AEC 2, AEC 3, AEC 4, and AEC 6	2021	• The objective of the WDA assessment was to visually assess each AEC to identify the extent of debris (including buried and partially buried debris areas [BDA], consolidated debris areas [CDA] and unconsolidated debris). The condition, stability and potential for erosion were assessed for each WDA to provide information to support future management and/or remedial options.	• Five WDAs were identified and observed in a stable condition with little evidence of erosion. The WDAs ranged in size (from approximately 4,120 to 205,000 sq.m.) and height above surrounding topography (from approximately 1.0 to 2.0 m). Areas of consolidated debris, buried debris, and partially buried debris were identified within each WDA. No further assessment for the WDAs was recommended.	• Disposition of the identified WDAs is addressed in the Updated RAP.

Table 4-1 Summary of Environmental Assessment Conclusions, Remediation Criteria and Outcomes

Location	Period	Environmental Assessment Overview	Environmental Assessment Conclusion	Remediation Criteria and Outcomes
Community Identified Additional Areas (CIAAs) and Aerial Photograph Review				
CIAAs (APEC 9, AEC 10, APEC 11, APEC 12, APEC 13)	2021	• The objective of the assessment of CIAA was to gather information on the historical site activities and to determine the responsibility for liability associated with potential environmental concerns for each additional area. Stantec completed in-person interviews with several members of the community to inquire about locations that were identified in the first stakeholder consultation meeting (March 2, 2021). The identified locations were visually assessed for evidence of historically contaminating activities/operations and potential environmental concerns (Stantec 2022b). • Following the SA field program, an aerial photograph review was completed for the CIAAs to verify former military/army operational activities and confirm locations and time periods.	• Nine CIAAs were identified at the Site; Community Identified Area, Creek Drums Area, Electrical Building, CIAA Former Tank Farm, Fossil Creek Bridge, Gravel Pit Area, Potential Buried Jeep Area, Southeast Beach Area and Unnamed Creek Area. Based on observations at the time of the SA field program and a review of aerial photographic imagery the following conclusion were made: - Two of the CIAAs (i.e., Community Identified Area and Potential Buried Jeep Area) had no potential environmental concerns identified – no further action is recommended. - One of the CIAAs (i.e., Electrical Building Area) was suspected to be in use by ECCC and pending determination of the building's current use, no further work was required in this area. - Six of the CIAAs (i.e., Creek Drums Area [APEC 9], Fossil Creek Bridge [APEC 11], Gravel Pit Area [APEC 12], and Unnamed Creek Area [APEC 13]) have potential environmental concerns including potential physical hazards and potential contamination sources (related to unconsolidated surface debris). Additional action, including the removal and disposal of debris was recommended. - One CIAA (i.e., the Former Tank Farm [AEC 10]) was identified as a potential contamination source (i.e., fuel storage). Stantec completed a test pit and soil sampling program in the area of the former tank farm and identified PHC/PAH impacted soil (discussed above under 'Impacted Soil'). Based on the aerial photograph review, CIRNAC has assumed responsibility for the former tank farm. - It was determined that one CIAA (i.e., the Southeast Beach Area) area was still actively being used by the community; as such, CIRNAC determined that the assessment of this area would not be included in this Project. • The aerial photograph review identified two additional items at the Site in relation to former military/army operations: the former pipeline and historic barrel cache locations. Neither of the items identified were observed by the field team during the 2021 field program, nor do they appear in recent Google Earth imagery or in the UAV survey imagery. The recommendation for these areas was to conduct a field program that includes assessment of soil, surface water and/or sediment. • **Additional assessment and/or preliminary assessment is recommended at APEC 9, AEC 10 and APEC 11 through 13, as well as the former pipeline and historical barrel cache locations.**	• As additional assessment and/or preliminary assessment is recommended at these locations to better understand the presence of military operations, existing waste and debris, and COPCs in soil, groundwater/active zone water, surface water and sediment, the CIAAs (APEC 9, AEC 10, and APEC 11 through 13 and the former pipeline and historical barrel cache locations) have not been considered in this RAP.
Borrow Source Assessment				
Airport Road Quarry # 1, Airport Road Quarry # 4,5,7, Airport Road Unnamed Quarry, Granular Material Deposit (GMD) A through G	2020/ 2021	• The objective of the 2020 borrow source field investigation was to identify and characterize granular deposits for potential use as borrow sources. The assessment included a desktop terrain analysis and field investigation. • The objective of the 2021 SA field investigation was to further identify and characterize granular deposits for potential use as borrow sources for construction of the proposed NHW facility.	• Local aggregate materials are associated with a vast glaciomarine lag deposit. The material consists mainly of medium to coarse shale gravels, with variable amounts of sand, and trace amounts of silt and clay sized particles. The gravel fragments are derived from local frost shattered shale deposits and are generally angular in shape. • Limited volumes of granular aggregate materials are available from the three existing borrow sources located alongside Airport Road. Volume estimates inferred on the basis of direct and indirect evidence such as desktop terrain analysis, and limited sampling suggest a total recoverable volume less than 50,000 cu.m. • Considering the assumed extraction depths and selective rejection of some materials noted above, GMD A through D each individually have sufficient material to supply the entire NHW facility construction requirements (i.e., 5,000 cu.m. to 10,000 cu.m. of granular fill). GMD E, which consists of stockpiled granular material has an estimated volume of approximately 5,100 cu.m. • Extraction of borrow materials at GMD A through D is expected to result in localized changes to the terrain conditions, for example by impacting permafrost thermal regime (i.e., a deepening of the active zone), and generating changes to local drainage conditions (e.g., often resulting in the accumulation of standing water in new low-lying areas where excavations take place). • During the field investigation program, GMDs F and G were concluded to not be practical borrow sources for the NHW facility, due to difficult access compared to the alternate GMDs.	N/A
Geotechnical Assessment				
Potential NHW Facility Location 1 through 5	2021	• The objective of the geotechnical assessment was to collect information to support the location selection for the proposed NHW facility. A geotechnical test pit program was conducted at five locations on the site and included field observations and soil sample collection.	• Geotechnical characterization of five potential locations for the construction of a NHW facility was completed, consisting of test pits, geological observations, and laboratory testing. This geotechnical characterization will be used in the site selection and design of the NHW facility.	N/A

Notes:
1. The volume totals presented in the conclusions represent the combined findings from 2020 and 2021.

4.2.4 Stantec – Additional Assessments

4.2.4.1 Site Wide Hazard Assessment, 2021

The SWHA included confirming previously documented hazards and identifying additional hazards observed during the most recent site assessment. The SWHA provided recommendations for additional control measures or risk management mitigations to reduce the hazard risk for future site visits, site work or public access. In short, the SWHA recommended development of plans to address site hazards to prevent impacts to wildlife and human health, including site workers during a remedial program.

4.2.4.2 Archaeological Impact Assessment, 2021

An AIA survey was completed for the Site to document any previously recorded or newly identified archaeological sites relative to the Project area. Fourteen areas of the Site were surveyed. Multiple project components were subject to assessment during the study, including five AECs associated with former military activity, five proposed NHW landfill location options, several potential borrow sources, the Old Airport Tank Farm, and areas surrounding Airport Road Quarry #1. Assessment included ground traverse by two archaeologists to inspect for and document archaeological sites. Shovel tests were not conducted at archaeological sites as identified sites will be avoided, and thus impact from shovel testing was not warranted.

During the studies, three archaeological sites were newly identified. Two sites were identified within the Project boundaries, including a precontact stone feature that may represent a cache or collapsed inuksuk, and a historical tent ring. The third site was identified outside of the Project boundary and consisted of multiple stone features, both precontact and historic, on a bedrock hill. Ongoing avoidance of all three archaeological sites is recommended. Should remediation activities be proposed in close proximity of identified archaeological sites, fencing of sites to facilitate avoidance could be considered. Site locations and descriptions have been provided to PSPC to facilitate long-term avoidance of these archaeological features.

5.0 REMEDIAL OPTIONS ANALYSIS OBJECTIVES AND METHODOLOGY

5.1 OBJECTIVE

The objective of the Updated RAP is to describe the approach to remedial activities at the Site including the rationale for option selection, while the objective for the proposed Site remedial activities is to reduce risk to human health and the environment by addressing site wastes and physical hazards that currently exist on-site. This Updated RAP has been developed to meet the requirements of the FCSAP process.

5.2 DEVELOPMENT OF PROPOSED REMEDIATION APPROACHES

The proposed remediation approaches were developed following the completion of the 2021 SA Technical Memo and incorporate the conclusions and recommendations that were drawn in that report and the subsequent HHERA Update (Stantec 2022c). The Updated RAP focuses primarily on addressing the risks identified in the HHERA while proposing solutions that can be evaluated against selected criteria to determine the best overall option for the community. Consultation was completed with the local community and its feedback and questions were considered in the development of the remedial approach. The community's knowledge was also used to identify other areas of concern (i.e., CIAAs). The proposed approach factors in affordability, feasibility, technical effectiveness and industry best practices.

5.3 REMEDIAL OPTIONS ANALYSIS METHODOLOGY

The ROA was prepared to provide PSPC/CIRNAC with information on costs, benefits and feasibility of potential remedial options and to support making an informed recommendation for a remedial approach. A variety of potential remedial solutions were suggested and evaluated for each waste stream that considered the environmental effectiveness relative to the specific site conditions.

Each option was reviewed considering factors such as technical practicability, permanence, and risk mitigation. From this review, a short list of remedial options was compiled. This short list was then further assessed against evaluation criteria and weighted to identify the best recommended approach.

5.3.1 Evaluation Criteria

Evaluation criteria were developed to allow a qualitative comparison of the remedial options and included:

- Cost Effectiveness
- Effectiveness (ability to mitigate risks to human and environmental health)
- Ease of Implementation and Timeliness
- Indigenous Participation

An overview of each evaluation criteria is described below.

Cost Effectiveness

This criterion evaluates the remedial option based on its estimated cost compared to the other remedial options. The estimated cost for each remedial option will factor in associated costs for the entirety of the remedial option (including long term monitoring and liability, if applicable). Each remedial option will be assessed for estimated cost and then evaluated.

Effectiveness

This criterion evaluates the remedial method for its ability to mitigate risks to human and environmental receptors that were identified in the HHERA at the Site. Consideration such as the ability of the remedial option to meet the applicable criteria, reduce the risk to receptors and minimize or eliminate the exposure pathway will be factored into the evaluation. Each remedial option will be rated against its demonstrated ability to mitigate risk.

Ease of Implementation and Timeliness

This criterion evaluates the feasibility and ease of implementation of the remedial option in the remote northern location of Coral Harbour, NU. Considerations such as equipment requirements, climate conditions, and site access will be factored into the evaluation. The length of time required for the remedial option to meet the applicable remedial criteria, including management of any residual risk (i.e., long-term monitoring) will also be factored into this evaluation.

Indigenous Participation

This criterion evaluates the remedial option for its ability to create opportunities for indigenous participation. Considerations such as potential employment opportunities and positive impact on the northern communities are included in this criterion.

5.3.2 Evaluation Criteria Scoring

To identify the most suitable remedial option for the Site, potential remedial options were scored using the evaluation criteria matrix. Each remedial option was qualitatively assessed against each evaluation criteria and compared to the other remedial options. Waste components with three or more remedial options were scored. Weightings were applied to each criterion based on the assumed importance (i.e., effectiveness of the remedial option is weighted as 20% of the overall score). The weighting applied to the four evaluation criteria was as follows:

*Cost*0.3 + Effectiveness*0.2 + Ease of Implementation*0.15 + Indigenous Participation*0.35.*

An overview of the remedial option evaluation criteria that were applied are presented in Table 5-1.

Table 5-1 Remedial Options Evaluation Criteria Scoring

Factor		3	2	1
1	Cost Effectiveness	Cost for this option is less than 70% of the most expensive option.	Cost for this option is between 70% and 99% of the most expensive option.	Most expensive option.
2	Effectiveness	Completely eliminates the risk to receptors, fully removes source of contamination or exposure pathway. Aesthetics of Site are similar to pre-disturbance conditions.	Reduces risk to receptors. Reduces or contains source of contamination. Aesthetics of Site are moderately improved.	Does not reduce risks. Sources of contamination remain in place. Aesthetics of Site remain the same.
3	Ease of Implementation and Timeliness	Can be completed well within the estimated time frame of the project, may shorten overall schedule. Will require minimal material imported to Site.	Can be completed within the estimated time frame of the project. Will require moderate effort and/or material imported to Site.	Could impact overall project schedule, will be on the critical path. Requires most material to be imported to Site or requires or may require permission by other agencies.
4	Indigenous Participation	This remedial option maximizes local and Indigenous employment and subcontracting opportunities.	This remedial option will include some local and Indigenous employment and subcontracting opportunities, but a significant portion of the work will be completed by southern companies and subcontractors.	This remedial option will be completed mainly by southern labour and subcontractors with minimal opportunities for local and Indigenous employees and companies or requires no labour (leave in place options).

6.0 REMEDIAL OPTIONS EVALUATION

The Updated RAP evaluates items that trigger remedial action. Triggers for remedial action include but are not limited to the following: aesthetics, physical hazards, potential sources of contamination and regulatory requirements. Each item is divided into waste streams (liquid waste [LW], hazardous waste [HW], non-hazardous waste [NHW]) based on the output that is created by managing or remediating it. Once the item has been broken down into waste streams, the waste streams are evaluated through the ROA and scored to determine the best and most appropriate solution for remediation.

The following limitations and exceptions are noted:

- Additional assessment is required at AEC 10 and AEC 14 to delineate impacted areas and assess areas that were unable to be fully assessed in the 2021 field program.
- Preliminary assessment of APEC 9, and APECs 11 through 13, as well as the former pipeline location and historical barrel cache locations, is required, as they have not yet been assessed.

- A hazardous buildings materials assessment of the AEC 6 former maintenance building is required to determine the presence/absence of hazardous building materials (e.g., lead and PCB amended paint, ozone-depleting substances [ODS], asbestos, etc.)

As assessment is recommended at APEC 9, AEC10, APECs 11 through 13, AEC 14 and the former pipeline location and historical barrel cache locations, these areas have not been included in the Updated RAP.

In addition to addressing impacted soil and the remaining sources of contamination, the remedial program will also address the physical hazards and aesthetics of the Site. The remedial activities and waste stream object locations are shown in Figure 2 through 6C, Appendix A. A summary of items that will be addressed as part of the ROA is provided in Table 6-1.

Table 6-1 Summary of Waste Streams Requiring Remedial Action

Waste Component(s)	Source/ Location	Estimated Volume	Remediation Trigger(s) [1]
Liquid Waste (LW)			
- barrel contents meeting incineration requirements - barrel contents not meeting incineration requirements	Barrels/ AECs 1, 2, 3, 6	169,800 L	PH, RR, PSC
- contents from the tank farm and associated piping meeting the incineration requirements - contents from the tank farm and associated piping not meeting the incineration requirements	Infrastructure/ AEC 6	Unknown – tank farm capacity is 355,870 US gallons. Assume ASTs at 5% capacity, or 67,356 L	PH, RR, PSC
- POLs meeting incineration criteria that may be encountered while amassing surface debris - POLs not meeting incineration criteria that may be encountered while amassing surface debris	Surface Debris/ AECs 1, 2, 3, 4, 6	<100 L	PH, RR, PSC
- LW including NAPL mixed with soil present in the buried concrete structure	Buried Infrastructure/ AEC 4	28,000 L (assumes that one quarter of the mixture is LW)	PH, RR, PSC
Non-Hazardous Waste (NHW)			
- barrels without amended paint[2], cleaned and compacted	Barrels/ AECs 1, 2, 3, 6	353 cu.m. (compacted)	A, PH
- general NHW debris (e.g., demolition debris from sheds at AEC 3, concrete anchors)	Infrastructure/ AECs 3, 6	Minimum of 400 cu.m.	A, PH

Table 6-1 Summary of Waste Streams Requiring Remedial Action

Waste Component(s)	Source/ Location	Estimated Volume	Remediation Trigger(s) [1]
- general NHW debris including unpainted metal, painted wood (below amended paint guidelines), rubber and glass - vehicles and heavy equipment[3] - unpainted wood	Surface Debris/ AECs 1, 2, 3, 4, 6	770 cu.m.	A, PH
- stained surficial soil	Stained Surficial Soil/ AECs 1, 2, 3, 6	2,167 cu.m.	A
- general NHW debris including unpainted metal, painted wood (below amended paint guidelines), rubber and glass	Buried Debris/ AECs 1, 3, 4	332 cu.m.	A, PH
- intact concrete and construction materials	Buried Infrastructure/ AECs 4, 6	Unknown material quantity	A, PH
- PHC impacted soil above CCME CWS	Contaminated Soil (Type A PHC [non-mobile])/ AEC 3	20 cu.m.	RR
	Contaminated Soil (Type B PHC [mobile])/ AEC 6	300 cu.m.	RR
Hazardous Waste (HW)			
- barrels with amended paint - residual petroleum product and/or tar	Barrels/ AECs 1, 2, 3, 6	Unknown material quantity	PH, RR, PSC
- PACMs, amended paint and other HW in Former Maintenance Building (not yet assessed)	Infrastructure/ AEC 6	269 cu.m.	A, PH, RR
- Amended paint on building materials, ASTs, heavy equipment; poorly adhered	Surface debris/ AECs 3, 6	30 sq.m.	PH, RR
- ACMs	Surface Debris/ AECs 1, 4, 6	13 cu.m.	PH, RR, PSC
- batteries	Surface Debris/ AECs 1, 2, 3, 4, 6	<10 cu.m.	PH, RR, PSC
- general HW debris	Buried Debris/ AECs 1, 3, 4	Unknown material quantity	PH, RR, PSC

Notes:

1. A – Aesthetics; PH – Physical hazard; RR - Regulatory requirement; PSC – Potential source of contamination
2. Lead and/or PCB amended paint; herein referred to as 'amended paint'
3. Vehicle and heavy equipment compaction ratios were calculated using a 3:1 compaction ratio. This calculation varies from the SA Technical Memo (Stantec 2022b) which applies 3:1 and 2:1 compaction ratio based on specific items.

6.1 LIQUID WASTE

LW consists of barrel contents, tank farm and associated piping contents, POLs, residual product (including NAPL) and wash water that may be generated on-site during the remediation. At this time, the nature of liquid waste has not been fully determined. There is the potential for aqueous liquids and liquid petroleum products to be present on-site. Further assessment will be required during the remedial program to determine the quality and quantity of the contents.

As discussed in Section 3.4, the AMSRP was used as a guidance document while developing the RAP. The Barrel Protocol from the AMSRP provides guidance for determining the correct disposal method for barrels and their contents (INAC 2009). The Barrel Protocol provides considerations for inspection, sampling, testing, disposal of contents, disposal of barrels and personal protective equipment, all of which can be applied to the management of liquid waste present on-site. The AMSRP Barrel Protocol provides criteria for determining the appropriate disposal method for aqueous and organic products based on their characteristics and contents. The Barrel Protocol criteria and disposal recommendations were adapted for the RAP.

The remedial options for aqueous liquids and liquid petroleum products are summarized in Table 6-2. An overview of each remedial option and the evaluation of each remedial option against the selected evaluation criteria is discussed in detail below. A ‘leave in place’ approach was considered as a remedial option; however, it did not seem an appropriate solution to leave liquid waste on-site. A leave in place approach would not remove the risk to receptors, reduce liability, or eliminate exposure pathways, as a result it was not carried forward and evaluated as a remedial option for LW.

Table 6-2 Summary of LW Components Remedial Options

LW Components	Considerations	Remedial Options Evaluated
Aqueous Liquids	Contents do not meet incineration criteria.	Off-site disposal in southern Canada
	Contents meet incineration criteria.	Incinerate on-site
	Contents meet wastewater discharge criteria.	Discharge
Liquid Petroleum Products (including residual product)	Contents meet incineration criteria.	Off-site disposal in southern Canada Incineration on-site
	Contents do not meet incineration criteria.	Off-site disposal in southern Canada

6.1.1 Liquid Waste (Barrel) Volume Calculation

For the purpose of this Updated RAP, Stantec calculated the approximate volume of liquid waste anticipated to be present on the Site. The calculations were based upon the combined results of the 2021 barrel sampling program (which sampled 9 barrels) and a barrel sorting and characterization program that was previously conducted at AEC 3 in 2017 by Nunami Stantec on behalf of the GNU (Nunami Stantec 2018) (which sampled 55 barrels). Samples were collected from barrels that were safely accessible with product available to sample. Visual observations in both 2017 and 2021 indicated that all of the barrels at AEC 1 and AEC 2 were full or nearly full, and the majority of barrels at AEC 3 and AEC 6 were empty.

The analytical results for the barrel program indicated that there are various types of products present on-site in the barrels, including tar, light oil, water and unknown product. The following summarized what was encountered at the AECs with barrel caches:

- AEC 1 – Contains approximately 200 full barrels; tar product was identified in the barrel samples.
- AEC 2 - Contains approximately 950 full barrels; light oil, including AVGAS, and an unknown product were identified in the barrel samples.
- AEC 3 – Contains approximately 1,350 barrels (majority were empty); light oil, water and unknown product were identified in the barrel samples.
- AEC 6 – Contains approximately 300 barrels (mostly empty); light oil was identified in the barrel sample.

Detailed information on the 2021 barrel sampling methodology, analytical results and findings are provided under separate cover in the Nunami Stantec Remedial Action Plan (Nunami Stantec 2018) and Stantec SA Technical Memo (Stantec 2022b).

Stantec assumed that each of the barrels on-Site is a standard 42 US gallon sized barrel which would result in 445,165 L of liquid waste at full capacity. Based on the field observations at AEC 1 (200) and AEC 2 (950), Stantec assumed that 90% of the barrels are full, for an approximate volume of 164,552 L of liquid waste. The field observations at AEC 3 (1,350) and AEC 6 (300) indicated that the majority of the barrels are empty, Stantec assumed that 2% of the barrels were full, which amounts to a volume of 5,247 L of liquid waste. Therefore, it has been assumed that the total volume of liquid waste contained in the barrels at AEC 1, AEC 2, AEC 3 and AEC 6 is approximately 169,800 L.

Based on a comparison of the analytical results of the 2021 barrel sampling program to the AMSRP Barrel Protocol Criteria, 77 % of the barrel contents that were sampled in 2021 met the criteria for on-site incineration and 23 % met the criteria for off-site disposal (i.e., shipped to southern Canada for disposal). Of the estimated volume of liquid waste, 77%, or 130,745 L was assumed to be the volume of liquid waste appropriate for incineration and 23%, or 39,054 L was assumed to require off-site disposal.

6.1.2 Aqueous Liquids Remedial Options

The remedial options below were considered for aqueous barrel contents:

Off-Site Disposal - Aqueous products that do not meet the incineration criteria or discharge criteria would be consolidated for off-site treatment at an appropriate disposal facility (southern Canada). As the quantity and quality of the aqueous liquids are unknown, the cost and timeframe of this option cannot be estimated at this time. This option would require consideration for transportation logistics, as it would require moderate effort to transport the material off-site via trucks and barge and would likely need to be conducted in accordance with the Transportation of Dangerous Goods (TDG) Act and CBMHW. Off-site disposal can likely be completed within the estimated time frame of the project. The consolidation and transportation of aqueous liquids would require labourers, which would provide opportunities for Indigenous participation. This option would likely be accepted by regulators and the community.

Incineration - Aqueous products that meet the incineration criteria would be consolidated on-site and incinerated. As the quantity and quality of the liquids are unknown, the cost and timeframe of this option cannot be estimated at this time, however, the incineration of aqueous products that meet the criteria would reduce the overall volume of barrel contents that require off-site disposal, which would ultimately reduce the transportation cost. This option would be relatively simple to implement on-site and would require specialty equipment (i.e., incinerator) to be mobilized to the Site. On-site incineration would be an effective method to remove and dispose of aqueous liquids and could be completed during the remedial timeframe. This option would provide opportunities for unskilled labour and heavy equipment operators, which could provide opportunities for Indigenous participation.

Discharge – Aqueous products that meet the AMSRP Barrel Protocol criteria for wastewater discharge would be discarded/discharged into the environment in accordance with the wastewater discharge requirements as identified in any permits and/or licences issued for cleanup activities by the Nunavut Water Board and/or other agencies. This option would require sampling of the barrel contents and the cost would be a result of laboratory fees and on-site labour for consolidation and handling of the barrels. As the quantity and quality of the liquids are unknown, the cost of this option cannot be estimated at this time. This option would be an effective method for disposal of the aqueous liquids and would likely be accepted by regulators and the community.

6.1.3 Liquid Petroleum Products Remedial Options

The options below were considered for liquid petroleum products:

Off-Site Disposal - Liquid petroleum products that do not meet incineration criteria would be consolidated for off-site treatment at an appropriate disposal facility (southern Canada). This is an effective solution as the off-site disposal of liquid petroleum products would remove on-site hazards and sources of contamination. This option is likely to meet the acceptance of regulators and the community stakeholders. The estimated cost of off-site disposal would include the consolidation, transport and disposal. This option could be completed during the remedial program with limited impact on schedule. The consolidation would require labourers and provide opportunities for Indigenous participation.

Incineration - Those liquids that meet the criteria for on-site incineration will be incinerated in accordance with the Technical Document for Batch Waste Incineration (EC 2010). Liquids that do not meet the incineration criteria will require disposal off-site, as described above. After incineration, ash generated by the incineration process would be analyzed to for Method 1311 Toxicity Characteristic Leaching Procedure (TCLP), or equivalent, determine whether its leachate would be classified as a hazardous waste. Analytical results will be compared against the criteria for process residuals, as described in Table 1 of the *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities* produced by the GNU (GNU 2011a). Ash determined to be NHW will be disposed of in the on-site NHW facility, while ash determined to be hazardous would be disposed of at an off-site licenced hazardous waste facility in accordance with the TDG Act and CBMHW. This is an effective method that can be used to reduce the volume of waste requiring management and disposal. The estimated volume of liquid petroleum products requiring incineration is 130,745 L. The cost of incineration would include the incinerator rental, labour for consolidation and operating the incinerator,

laboratory fees for leachate sampling and mobilization/demobilization costs for the equipment. This option could be completed during the remedial program with limited impact on schedule. The consolidation would require labourers which would provide opportunities for Indigenous participation, although operation of the incinerator may be limited to trained operators.

6.1.4 Recommended Liquid Waste Remedial Approach

The recommended approach for the management of LW is a hybrid approach using all of the remedial options described above. As there are varying criteria and disposal options for aqueous and organic products, implementing a hybrid approach would be less expensive than shipping LW off-site and would allow for elimination of on-site hazards associated with the barrels. A hybrid approach for the remedial activities would likely be accepted by regulators and the community stakeholders. The hybrid approach would provide Indigenous participation opportunities. An overview of the recommended LW remedial approach is summarized in Table 6-3.

Prior to any remedial activities, it is recommended that a site-specific barrel protocol, prepared in accordance with the AMSRP Barrel Protocol, be created and implemented for the future remediation to ensure the safety of workers and to provide a cohesive plan for inspection, sampling, consolidation, handling and transportation.

To further reduce costs, it is recommended that LW contents be consolidated based on visual observations (i.e., barrel labels, colour, relative viscosity, etc.), with the exception of barrel contents which consist of black oil, as per the AMSRP (INAC 2009), and a representative sample collected and submitted for laboratory analysis to determine if the contents meet the AMSRP Barrel criteria. Collection of representative samples instead of individual barrel samples will greatly reduce the costs associated with labour, shipping and laboratory analysis. Additionally, there will be less data (i.e., analytical results) to manage and the turnaround time for determining consolidated sample characteristics will be shorter which will allow for the remedial activities to be completed with minimal time lag between sampling and identifying the appropriate disposal method.

Table 6-3 Summary of Recommended Liquid Waste Remedial Approaches

LW Component	Approximate Volume	Recommended Remedial Approach	Comments
Aqueous Products	Unknown	- characterize the material and incinerate on-site for those liquids that meet the incineration criteria. - any liquids deemed unfit for on-site incineration or discharge will be transported off-site for disposal at a licensed facility (southern Canada). - any liquids that meet the wastewater discharge criteria will be disposed in accordance with applicable licences and permits.	- Barrels should be inspected to identify symbols, words, labels, and marks on the barrel as well as signs of deterioration, damage, pressure (i.e., bulging and swelling) and evidence of spillage. - A representative number of samples from each visual grouping of consolidated contents should be collected and analyzed to characterize the contents. Analytical testing of the organic liquid waste will need to conform with territorial requirements (GNU 2012). - wash water from the barrels will require sampling to determine if it meets the requirements for wastewater discharge, incineration, or off-site disposal. Additional information on barrel processing is provided in Section 6.2.
Liquid Petroleum Products (Barrel contents, tank farm contents, POLs, NAPL from buried concrete structure at AEC 4)	265,255 L (estimate)	- characterize the material and incinerate on-site for those liquids that meet the incineration criteria. - any liquids deemed unfit for on-site incineration will be combined and transported off-site for disposal at a licensed facility (southern Canada).	- Barrels should be inspected to identify symbols, words, labels, and marks on the barrel as well as signs of deterioration, damage, pressure (i.e., bulging and swelling) and evidence of spillage. - A representative number of samples from each visual grouping of consolidated contents should be collected and analyzed to characterize the contents. Analytical testing of the organic liquid waste will need to conform with territorial requirements (GNU 2012). - Vehicles and machinery will have to be inspected to determine if POL are present. - Barrels, drums and tanks discussed in Section 6.2. - NAPL from buried concrete structure will require screening to remove inorganic debris that is not suitable for incineration. Inorganic debris will require off-site disposal (i.e., southern Canada).

6.2 NON-HAZARDOUS WASTE

NHW consists of emptied and cleaned barrels, infrastructure that requires demolition, stained surficial soil, surface debris, buried debris, and buried infrastructure.

As discussed in Section 4, the AMSRP was used as a guidance document while developing the Updated RAP. The AMSRP provides guidance for the management of on-site non-hazardous waste, including surface debris, buried debris, waste debris areas, and building materials (i.e., demolition debris), and the disposal options (INAC 2009). The AMSRP criteria and disposal recommendation for NHW were adapted for the RAP.

The remedial options for the NHW are summarized in Table 6-4 and described in detail below. An overview of each remedial option and the evaluation of each remedial option against the selected evaluation criteria is discussed in detail below. The associated remedial options scoring for NHW is presented in Table B-1, B-2, B-3 and B-4, Appendix B.

Table 6-4 Summary of NHW Components Remedial Options

NHW Component	Considerations	Remedial Options Evaluated
General NHW Debris (Table B-1, Appendix B)	General NHW debris is not appropriate for incineration.	1. Leave in place (do nothing) 2. On-Site Disposal 3. Off-Site Disposal in Coral Harbour 4. Off-Site Disposal in southern Canada
	General NHW debris is appropriate for incineration.	1. Incineration
Buried Debris (Table B-2, Appendix B)	Buried debris designated as a Class A * buried debris area (BDA)	1. Leave in place (do nothing) 2. Partial Excavation and Disposal** 3. Full Excavation and Disposal** 4. Cover
	Buried debris designated as a Class B * BDA	
	Buried debris designated as a Class C * BDA	
Buried Infrastructure (Table B-3, Appendix B)	n/a	1. Leave in place (do nothing) 2. Excavate and Dispose** 3. Regrade
Contaminated Soil (PHC) – Type A (non-mobile PHCs)	Soil contains exceedances of PHC F3 above the CCME CWS and is Type A soil according to AMSRP (INAC 2009)	1. On-Site disposal in NHW facility 2. Scarification
Contaminated Soil (PHC) – Type B (mobile PHCs)	Soil contains exceedances of PHC F3 above the CCME CWS and is Type B soil according to AMSRP (INAC 2009)	1. On-Site disposal 2. On-Site Land Treatment Unit (LTU) 3. Off-Site Disposal in southern Canada
Stained Surficial Soil (Table B-4, Appendix B)	Surficial staining is moderate or significant and covers a large geographical area	1. Leave in place (do nothing) 2. On-Site Disposal 3. Off-Site Disposal in Coral Harbour 4. Off-Site Disposal in southern Canada 5. Cover 6. Scarification
	Surficial staining is minor and covers a small geographical area	
Notes: (*) – Refer to Section 6.2.2 for BDA classifications and appropriate remedial action(s) (**) – Disposal option will align with remedial option selected for general NHW debris.		

6.2.1 General NHW Debris Remedial Options

The following remedial options were assessed for general NHW debris:

Leave in Place - This option would involve leaving the non-hazardous debris on-site in its current condition and location. The NHW poses a potential physical hazard to human or ecological receptors on-site. Leaving the NHW on-site would not likely meet the criteria for regulatory acceptance. Although the most inexpensive and timesaving remedial option for NHW, this option would not return the Site to its pre-disturbed condition and would likely not satisfy the expectations of the local community stakeholders. As the likelihood of approval of the community stakeholders is anticipated to be low, this remedial option is considered a no-go.

Disposal – NHW would be collected, segregated and compacted prior to disposal. The disposal options for debris include the following:

- On-Site Disposal: This option would include constructing a NHW facility on-site, to which NHW would be transported for disposal after compacting. After all items are placed in the waste facility, it would be capped with either a liner and/or borrow material (dependent on the design), and long-term monitoring would be required, as discussed in Section 9.3. This option offers a balance of reduced cost and Indigenous participation opportunities compared to other options, while managing waste that the Crown is responsible for in a dedicated location. It is likely that this option will be accepted by regulators, however it is possible the community will not support this option as the waste will be located within community limits. This option would likely have limited impact on the schedule and the requirement for long term monitoring.
- Off-Site Disposal in Coral Harbour: This option would include compacting of NHW and transport off-site for disposal in the local community landfill owned and operated by the Hamlet of Coral Harbour. This option requires an agreement with the Hamlet of Coral Harbour and is anticipated to include a long-term monitoring component. When comparing the disposal options, this solution is anticipated to be the least costly, however the community may not support this option, and the Crown will still maintain liability for the waste, and therefore a long-term monitoring program would still be anticipated. This option would provide Indigenous participation opportunities as unskilled labourers would be required for the collection, compaction and transportation of the NHW. This option would likely have limited impact on the schedule.
- Off-Site Disposal in Southern Canada: This option would include compacting, packaging and transport (initially by barge) of NHW for disposal in a licensed landfill in a location in southern Canada (anticipated to be Quebec). This option is the costliest approach and has the potential to impact the Project schedule as transportation is based on a strict external schedule, however, is expected to be supported by the community as there is no permanent disposal in or near the community. The Crown would have no long-term monitoring requirement. This option would provide some Indigenous participation, however not nearly as much as the other options.

Incineration - Incineration is a standard approach for waste minimization prior to disposal and can reduce the volume of debris that requires management. Materials that are appropriate to burn will be incinerated on-site under controlled conditions. Residual ash will require analytical testing and disposal in accordance with the results. Incineration of non-hazardous debris only applies to unpainted wood debris at the Site. This option would be relatively simple to implement on-site and would require specialty equipment (i.e., incinerator) to be mobilized to the Site. On-site incineration would be an effective method to remove and dispose of NHW and could be completed during the remedial timeframe. This option would provide Indigenous participation opportunities for unskilled labour and heavy equipment operators. The cost of this options is lower than the disposal options and would effectively remove on-site hazards that are associated with NHW.

Incineration is the preferred option for materials that are appropriate to burn, as it effectively reduces the volume of materials requiring disposal. As it is applicable for only a small volume of NH waste it was selected as the chosen remedial option and not included in the NHW Remedial Options scoring.

6.2.1.1 Proposed Remedial Approach - General NHW Debris

The recommended approach for the management of general NHW is a hybrid approach using two remedial options: disposal at an on-site NHW facility and incineration of materials that are appropriate to burn. Implementing a hybrid approach would be less expensive than shipping NHW off-site and would allow for elimination of on-site hazards associated with the debris and infrastructure. A hybrid approach for the remedial activities would likely be accepted by regulators and the community stakeholders, and would provide Indigenous participation opportunities. An overview of the recommended NHW remedial approach for general NHW debris is summarized in Table 6-5 and the scoring for General NHW Debris is presented in Table B-1, Appendix B.

6.2.2 Buried Debris Remedial Options

AMSRP provides guidance for determining the most appropriate remedial actions for BDAs using a classification system (INAC 2009) that evaluates erosion potential, stability and evidence of contamination to determine the appropriate category for the BDA. There are three broad categories that the BDA can be classified as:

- Class A: The BDA is located in an unstable, high erosion location, and/or the BDA is located at an elevation of less than two metres above mean sea level (INAC 2009). The appropriate remedial action for a Class A BDA is full or partial excavation and disposal.
- Class B: The BDA is located in a suitable, stable location, but there is evidence of contaminant migration; potential remedial solutions include excavation or provision of a suitably engineered containment system (INAC 2009).
- Class C: If the BDA is located in a suitable, stable location, with no evidence of contaminant migration, it may be left in place. If required, additional granular fill shall be placed to ensure erosion protection and proper drainage. Consideration must be given to surrounding topography (to blend into existing terrain) and long term monitoring costs (INAC 2009). The appropriate remedial action for a Class C BDA is leave in place and/or cover.

The following remedial options were assessed for buried debris:

Leave in Place - This option would involve leaving the buried debris on-site in its current condition and location. Areas of exposed buried waste and/or partially buried waste pose potential physical hazard to human or ecological receptors on-site. Leaving the buried waste on-site would likely meet the criteria for regulatory acceptance if it aligns with the AMSRP recommendations for BDAs based on an evaluation of erosion potential, stability and evidence of contamination. Although the most inexpensive and timesaving remedial option for buried debris, this option would not return the Site to its pre-disturbed condition and may not satisfy the expectations of the local community stakeholders. This option would not provide Indigenous participation opportunities.

As the likelihood of approval of the community stakeholders is anticipated to be low, this remedial option is considered a no-go.

Partial Excavation and Disposal – This option would involve partial excavation of BDA up to a depth of 0.5 m below ground surface (mbgs). Buried debris would be excavated, segregated, and removed from the BDA and disposed of in accordance with the selected remedial options for NHW and HW, depending on its composition. Once segregated, the soil that was mixed in with the debris will be analyzed to determine soil quality and used as fill where appropriate. Additional borrow material will be used to backfill the excavation to meet the surrounding grade. Conversely, if the BDA is mounded above grade to a height of 2 m or less, the material will be excavated, and the area will be regraded. This option would be effective at removing potential physical hazards from exposed debris but may not fully reach and identify deeper potential sources of contamination. This option is less expensive and intensive than the full excavation effort but does require more labour than the cover option. Unskilled labour would be required for excavation, waste segregation and disposal which would provide Indigenous participation opportunities. Overall, the partial excavation and disposal option is anticipated to meet the approval of regulators and the community.

Full Excavation and Disposal - This option would involve full excavation of BDA up to a depth of 1.5 mbgs or the depth of permafrost, below which buried debris would not be expected. Buried debris would be excavated, segregated, and removed from the BDA and disposed of in accordance with the selected remedial options for NHW and HW, depending on its composition. Once segregated, the soil that was mixed in with the debris will be analyzed to confirm soil quality and used as fill where appropriate. Additional borrow material will be used to backfill the resulting excavation to meet the surrounding grade. If the BDA is mounded above grade to a height of 2 m or less, the material will be excavated, and the area will be regraded. This option would be effective at removing potential physical hazards from exposed debris and would remove waste including potential contamination sources. This option is the most expensive and intensive as it would require the most labourers and equipment usage and would generate the largest volume of waste for disposal. Unskilled labour would be required for excavation, waste segregation and disposal which would provide Indigenous participation opportunities. The full excavation and disposal option would likely meet the approval of regulators and the community; however, the costs of the additional excavation may outweigh the benefits of the effectiveness of the remedial option.

Cover – This option would involve covering the BDAs with borrow material to conceal potentially exposed portions of buried debris. Areas of exposed buried waste pose potential physical hazard to human or ecological receptors on-site and covering the waste would mitigate that risk. Leaving the buried waste on-site would likely meet the criteria for regulatory acceptance as it aligns with the recommendations for BDAs in the AMSRP, as long as the BDAs do not exhibit signs of contamination. Covering the buried debris with borrow material would be an inexpensive and timesaving remedial option which could be completed during the remedial phase. This option would provide Indigenous participation opportunities as there would be a need for heavy equipment operators. However, this remedial option is not viewed as the preferred option as the likelihood of acceptance of stakeholders is anticipated to be low.

6.2.2.1 Proposed Remedial Approach - Buried Debris

The recommended approach for the management of buried debris is a hybrid approach using the AMSRP classification of BDAs. Each BDA would be evaluated for erosion potential, stability and evidence of contamination to designate each BDA as a Class A, B or C and determine the appropriate remedial action. Waste recovered from the BDAs will be segregated and managed by the remedial approaches selected for NHW and HW, depending on composition. The remedial options will apply to the AMSRP designated classes as follows:

- Class A – Partial Excavation and Disposal
- Class B – Excavation and Disposal
- Class C – Cover

Implementing a hybrid approach would be less expensive than completing full excavations of the BDAs and would eliminate on-site hazards associated with the buried debris. This remedial approach would provide a balance of cost and effectiveness. A hybrid approach for the remedial activities would likely be accepted by regulators and the community stakeholders. An overview of the recommended remedial approach for buried debris is summarized in Table 6-5 and the scoring for buried debris is presented in Table B-2, Appendix B.

Six BDAs were identified at AEC 1, AEC 3, and AEC 4 during the 2021 field program and are illustrated in Figures 2, 4, and 5 (Appendix A). Information pertaining to the identified BDAs is provided in the SA Technical Memo (Stantec 2022b) and supports that the BDAs would be categorized as Class A and C BDAs and are suitable for the ‘Partial Excavation and Disposal’, and ‘Cover’ option.

6.2.2.2 Contingency for Identification of Additional BDAs

It is recognized that the removal of consolidated surface debris may identify additional BDAs. Additional BDAs that may be identified during the remediation should be evaluated according to AMSRP guidance, as discussed above, to determine the appropriate remedial option.

6.2.3 Buried Infrastructure Remedial Options

The buried infrastructure NHW relates to the buried concrete structure and foundations observed at AEC 4, the anticipated piping associated with the Tank Farm at AEC 6, and the anticipated concrete pad under the Former Maintenance Building at AEC 6. In regard to the buried concrete structure at AEC 4, the contents would require removal and disposal following the selected LW remedial options. Note soil and debris were observed in the NAPL and the mixture would require screening to remove the soil and debris prior to incineration of the NAPL. Once screened, soil and debris material will require off-site disposal in southern Canada; volume to be determined once screening is completed.

The following remedial options were assessed for buried infrastructure:

Leave in Place - This option would involve leaving the buried infrastructure on-site in its current condition and location. This poses a potential physical hazard to human or ecological receptors on-site. Leaving the buried infrastructure on-site in its current condition would not likely meet the criteria for regulatory acceptance. Although the most inexpensive and timesaving remedial option for buried infrastructure, this option would not return the Site to its pre-disturbed condition and may not satisfy the expectations of the community stakeholders.

Partial Excavation and Disposal – This option only applies to the buried concrete structure at AEC 4. This option would involve partial extraction of buried infrastructure. Partial excavation would involve partial removal of concrete infrastructure to access the interior of the structure (which is likely required for emptying the contents). Buried infrastructure would be partially excavated and disposed of in accordance with the selected remedial options for NHW, depending on its composition. Borrow material will be used to fill the interior of the buried concrete structure and compacted until the resulting excavation(s) meets the surrounding grade. This option would be effective at removing potential physical hazards and is less expensive and intensive than full excavation and disposal. Specialized equipment may be required for the consolidation of the buried concrete structure contents (i.e., NAPL). Unskilled labour would be required for excavation and backfilling which would provide Indigenous participation opportunities. The partial excavation and disposal option would likely meet the approval of regulators and the community.

Full Excavation and Disposal - This option would involve full extraction of buried infrastructure. Buried infrastructure would be excavated and disposed of in accordance with the selected remedial options for NHW and HW, depending on its composition. Borrow material will be used to backfill the resulting excavation(s) to meet the surrounding grade. This option would be effective at removing potential physical hazards and would remove waste including potential contamination sources. This option is the most expensive and intensive as it would require the most labourers and equipment usage and would generate the largest volume of waste for disposal. Unskilled labour would be required for excavation, waste segregation and disposal which would provide Indigenous participation opportunities. The full excavation and disposal option would likely meet the approval of regulators and the community; however, the costs of the additional excavation may outweigh the benefits of the effectiveness of the remedial option.

Re-grading – This option would involve re-grading the areas of buried infrastructure to meet the grade of the surrounding topography. This could be done by either covering or filling the buried infrastructure with borrow or demolishing existing infrastructure (i.e., foundations) to meet the grade of the surrounding ground surface. This option would require some monitoring over time to confirm the cover is stable and no erosion is occurring. This option would remove physical hazards, be cost effective and could be completed during the remediation phase. Unskilled labour would be required which would provide Indigenous participation opportunities. The re-grading option would likely meet the approval of regulators and the community.

6.2.3.1 Proposed Remedial Approach - Buried Infrastructure

The recommended approach for the management of buried infrastructure is a hybrid approach of partial excavation and regrading. Waste recovered (e.g., concrete from foundations) from the debris areas will be segregated and managed by the remedial approaches selected for NHW and HW, depending on its composition. The regrading approach would provide a balance of cost and effectiveness. The Site would be returned to a pre-disturbance condition, eliminate the on-site hazard from buried infrastructure, and would not require intensive excavation to remove. This approach for the remedial activities would likely be accepted by regulators and the community stakeholders. An overview of the recommended remedial approach for buried infrastructure is summarized in Table 6-5 and the scoring for buried infrastructure is presented in Table B-3, Appendix B.

6.2.4 Contaminated Soil (PHC)

Approximately 320 cu.m. of PHC impacted soil was identified at AEC 3 (20 cu.m.) and AEC 6 (300 cu.m.), following screening of the analytical soil data against the CCME CWS. The current understanding of the contaminated soil is that the PHC contamination likely originated from the barrel cache (AEC 3) and the debris pile (AEC 6). The locations of the PHC impacted soil and the estimated extent of contamination that was identified are shown in Figures 4 (AEC 3) and 6C (AEC 6), Appendix A.

AMSRP provides guidance for determining Type A hydrocarbon contamination (‘Type A’) versus Type B hydrocarbon contamination (‘Type B’). Type A refers to heavy end, non-mobile products such as lubricating oils which are characteristically differentiated by dark staining, while Type B refers to lighter end, mobile and more volatile hydrocarbon products (INAC 2009). When all four hydrocarbon fractions are detected, the dominant hydrocarbon type is defined by the percentage of the sum of F3 and F4, relative to the sum of F1 to F4. For Type A contaminated soil, the sum of F3 plus F4 must be greater than 70% of the total TPH concentration and the F2 concentration must be less than the F4 concentration. If all fractions were not detected in a particular sample, the hydrocarbon type (F3 plus F4 for Type A, or F1 through F3 for Type B) which demonstrated the greater percentage of overall TPH concentration was used to determine the dominant type.

The comparison of the analytical soil data for PHC against the AMSRP Remedial Objectives for Hydrocarbon Contaminated Soil is provided in Tables C-1 through C-5, Appendix C. The 20 cu.m. of contaminated soil identified at AEC 3 has been defined as Type A soil, while the 300 cu.m. of contaminated soil at AEC 6 has been defined as Type B soil.

Type A PHC Soil - The AMSRP recommends that Type A soil either be excavated and placed in an on-site engineered landfill or scarified until the soil meets PHC criteria. As scarification has not been selected as the most appropriate approach for stained surficial soil, the same rationale is applied to the Type A soil identified at AEC 3 (as described in Section 6.2.5.1). As the volume of contaminated soil is limited to 20 cu.m., excavation and disposal in the on-Site NHW facility is considered the appropriate alternative.

Type B PHC Soil – The AMSRP recommends if the volume of Type B soil falls between 300 to 500 cu.m. that the soil be excavated and shipped off-site for disposal. As the volumes of Type B soil increases beyond this threshold, it is recommended that the site-specific conditions be evaluated to determine if an on-site disposal facility or LTU is feasible. As the known volume of Type B soil is 300 cu.m., excavation and disposal in southern Canada is considered an appropriate option. However, as there is the potential that additional PHC contaminated soil may be identified during additional assessment (i.e., of CIAAs), it may be beneficial to await the results of the additional assessments to confirm quantities and type of contaminated soil before completing the remedial action for the 300 cu.m. of Type B soil.

6.2.4.1 Proposed Remedial Approach – Contaminated Soil

The Type A PHC impacted soil would be excavated and removed from AEC 3 and disposed of in the NHW facility. Confirmatory soil sampling would be completed to confirm that the impacted soil material has been removed to the remedial target (i.e., CCME CWS for PHC in Soil). The resulting excavation would be backfilled with borrow and graded to match surrounding topography.

The Type B PHC impacted soil would be excavated from AEC 6 and bagged for off-site disposal in southern Canada. Confirmatory soil sampling to be completed for the walls of the excavation. Excavated areas would be backfilled with borrow material and regraded to match surrounding topography. However, as the recommended additional assessment of the CIAAs may identify additional Type B soil, deferring excavation and disposal of the 300 cu.m. of Type B identified at AEC 6 should be considered until the results of the additional assessment are available.

6.2.4.2 Contingency for Identification of Additional PHC Contaminated Soil

Any soil with concentrations exceeding the CCME CWS for PHC in soil identified during the remedial and/or post-remedial phase at any of the AECs, in addition to the 20 cu.m. identified at AEC 3 and 300 cu.m. identified at AEC 6 will require further remedial considerations. The remedial options for additional soil exceeding the CCME CWS for PHC in soil include:

Excavation and On-Site Disposal - The delineated area of impacted soil would be excavated and impacted soil would be disposed of in a separate cell of the on-site NHW facility, which would be designed with a specialized engineered liner to reduce the potential of contaminants mobilizing. Impacted soil disposed of in the facility would be capped. This would require a long-term monitoring program to monitor the facility, and the permafrost for stability.

Excavation and Off-Site Disposal

- Off-Site Disposal in Coral Harbour: Impacted soil would be excavated and transported off-site for disposal in the local community contaminated soil cell that is owned and operated by the Hamlet of Coral Harbour. Off-site disposal would require permission from the Hamlet. It is anticipated that further management and monitoring of the soil would likely be required.
- Off-Site Disposal in southern Canada: Impacted soil would be excavated, bagged and transported (initially by barge) for disposal in a licensed landfill in a location outside of Coral Harbour (anticipated to be Quebec). This option is the costliest approach, and results in the most greenhouse gas emissions overall; however, is expected to be supported by the community as there is no permanent disposal in or near the community. This option would allow the Crown to have no long-term monitoring requirement.

Land Treatment Unit - An engineered LTU would be constructed and would require annual tilling (in the summer as it would require snow-free periods) using a ripper attachment, disc harrow, or Allu ™ bucket, sump dewatering and potential nutrient amendments. The specification for this option would require the contractor to provide a soil treatment plan as an initial deliverable.

Once the soil has met remedial targets defined in the soil treatment planned, the soil could be reinstated back into the natural environment. As coastal erosion can be a significant issue in northern communities, the treatment of soil would prevent permanent disposal and may allow for future use of the soil by human and ecological communities.

A LTU is an effective method for the treatment of PHC/PAH impacted soil, although effectiveness is based on the consistent treatment (i.e., tilling) over time and proper characterization of the soil. Additional soil sampling would be required to confirm soil qualities such as microbial action and nutrient availability. Landfarming has proven to be a relatively low cost and reliable method for remediation of PHC and to some extent PAH contaminated soil in northern and remote site locations. It is a method that is commonly employed by federal custodians and industry, and well accepted by regulators. It is likely that the construction and operation of a LTU will require additional permitting and licensing from the Nunavut Water Board, including specified remedial targets. This option will provide opportunities for Indigenous participation as labourers will be need for the construction of the LTU, excavating and transporting impacted soil, annual tilling and sump dewatering operations, and the decommissioning of the LTU once the soil has been treated. Depending on the level of effort in treatment and maintenance, bioremediation rates and timelines for closure can vary widely. It is estimated that the LTU would be operational for up to five years, although given that the Site is relatively accessible compared to other Northern contaminated sites with no commercial air service, there is the potential that the operational period could be substantially shorter.

While is it expected that the preferred remedial option would be the same as for Contaminated Soil (PHC) (i.e., excavate and dispose in the on-site NHW facility), the final decision will be based on the nature and extent of identified PHC impacts. The extent (i.e. volume) of PHC impacted soil and the type (Type A vs Type B) will ultimately be the deciding factor. Although the proposed NHW facility design is scalable, the NHW facility may not be able to accommodate a large volume of PHC impacted soil. The remedial option analysis will have to be re-visited if significantly more PHC impacted soil is encountered.

6.2.5 Stained Surficial Soil Remedial Options

Stained surficial soil was primarily limited to around the barrel caches in AECs 1, 2, 3 and 6. The analytical soil results for stained surficial soil did not identify contaminants above the referenced criteria (refer to Section 3.0), with the exception of one location at AEC 1. Addressing the stained surficial staining is considered an aesthetic objective for the RAP and is not driven by human health or ecological risk concerns. Addressing the surficial staining at the Site will help to return the Site to its pre-disturbed condition, aid natural revegetation and improve the state of the local environment. Figures 2, 3, 4 and 6, Appendix A, show locations of stained surficial soil at the Site.

The following remedial options were assessed:

Leave in Place - This option would involve leaving the soil conditions (i.e., surficial staining) as they are. As surficial staining does not pose a risk to human or ecological receptors, this is an acceptable option and would likely meet the criteria for regulatory acceptance. Although the most inexpensive and timesaving approach, this option would not return the Site to its pre-disturbed condition, and may not satisfy the expectations of the local community.

Removal - Areas of surficial staining would be excavated to a depth of approximately 0.5 m and disposed of at a waste disposal facility. For either of the three identified removal options below, borrow material would be required for backfill and all options would require more labour than the other identified remedial options. Further details on each disposal option are discussed below.

- On-Site Disposal: This option would include disposal of the stained surficial soil in the proposed on-Site NHW facility. Excavated soil would be trucked from each AEC for disposal. It is likely that the design of the waste disposal facility would include capping with a liner to reduce the potential of contaminants mobilizing. The stained surficial soil is classified as Type A soil and could be used as intermediate fill in the NHW facility lifts, as needed. As discussed in Section 6.2.4, one of the options that the AMSRP recommends for Type A soil is to use it as an intermediate fill. Type A soil is characterized by heavy end, non-mobile hydrocarbon products which are not likely to migrate through the soil into the groundwater/active zone. An engineered cover has been incorporated into the design of the NHW facility to prevent erosion and protect interred wastes from weathering processes. The engineered barrier will prevent water and oxygen from infiltrating and is also considered to be beneficial in reducing seepage and preventing unforeseen geochemical processes from occurring. Construction would require a significant volume of borrow material, regulatory approval, and a long-term monitoring program. This option would be less expensive than off-site disposal in southern Canada and would effectively improve the on-site aesthetic and likely meet the approval of the regulators and community stakeholders. Labourers would be required for construction of the on-site facility, excavating stained surficial soil, and transporting the soil to the facility which would provide Indigenous participation opportunities.

- Off-Site Disposal in Coral Harbour: This option would include disposing of the soil in the existing Hamlet contaminated soil cell located near the Site. This option is ideal in that the cell appears to have sufficient capacity (approximately 120 m by 60 m [7,200 sq.m.]). Based on the estimated volume of soil for disposal, it would cover 0.5 m across 5,154 sq.m. of the facility. This option would need to be negotiated with the Hamlet and is anticipated to include a long-term monitoring component. When comparing the removal options, this solution is anticipated to be the least costly, however the community may not support this option, and the Crown will still maintain liability for the waste, and therefore a long-term monitoring program would be anticipated. This option would effectively improve the on-site aesthetic and likely meet the approval of the regulators. Labourers would be required for excavating stained surficial soil and transporting the soil to the facility which would provide Indigenous participation opportunities.
- Off-Site Disposal in Southern Canada: This option would include packaging excavated soil in lined bins or super sacs placed in bins for barging to a disposal location outside of Coral Harbour (most likely Quebec). This option would result in the most greenhouse gas emissions as packing the material for barging would require considerable effort, and the waste would be barged a significant distance. This option would be the most expensive and has the potential to impact the remediation schedule as the transportation (i.e., barge) runs on a strict schedule and has limited capacity which requires pre-booking. The barge schedule is determined by the operating company and is based around seasonal conditions (i.e., ice-free conditions). This option would effectively improve the on-site aesthetic and would likely meet the approval of the regulators and community stakeholders. Labourers would be required for excavating, packaging and transporting the packed soil to the barge which would provide Indigenous participation opportunities.
- Scarification - Areas of surficial staining would be mechanically scarified by an excavator using attachments that promote soil mixing. This option removes the aesthetic component of the surface staining. The selected attachment would need to break up the top layer of soil (0 m to 0.15 m) and depending on the effectiveness of the selected attachment, the excavator may be required to go over the area more than once to achieve the desired aesthetic. Mechanical scarification is ideal for smaller areas with minimal surface staining and is less ideal for large areas or areas with heavy soiling. It is expected that equipment to do so would be available in the community, making execution efficient. This option is the most cost effective, although the level of acceptance by the local community is anticipated to be relatively low. It is anticipated that the application of mechanical scarification for large areas and heavy soiling will not be approved by the community stakeholders, although it may be applicable for small areas of light staining.
- Cover - Borrow material would be used to cover the areas of surficial staining. It is expected that borrow would be taken from the existing borrow source areas and spread over the stained surficial soil at a depth of 0.1 m to 0.5 m. If sufficient borrow material is not available, an additional borrow site may need to be developed at additional cost. This option would have limited impact on the schedule and would be simple to execute. This option would require some monitoring over time to confirm the cover is stable and no erosion is occurring. This option is relatively cost effective and the anticipated level of acceptance by the local community is low to medium. This option would be effective at improving the aesthetic of the Site and would provide Indigenous participation opportunities for unskilled labourers.

6.2.5.1 Proposed Remedial Approach - Stained Surficial Soil

The recommended approach for addressing stained surficial soil is on-site disposal in the proposed engineered NHW facility. This is an effective approach that would meet regulatory requirements, address the aesthetics of the Site and meet the acceptance community stakeholders. Additionally, the surficial soil material could be used as the lift material between layers of compacted NHW in the NHW facility. This approach does require borrow material for the construction of the NHW facility and re-grading the areas of surficial soil staining, once removed. On-site disposal is likely to significantly reduce shipping costs. This approach has been used effectively at other abandoned military sites. An overview of the remedial options evaluation and scoring for stained surficial soil is presented in Table B-4, Appendix B.

6.2.6 Summary of Recommended NHW Remedial Approaches

Table 6-5 provides a summary of the recommended remedial approaches for the NHW components.

Table 6-5 Summary of Recommended NHW Remedial Approaches

NHW Component	Approximate Quantity	Proposed Remedial Approach	Comments
General NHW Debris			
Barrels	2,800 barrels, estimated 353 cu.m. following compaction	- Empty, wash on-site to remove residual product - Crush and dispose of cleaned barrels in on-site NHW facility	- Liquid waste (barrel contents, wash water) to be addressed as per Section 6.1.4. - Barrel contents to be addressed as per Section 6.2.1.1
Infrastructure – Wooden Sheds, Dilapidated Building and Old Buildings	81 cu.m. compacted	- Demolish - Segregate demolition waste - Incinerate (on-site) combustible materials (assuming no amended paint) - Dispose of remainder in on-site NHW facility	Amended paint to be addressed as per Section 6.3.2.1.
Infrastructure – Tank Farm	One tank farm consisting of seven vertical and one horizontal ASTs with an approximate total capacity of 355,970 US gallons, associated piping, high-density polyethylene (HDPE) liner and geotextile. Tanks are of varying sizes.	- Empty, wash on-site to remove residual product, strip of amended paint, if required - Crush, compact and dispose of resulting debris in on-site NHW facility	Liquid waste (tank and line contents, wash water) and amended paint to be addressed as per Section 6.1.4 and 6.3.2.1, respectively.

Table 6-5 Summary of Recommended NHW Remedial Approaches

NHW Component	Approximate Quantity	Proposed Remedial Approach	Comments
Surface Debris	770 cu.m.	- Collect, sort and classify debris - Dispose of NHW in on-site NHW facility	Hazardous waste found during collection and sorting will be addressed as per Section 6.3.
Buried Debris			
Buried Debris	Estimated area of buried debris in AECs 1, 3, and 4 of 332 cu.m.	- NHW - Collect, sort and classify, and dispose in on-site NHW facility - HW - Collect, sort and classify, and dispose as per Section 6.3	No testing or visual identification of type of debris (hazardous or non-hazardous) undertaken to date.
Buried Infrastructure			
Buried Infrastructure	Buried concrete structure at AEC 4; approximately 248 cu.m.	- Remove and dispose of contents accordingly (refer to Section 6.1) - Remove structure from ground and dispose in on-site NHW facility - If structure cannot be removed from ground, bury in place (including all voids) and grade area to match surroundings	- If structure can be removed, backfill resulting excavation and grade area to match surrounding area - If structure cannot be removed, grade area to match surrounding area following burial in place - If LW is encountered, follow selected LW remedial option.
	Piping associated with AEC 6 Tank Farm; unknown size and quantity/ quality of any contents	- Remove piping and underground infrastructure; dispose in on-site NHW facility	- conduct confirmatory soil sampling following removal of underground infrastructure associated with Tank Farm
	Potential concrete slab under the AEC 6 Former Maintenance Building; estimated volume of 60 cu.m.	- Remove the concrete slab; dispose of in on-site NHW facility	- conduct confirmatory soil sampling following removal of concrete slab
Contaminated Soil			
PHC Impacted Soil (Type A)	20 cu.m.	- Contaminated soil to be excavated to an assumed depth of 0.5 m at AEC 3 and disposed of in the on-site NHW facility. Confirmatory soil sampling to be completed for the walls of the excavation. - Excavated areas to be backfilled with borrow material and re-graded to match surrounding topography	- Contaminated soil may be used as intermediate fill in the NHW facility.

Table 6-5 Summary of Recommended NHW Remedial Approaches

NHW Component	Approximate Quantity	Proposed Remedial Approach	Comments
PHC Impacted Soil (Type B)	300 cu.m.	- Contaminated soil to be excavated to an assumed depth of 1.0 m at AEC 6 and bagged for off-site disposal. Soil will be shipped to southern Canada for disposal. Confirmatory soil sampling to be completed for the walls of the excavation. - Excavated areas to be backfilled with borrow material and re-graded to match surrounding topography	- Contaminated soil may be stockpiled on the Site until additional assessment is completed on the CIAA to determine if other Type B PHC impacted soil is present on the Site.
Stained Surficial Soil			
Stained Surficial Soil	2,167 cu.m.	- Excavate stained soil to a depth of approximately 0.5 m and dispose of in the on-site NHW facility - Use borrow material to grade the area to match the surrounding topography	

6.3 HAZARDOUS WASTE

Site materials that were identified as HW include ACMs, lead-amended paint, and unknown liquid contents in barrels. The hazardous materials present on-site are considered past and/or potential future sources of contamination. Removal of these materials from Site removes the contaminant source and the potential exposure hazard for future receptors. Figures 2 through 6C, Appendix A show the locations of hazardous materials that were identified during the Phase III ESA (Stantec 2021a) and SA Field Program (Stantec 2022b).

The ‘leave in place’ approach was considered as a remedial option, but would not remove the risk to receptors, reduce liability, or eliminate exposure pathways, and as a result was not carried forward or evaluated as a remedial option.

The remedial options for HW are summarized in Table 6-6. An overview of each remedial option and the evaluation of each remedial option against the selected evaluation criteria is discussed in detail below.

Table 6-6 Summary of Hazardous Waste Remedial Options

HW Component	Considerations	Remedial Options Evaluated
Asbestos	n/a	1. On-site disposal 2. Off-site disposal in southern Canada
Amended Paint	Amended paint is in poor to fair condition (i.e., chipping, flaking and peeling from substrate).	1. Full abatement 2. Partial abatement and disposal 3. Off-site disposal 4. Application of Lead Defender®
	Amended paint is in good condition (i.e., well adhered to substrate).	
Batteries	n/a	1. Off-site disposal in southern Canada
Residual Product (Petroleum)	Residual product does meet criteria for incineration.	1. Off-site disposal* 2. Incineration
	Residual product does not meet criteria for incineration.	
Notes: (*) – Disposal option will align with remedial option selected for general LW debris.		

6.3.1 Asbestos Remedial Options

The current understanding of the quantity of ACMs present on-site is a minimum of 13 cu.m. The remedial options below were considered for ACMs:

Disposal – ACMs would be collected and double bagged prior to disposal. The disposal options for ACMs include the following:

- On-Site Disposal - the ACMs would be handled and removed by trained personnel in accordance with the applicable guidelines and regulations. The ACMs would be double bagged and placed in the on-site NHW facility to reduce the potential for release of ACMS, which is a standard practice recommended in the AMRSP (INAC 2009). The location of the ACMs within the NHW facility would be recorded and appropriate signage would be place on-site. This option would be effective and would eliminate the on-site hazard. This option is likely to be accepted by regulators and community stakeholders. This option would not provide any Indigenous participation opportunities as trained abatement contractors would be required to handle the ACMs.
- Off-Site Disposal - Upon proper removal, the ACMs would be readied for off-site transport to an appropriate facility (southern Canada). This option would be equally effective and would eliminate the on-site hazard. This option is likely to be accepted by regulators and community stakeholders. This option would not provide any Indigenous participation opportunities as trained abatement contractors would be required to handle the ACMs. This option would be more costly as the ACMs would have to be shipped to southern Canada for disposal.

6.3.1.1 Asbestos Proposed Remedial Approach

The proposed remedial approach for ACMs is on-site disposal in the NHW facility. Both remedial options present similar levels of effectiveness, ease of implementation, timeliness, and Indigenous participation. The differentiating factor is the cost, with on-site disposal in the NHW facility being lower. An overview of the recommended remedial approach for ACMs is summarized in Table 6-7.

6.3.2 Amended Paint Remedial Options

Based on the findings of the Phase III ESA and the observational data gathered from the SA field program, Stantec has concluded that orange, yellow and green paint associated with the heavy equipment at AEC 6 is lead-containing material (i.e., exceeds the applicable guidelines of 100 mg/kg or 0.01% of lead). During the SA field program, orange, yellow, and green paint samples were collected and submitted for analysis of PCBs, which indicated that the orange, yellow and green paints did not contain concentrations of PCBs above the laboratory's reporting detection limit.

Although these painted materials are considered to contain hazardous concentrations of lead, the analytical results of the drip line sampling program suggested that leaching of the lead in the paint is not likely occurring. Drip line soil samples collected from the perimeter of orange, yellow and green painted heavy equipment items and demolition items concluded that lead and PCB concentrations were below the CCME SQG for lead and PCBs. As a result, Stantec has concluded that the orange, yellow and green paint is not likely to be lead leachate toxic and can be disposed of as a non-hazardous waste material if it is well adhered to a substrate.

The current understanding of the quantity of amended paint present on-site is a minimum of 556 sq.m. of lead amended paint. The paint in the Former Maintenance building is assumed to be amended with lead and PCBs until analytical results have been confirmed. Amended paint is present on wood and metal substrate (i.e., heavy equipment, ASTs, and vehicles). For the purposes of this RAP, amended paint can be considered as NHW, although considerations for occupational exposure are included in the remedial options as some of the paints contain lead concentrations that exceed the guidelines for working with lead.

Two remedial options were initially considered but ruled out prior the evaluation and scoring. The 'full on-site abatement' and 'off-site disposal in southern Canada' approaches were initially considered as a remedial option; however, it did not seem an appropriate solution to fully abate or require removal of amended paint material that was demonstrated to not be a leachate toxic risk. Both remedial options would be overly conservative, expensive and require significant non-Indigenous labour resources, as a result they were not carried forward and evaluated as a remedial option for amended paint.

- Partial On-Site Abatement - Abatement will be conducted manually in an enclosed area (such as inside a temporary enclosure) and will focus on removal of poorly adhered paint. Removed paint will be collected and disposed of at an off-site licensed hazardous waste facility in accordance with the TDG Act, as the concentrated lead paint may be leachable material. The remaining substrate would be compacted and disposed of in the on-site NHW facility. The purpose of the partial abatement

would be to reduce the amount of paint flakes (containing lead) that are released into the environmental during compaction, which would be protective of the environment and the labourers that are working with the painted metal substrate. This option would not provide any Indigenous participation opportunities for the abatement work as trained abatement contractors would be required to complete the work; however, labourers would be required for the compaction and disposal of the remaining substrate.

- On-Site Disposal with No Abatement - This option would include consolidation, compaction and disposal of painted materials on-Site in the NHW facility. On-site disposal would provide opportunities for Indigenous participation opportunities as labourers would be required for the compaction and disposal of the remaining substrate. This option would be the least expensive, however it would not manage the flaking paint which presents an occupation hazard to the labourers completing the consolidation, compaction and disposal of materials. This approach will likely meet the requirements of regulators but will not be the preferred option by the community.

6.3.2.1 Amended Paint Proposed Remedial Approach

The recommended approach for the management of amended paint is partial abatement and on-site disposal. The partial abatement would provide a balance of cost and effectiveness, as this option is more expensive and more protective than the On-Site Disposal with No Abatement option. This approach for the remedial activities would likely be accepted by regulators and the community stakeholders. An overview of the recommended remedial approach for amended paint is summarized in Table 6-7. Although no PCB amended paint has been encountered on Site, there is the potential for it to be present in the Former Maintenance Building and health and safety considerations should be included in the contractor's work plan.

6.3.3 Batteries

Although no batteries were identified during the SA field program (heavy equipment inventory), there is the potential for batteries to be present in abandoned vehicles and equipment. The remedial option for batteries is limited to one option, off-site disposal at an appropriate disposal facility (southern Canada) in accordance with the TDG Act.

6.3.4 Recommended Hazardous Materials Remedial Approach

Table 6-7 provides a summary of the recommended remedial approaches for hazardous waste.

Table 6-7 Summary of Recommended Hazardous Waste Remedial Approaches

Hazardous Waste Component	Approximate Quantity	Proposed Remedial Approach	Comments
ACMs	Minimum 13 cu.m.	- Collect, double-bag and dispose of in on-site NHW facility - Mark designated disposal area with appropriate signage	- Removal of ACMs to be confirmed with on-site visual inspection and testing as necessary - Abatement should be completed by a certified contractor and handled in accordance with the applicable Federal and Territorial Asbestos regulations - Any suspected ACMs encountered during the remedial program to be collected and submitted for analysis to determine appropriate disposal options
Batteries	Estimated <10 cu.m.	- Consolidate and package for disposal at a licensed off-site facility (southern Canada)	- Any batteries encountered on the ground during the remedial program should be collected and the soil beneath the battery should be tested for inorganic metals to determine if the soil has been impacted.
Poorly adhered amended paint	Minimum 30 sq.m.	Partial On-Site Abatement	- Materials with poorly adhered lead paint will be partially abated, removed paint will be collected and shipped for disposal at a licensed hazardous waste facility (southern Canada) - Remaining substrate will be compacted and disposed of in the NHW facility. -An unknown volume of lead amended paint is assumed to be present in the Former Maintenance Building.

6.4 PROPOSED REMEDIAL APPROACH SUMMARY

Table 6-8 summarizes the recommended remedial approach for each waste stream component.

Table 6-8 Summary of Recommended Remedial Approaches

Category/ Component	Estimated Area / Volume	Recommended Option
Liquid Waste		
Aqueous Liquids	Unknown	To be sampled, consolidated, and disposed of pending the criteria that they meet. Liquids that meet the incineration criteria will be incinerated, liquids that meet the wastewater discharge criteria will be discharged and liquids that do not meet the incineration or wastewater discharge criteria will be disposed of off-site (southern Canada).
Liquid Petroleum Products	265,255 L	To be consolidated, sampled and disposed of pending the criteria that they meet. Liquids that meet the incineration criteria will be incinerated, liquids that meet the wastewater discharge criteria will be discharged and liquids that do not meet the incineration or wastewater discharge criteria will be disposed of off-site (southern Canada).

Table 6-8 Summary of Recommended Remedial Approaches

Category/ Component	Estimated Area / Volume	Recommended Option
Non-Hazardous Waste		
Empty Barrels	353 cu.m. compacted	To be emptied, cleaned, crushed, and disposed of in a non-hazardous waste facility constructed at the Site
Infrastructure	Minimum 400 cu.m.	To be emptied, dismantled, incinerated or compacted, and disposed of in the on-site NHW facility. The AEC 6 tank farm will require an assessment prior to the remedial program to determine if/what contents are present.
Surface Debris	770 cu.m.	To be collected, segregated, compacted and disposed of in the on-site NHW facility. Note bare wooden materials will be segregated and incinerated on-site.
Buried Debris	332 cu.m.	The six buried debris areas (BDAs) identified in the 2021 SA field program meet the Class A (i.e., partial excavation and disposal) or Class C (i.e., cover) remedial option. Classification of additionally identified BDAs should be done in accordance with the AMSRP to designate each as a Class A, B or C and determine the appropriate remedial action prior to the remedial program. Dispose of as NHW or HW based on results.
Buried Infrastructure	Unknown	Excavate infrastructure from the ground, where possible. Where it is not practical to excavate the infrastructure, complete partial excavation and regrade the infrastructure to meet the grade of the surrounding topography. Backfill the excavated areas with borrow material. Backfill the buried concrete structure once the contents have been removed.
Contaminated Soil (Type A PHC)	20 cu.m.	Excavate impacted soil and place in on-site NHW facility. Complete confirmatory soil sampling of excavations. Re-grade areas with borrow materials.
Contaminated Soil (Type B PHC)	300 cu.m.	Excavate impacted soil will be bagged for off-site disposal in southern Canada. Complete confirmatory soil sampling of excavations. Re-grade areas with borrow materials. However, because the recommended additional assessment of the Community Identified Additional Areas (CIAAs) may identify additional Type B soil, deferring excavation and disposal of the 300 cu.m. of Type B identified at AEC 6 should be considered until the results of the additional assessment are available.
Stained Surficial Soil	2,167 cu.m.	Excavate soil and disposed of in on-site NHW facility.
Hazardous Waste		
Asbestos	Minimum 13 cu.m.	Abate, double bag and dispose of in on-site NHW facility.
Amended paint	Minimum 30 sq.m.	Partial abatement on-site of poorly adhered paint and off-site disposal of removed paint flakes at hazardous waste facility (southern Canada). Remaining substrate will be compacted for on-Site disposal in NHW facility.
Batteries	Unknown (expected to be no more than 10 cu.m.)	Removal from vehicles and equipment, if present, and off-site disposal at a registered hazardous waste facility (southern Canada). If batteries are found on the ground at the Site, confirmatory soil samples should be collected and submitted for analysis of lead to determine if lead had leached into the soil.

6.5 CONTINGENCY FOR OTHER CONTAMINATED SOIL

It is recognized that during remediation, new potential sources of soil contamination could be encountered, such as batteries located on the ground surface, and previously unidentified sources in buried debris. Because these potential sources are not confirmed to exist, any contaminated soil that may be associated with them cannot be quantified, or the potential COC(s) identified. Therefore, a contingency plan is required in the event that these sources are identified during the remedial program. This contingency plan would be developed by the contractor prior to initiation of remediation activities and would outline the contractor's methodology for managing contaminated soil in the event that it is encountered.

The contingency plan should reference the AMSRP as a guidance document to identify sampling and assessment requirements, and recommended remedial options. Table 6-9 presents a summary of remedial options for various types of contaminated soil other than PHC contaminated soil that might be encountered during the remediation program, following AMSRP guidance.

Table 6-9 Summary of Remedial Options for Other Contaminated Soil

AMSRP Soil Category [1]	Remedial Option(s)
Tier I	• Excavate and place in an on-site engineered landfill • Cap in place under 0.3 m of clean fill if in a stable location
Tier II	• Excavate and dispose of in an on-site Tier II facility [2] • Containerize for off-site disposal [3]
Hazardous	• Dispose in compliance with applicable regulations

Notes:
1 Refer to AMSRP (INAC 2009) for definitions of soil categories
2 Tier II facility design is based on the containment of contaminated soil in a landfill provided with a geo-synthetic liner and a granular fill cover of sufficient thickness to maintain the contaminated soil in a frozen condition.
3 Decision of whether to dispose of on or off-site is based on cost –benefit analyses (INAC 2009)

These options cannot be evaluated at this time given uncertainties such as contaminant type and contaminated soil quantities.

7.0 STAKEHOLDER CONSULTATION

7.1 COMMUNITY MEETING

On March 2, 2021 a community meeting was held with residents of the Hamlet of Coral Harbour at the Hamlet's community hall. The purpose was to present the preliminary RAP and to allow an opportunity for feedback from the community. The consultation was advertised by the Hamlet Office prior to the meeting and began at 7:15 pm. In attendance were approximately 13 members of the community, in addition to Ms. Charlotte Lamontagne and Ms. Melanie Netser from CIRNAC and Mr. Isaac Freda from Stantec who were present on-site. Mr. Dele Morakinyo and Ms. Amy Elder from CIRNAC, Ms. Caitlin Moore from PSPC, and Mr. Michael Doucet of Stantec attended the community meeting virtually. The names of the attendees and meeting minutes were document by CIRNAC.

The general plan for remediation as outlined in the preliminary RAP was presented by Mr. Morakinyo. After the presentation was completed, an opportunity for feedback was provided to the attendees. Comments included questions about community involvement and employment opportunities, governmental involvement, questions about the material remaining at the Site and if it could be salvaged, and a reference to buried debris and contaminated areas that were not addressed by the RAP. Locations of reported contaminated areas that were not included in the preliminary RAP (i.e., CIAAs) were recorded and documented in the meeting minutes. In addition, there was a comment that the community was happy that the Site was being cleaned-up and supports the project. Feedback from the meeting suggested that the community would like to have longer periods (i.e., several hours versus one) scheduled for the community meetings in the future.

With respect to the community involvement and employment opportunities, the attendees were advised that there would be further consultation with the community as the remedial process progresses. In addition, the attendees were advised that the successful contractor would be strongly encouraged and held accountable for a local hiring commitment. For material that remains at the Site, if it is deemed to be non-hazardous or not contaminated, CIRNAC has a release process whereby a community member may take the material if they sign for the liability associated with it.

7.2 COMMUNITY IDENTIFIED ADDITIONAL AREAS CONSULTATION

Prior to additional field work in 2021, CIRNAC provided Stantec with a list of the seven community Elders that attended the March 2021 community meeting and requested that Stantec follow-up with them to learn more about the CIAAs. Stantec contacted the Hamlet of Coral Harbour to inquire if the Elders or any other members of the community who were familiar with the CIAAs identified in the community meeting would be willing to discuss the CIAAs with Stantec during the 2021 field program.

The Hamlet identified six individuals from the community who contacted to discuss the CIAAs. Individuals included Noah Kadlak (Deputy Mayor, Hamlet of Coral Harbour), Jerry Taniyuk (Public Works, Hamlet of Coral Harbour), Inuapik Ell and Jeffry Keenainak (Wildlife Monitors – Aiviit Hunters' and Trappers' Organization), and Dino Bruce and Sandy Saviakuk (Project Manager and Subcontractor - Sudliq Development Ltd., respectively).

The informal discussions were conducted to learn about the CIAAs and determine the ownership and responsible group for the areas. Community members were asked about the locations and their memories of the historical activities and operations in those areas. Using the information and locations provided by the community members, Stantec's field crew completed site reconnaissance of the CIAAs. In total, nine CIAAs were visually assessed (as discussed in Table 4-1).

7.3 ONGOING CONSULTATION

PSPC and CIRNAC have completed ongoing consultation with potential contractors since August 2021, including a workshop to discuss the PSPC Procurement Supply Arrangement. The ongoing consultation has included communicating with Inuit owned and Nunavut based contractors to determine services, availability of equipment and capacity. PSPC/CIRNAC engaged with potential contractors and provided support for the PSPC Supply Arrangement pre-approval application. This was done proactively to keep the Project on schedule and ensure that potential obstacle associated with the PSPC Supply Arrangement pre-approval application did not prevent qualified contractors from bidding.

Additional community meetings are planned for the start of remediation (July 2022), at the end of each construction season (October 2022 and October 2023) and a final community meeting after demobilization (September 2024).

8.0 LOGISTICS AND REMEDIATION DEVELOPMENT

8.1 SCHEDULE

A proposed schedule for the remediation is presented in Table 8-1. Based on the location of the Site, it is assumed that active remediation can only be completed in the late spring and summer months (i.e., June to September). It is noted that construction of the on-site NHW facility can be undertaken in conjunction with the active remedial activities to reduce the duration of the remedial program.

Table 8-1 Proposed Schedule

Activity	Timing
Consultation meeting with stakeholders	March 2, 2021
Additional assessment/investigation/sampling: - Phase III ESA at AEC 6 - Assessment of the tank farm for contaminated soil under and immediately around the tanks, extent of associated piping, determination of content characteristics and quantity, and assessment of paint on the tanks for lead and PCBs (AEC 6) - Assessment of concrete bunker (AEC 4) (contents, size, construction, etc.) - Further assessment of buried debris areas - Heavy equipment and large bulk item inventory, including detailed inventory of batteries, sampling of brake pads for ACMs - Assessment of wooden sheds for lead paint, asbestos, etc. - Barrel sampling program - Assessment if access road from barge landing - Archaeology assessment - Borrow source assessment	April 1, 2021 – March 31, 2022
Complete detailed design, specifications and supporting permitting documents	October 30, 2021 – March 31, 2022
Apply for permits	April 1, 2021 to May 31, 2022
Tendering process	January 1, 2022 to June 30, 2022
Additional assessment/investigation/sampling: - Hazardous materials assessment at the Former Maintenance Building - Complete soil sampling of the temporary storage areas (TSAs) and camp area to determine baseline site conditions, prior to Remediation Program. - Assessment of the CIAAs (APEC 9, AEC 10, APEC 11, APEC 12, APEC 13 and AEC 14)	April 1, 2022 to August 31, 2022
Community Meeting – Start of Site Remediation at Coral Harbour	September 2022
Mobilize equipment to Site	September 2022
Construct on-site NHW facility	September 2022 – October 2023
Conduct Active Remediation - Collection, segregation, and compaction of surface debris - Collection and consolidation of barrel contents, compaction of barrels - Dismantling, cleaning, and compaction of tank farm - Incineration - Consolidate, package and transport materials for disposal off-site in southern Canada if they do not meet the incineration criteria - Re-grading the infrastructure to meet the grade of the surrounding topography - Excavating surficial stained soil and placing in on-site NHW facility - ACM abatement and partial abatement of amended paints - Consolidating, packaging and transporting HW materials for disposal off-site in southern Canada - Excavating contaminated soil and placing in on-site NHW facility	September 2022 – September 2024

Table 8-1 Proposed Schedule

Activity	Timing
Demobilize from Site	September 2024
Final Community Meeting	October 2024
NHW Facility Monitoring	2024 – 2049
Final Site Closure	2050

8.2 FEDERAL / TERRITORIAL PERMITTING

The type of permits required for the remedial program depend on the remedial approaches selected. Preparation of the permit applications will start prior to the remedial program to allow the authorities having jurisdiction (AHJ) time to review and approve prior to on-site activity. The Project is expected to require authorizations from the federal or territorial government for the development of a permanent NHW facility, use of water, and discharge of wastewater. Pending the identification of PHC Contaminated Soil (as discussed in Section 6.2.4.2), there is the potential for construction and operation of a LTU.

Table 8-2 Approvals/Authorizations Applicable to the Project

Legislation	Authority	Activity	Authorization / Action
Nunavut Planning and Project Assessment Act	Nunavut Planning Commission	New project within Nunavut	Determination that project proposal conforms to the Keewatin Regional Land Use Plan
Nunavut Planning and Project Assessment Act	Nunavut Impact Review Board / Minister	New project within Nunavut that requires a permit or licence and is not exempt from screening	Screening determination whether review is required (to be agreed to or rejected by Minister)
Nunavut Waters Regulations	Nunavut Water Board	Disposal of wastewater to ground Permanent waste facility Potential LTU facility	Type B Water License
Nunavut Archaeological and Palaeontological Sites Regulations	Government of Nunavut Department of Culture and Heritage	Documentation and excavation of archaeological sites or specimens, if found	Archaeological Permit(s)
Spill Contingency Planning and Reporting Regulations of the *Environmental Protection Act (Nunavut)*	Department of Environment – Chief Environmental Protection Officer	Storage of more than 20,000 L of fuel, where a contingency plan is not being approved by another regulatory authority	Spill Contingency Plan Approval
Coral Harbour By-law(s)	Hamlet of Coral Harbour	New land use within designated zones Borrow source development	Amendment to zoning bylaw; Development Permit
Not applicable	NAV Canada	Land use near airport	Land Use Application Approval

Table 8-2 Approvals/Authorizations Applicable to the Project

Legislation	Authority	Activity	Authorization / Action
-	Government of Nunavut - Economic Development and Transportation	Any activity that might interfere with airport operations	Letter of No Objection from Government of Nunavut - Economic Development and Transportation
Not applicable	Hamlet of Coral Harbour	Use of municipal water supply and waste facilities	Letter of approval from the Hamlet of Coral Harbour

8.3 SITE DEVELOPMENT

8.3.1 Access Roads

There is presently an existing access road that connects the Site to the Hamlet of Coral Harbour as well as a diverging access road that accesses the Hamlet's barge landing area west of the Site. The access road will be the primary route for equipment required for the remedial program. The roads were generally noted in good condition and passable by vehicles. The roads are typically two lanes wide and allow for the safe passing of vehicles/equipment moving in opposite directions. The roads have previously been used for transporting heavy equipment around the Site (by local companies and members of the community). As the remedial activities are not scheduled to commence until late 2022, it is possible that the road conditions may change between the time that the 2021 SA field program was completed, and remedial activities begin. As the vehicle classes will be selected and provided by the contractor, Stantec recommends that roads be assessed by the contractor closer to the date of the future remediation activities to confirm they are safe and passible by the various vehicle classes that may be using them for transportation (e.g., heavy equipment, tracked equipment, etc.). Additionally, the contractor may want to develop turn outs and or build or upgrade the road to access various site locations with its equipment.

Additionally, current access to AEC 1 requires crossing the active airstrip, as there are no alternative routes to access the area west of the runway. This practice is dangerous and may damage the airstrip. An access road should be developed around the airstrip to eliminate vehicles and equipment traveling over it during the pre-remedial activities and remedial program. Current access roads are illustrated on Figure 1, Appendix A.

8.3.2 Active Airstrip

The Coral Harbour Airport (CYZS) is a small public use airport which serves the Hamlet of Coral Harbour. The airport has operational staff on-site during regular hours and the active airstrip is maintained daily by the Coral Harbour Airport. The airport contains one gravel runway, a taxiway and an apron. The airstrip is an approximately 1,526 m long gravel airstrip located adjacent to the Site. The critical aircraft is the ATR-42-500, although aircraft larger than the critical aircraft may operate as long as it complies with the Canadian Aviation Regulations (GNU 2021). The airstrip could potentially be used to bring in workers, materials and small pieces of equipment. As this is a commercially maintained runway, information for appropriate aircraft and authorizations can be obtained from the airport authority.

8.3.3 Barge Landing Area and Sealift

There is a barge landing area located approximately 15 km west of the Hamlet of Coral Harbour, approximately 5 km west of the Site. Coral Harbour is a location that is routinely accessed by various sealift companies that transport goods (including dangerous goods), construction materials and heavy equipment to Coral Harbour and other northern communities. It is anticipated that these companies would not provide transportation of any goods from the barge landing area to the Site. Many of the sealift and barge companies require advanced booking up to several months in advance and generally only operate during ice free conditions (i.e., June to September).

The access roads from the barge landing area to the Site were assessed during the SA Field Program and were noted in good condition. They are expected to be in a condition that heavy equipment could operate due to their current use. It is recommended that all access roads be re-assessed by the contractor closer to the active remediation phase.

8.3.4 Borrow Sources

Borrow source field investigations were conducted at the Site in 2020 and 2021 to identify and characterize granular deposits for potential use as borrow sources for construction of the proposed NHW facility. There are three existing borrow sources and seven potential borrow sources that have been identified and assessed to date ((Stantec 2021a) and (Stantec 2022b)). The location of the borrow sources are illustrated in Figure 7, Appendix A.

Borrow Source – Airport Road Quarry #1: This existing source is managed by the Hamlet of Coral Harbour under a 10 year Quarry Administration Agreement. Small stockpiles of gravel were observed at the property with overall volumes estimated to be less than 10,000 cu.m. No test pits were conducted during the borrow source assessment (included in the Phase III ESA) for this source.

Borrow Source – Airport Road Quarry #4, 5, 7: This existing source is managed by the Hamlet of Coral Harbour under a 10 year Quarry Administration Agreement. Stockpiled material consists predominantly of poorly graded gravel (mainly angular, medium to coarse shale gravels, variable amount of sand with trace amounts of silt and clay sized particles) and was classified as Class 3 Fair Quality under the Northwest Territories Granular Resource Directory (GNWT 2015) (used in the absence of a similar guide for Nunavut). The footprint of the borrow source is constrained by the presence of active river channels to the east and west, and by standing water or poorly drained terrain to the north and south. Due to the similarities of materials between this location and the Airport Road Quarry 4,5,7, no test pits were conducted at this unnamed quarry borrow source. The volume of source material was estimated to be less than 20,000 cu.m.

Borrow Source – Airport Road Unnamed Quarry: This existing source is located within lands owned by the Federal Government (Transport Canada). No test pits were conducted during the borrow source assessment (Phase III ESA) for this source as the materials looked similar between this location and the Airport Road Quarry #4, 5, 7. The volume of source material was estimated to be less than 10,000 cu.m.

Borrow Source – Granular Material Deposit (GMD) A: This potential source is located approximately 200 m east of the Airport Road, and approximately 2 km north of the airport facility. GMD A spans up to approximately 1.6 km east of the Airport Road and covers an area estimated at more than 459,000 m². The estimated volume of available borrow material is approximately 344,250 m³ (Stantec 2022b). GMD A generally appeared to be well-drained, however a few isolated low-lying poorly-drained areas covering approximately 10% of the area were identified. The terrain consisted predominantly of raised beach deposits with sparse to no vegetative groundcover. Eight test pits were excavated during the borrow source assessment for this source (Stantec 2022b).

Borrow Source – GMD B: GMD B covers an area of approximately 407,000 m², and lies immediately east of Airport Road, with its southern limit approximately 1,000 m north of the airport facility. GMD B spans a distance of approximately 750 m east of Airport Road at its southern limit. The estimated volume of available borrow material is approximately 305,250 m³ (Stantec 2022b) GMD B generally appeared well-drained above elevation 78 m, with some signs of inundated areas in the flatter region between elevation 78 m and elevation 70 m. The presence of wet areas below elevation 78 m is likely attributed to subsurface drainage of the lake situated approximately 100 m east of GMD B. The terrain consisted predominantly of raised beach deposits with sparse to no vegetative groundcover. Seven test pits were excavated during the borrow source assessment for this source (Stantec 2022b).

Borrow Source – GMD C: GMD C covers an area of approximately 86,000 m², and lies immediately east of Airport Road, and approximately 1600 m south of the airport facility. GMD C spans a distance of approximately 600 m east of Airport Road at its eastern limit. The estimated volume of available borrow material is approximately 64,500 m³ (Stantec 2022b) GMD C generally appeared well-drained above elevation 36 m, however wet areas were observed on the boundaries. Five test pits were excavated during the borrow source assessment for this source (Stantec 2022b).

Borrow Source – GMD D: GMD D covers an area of approximately 38,000 m², and lies immediately east of Airport Road, and approximately 2,200 m south of the airport facility. GMD D spans a distance of approximately 550 m east of Airport Road at its eastern limit. The estimated volume of available borrow material is approximately 28,500 m³ (Stantec 2022b) GMD D generally appeared well-drained above elevation 27 m asl, however with signs of wet areas immediately on the boundaries of the GMD D. The terrain appears to consist of raised beach deposits with sparse to no vegetative groundcover observed. From discussion with the excavation contractor, the area formerly contained military buildings. Signs of historical human activities are limited to possible disturbance of the ground surface with machinery, and presence of occasional wood and metal debris. Three test pits were excavated during the borrow source assessment for this source (Stantec 2022b).

Borrow Source – GMD E: The stockpile is an approximately 250 m long berm extending west to east, and approximately 15 m wide at its base and 3 m high at its crest. GMD E consists of a stockpile of granular material. Using drone survey data, the volume of the stockpile was estimated to be approximately 5,100 m³ (Stantec 2022b). The stockpile is located on the south side of GMD E, separated by a 25 m wide wetland area. From discussion with the excavation contractor, the GMD E stockpile was placed there at the time of the former military operations. Three test pits were excavated during the borrow source assessment for this source (Stantec 2022b).

Borrow Source – GMD F: GMD F covers an area of approximately 80,000 m² and is located approximately 750 m east of the Airport Road, and approximately 2000 m north of the airport facility. The north boundary of GMD F corresponds to the northern limit of the Hamlet Municipal Boundary. GMD F generally appeared to be well-drained, however contained a few isolated wetland areas. The terrain consisted predominantly of raised beach deposits with sparse to no vegetative groundcover observed. A large wetland area lies between GMD F and the Airport Road. Access to GMD F by vehicle from Airport Road necessitates travel over rugged terrain around the west side of the lake centered at UTM coordinates 386350 m E, 71616280 m N. Three hand dug test pits were completed during the borrow source assessment for this source (Stantec 2022b). During the field investigation program, GMD F was concluded to not be a practical borrow sources for the NHW facility, due to difficult access compared to the alternate GMDs. Extraction areas and approximate borrow material volumes were not calculated as the GMD F was determined to be impractical source (Stantec 2022b).

Borrow Source – GMD G: GMD G covers an area of approximately 3,652,000 m², with its easternmost portion located approximately 500 m west of the Airport Road, and westernmost portion located approximately 3,000 m further west. GMD G generally appeared to be predominantly well-drained, however with frequent low-lying wetlands between the rolling hills. The terrain consisted predominantly of raised beach deposits with sparse to no vegetative groundcover observed. Fossil Creek bounds the north and east sides of GMD G. Access to GMD G by vehicle from Airport Road necessitates an in-water crossing of Fossil Creek at UTM coordinates 386690 m E, 7118120 m N. From discussion with local residents, this creek crossing is typically impassible from the start of spring runoff until mid-July. Five hand dug test pits were completed during the borrow source assessment for this source (Stantec 2022b). During the field investigation program, GMD G was concluded to not be a practical borrow sources for the NHW facility, due to difficult access compared to the alternate GMDs. An in-water crossing of Fossil Creek is required to access GMD G. Extraction areas and approximate borrow material volumes were not calculated as the GMD G was determined to be impractical source (Stantec 2022b).

8.3.5 Camp

Based on the limited availability of accommodations in the Hamlet of Coral Harbour and the COVID-19 pandemic, it is recommended that a camp be constructed at the Site to facilitate timely remediation. The on-site camp will need to be set-up in a location that will ensure workers are not affected by hazards during remediation. The camp is expected to require a capacity for as many as 18 on-site workers and associated camp staff. The camp will be constructed with suitable infrastructure to meet Nunavut guidelines for this type of temporary camp as applicable, including the WSCC's Camp Set Up and Management (WSCC 2017), and will be constructed and prepared for weather and/or emergency situations. The camp will minimize contact between the workers and the local community. Additional COVID-19 related requirements will meet Territorial requirements in place at the time leading up to and during the remedial program. Specific locations were not identified for the camp during the Phase III ESA or SA Field Program but there are numerous possibilities in close proximity to the AECs.

Facilities that will be required include the following:

- Sleeping quarters
- Offices
- Kitchen and dining areas
- Bathrooms and showers
- Laundry facilities
- First aid facilities
- Water treatment system for camp
- Mechanic and equipment area that would also have a petroleum and lube containment area
- Water supply and pumps
- Geotechnical laboratory
- Diesel powered generators
- Emergency shelter
- Quarantine building (for on-site workers who exhibit symptoms of COVID-19)

Potable water will be obtained from the Hamlet's municipal supply. Sewage and domestic wastes will be collected and disposed to municipal solid waste and wastewater facilities in the Hamlet. Greywater meeting appropriate criteria will be discharged to land.

8.3.6 On-Site NHW Facility

The on-site NHW facility is anticipated to be constructed aboveground such that it will not rely on or disrupt the permafrost. Based on estimated volumes of waste, it is expected to cover an area of 3,000 sq.m. and consist of a granular structured berm with a minimum layer of 1.0 m granular cover above the structured berm. However, the final design of the NHW facility will be completed once the remedial options are selected and approved for each waste stream.

Five potential locations for a NHW facility were identified and assessed during the 2021 SA field program, identified as "Potential NHW Facility Locations" 1 through 5, as shown on Figure 1, Appendix A. A summary of the Potential NHW Facility Locations is provided in Table 8-3.

Table 8-3 Summary of Potential NHW Facility Locations

Potential NHW Facility Location	Description
Location 1	Location 1 is located immediately west of AEC 3, on the west side of Airport Road. In addition to AEC 3, swampy, poorly draining areas are located immediately to the northeast of Location 1. The topography within Location 1 slopes at 5% from Airport Road on its eastern boundary at elevation 97 m asl, down to the west at elevation 92 m asl. To the west of the Location 1 the ground continues to slope down at 5% for another 200 m. The terrain consists of raised beach deposits with sparse to no vegetative groundcover observed. This location is beyond the airport and would be past the area where the public travel between the airport and the Hamlet, making it more of a discrete location.
Location 2	Location 2 is located immediately south of AEC 3, on the east side of Airport Road. In addition to AEC 3, swampy, poorly draining areas are located immediately to the northeast of Location 2. The terrain consists of raised beach deposits with sparse to no vegetative groundcover observed. Signs of human disturbance include presence of waste wood and metal debris at the ground surface, mounded soils from former ground disturbance, and presence of barrels (i.e., AEC 3).
Location 3	Location 3 is located within GMD B, on the east side of Airport Road. A 400 m diameter lake is located approximately 300 m NW of Location 3, and a wet, poorly drained area is located approximately 100 m to the northwest. The terrain consists of raised beach deposits with sparse to no vegetative groundcover observed. This location is within one of the proposed borrow sources (i.e., GMD B)
Location 4	Location 4 is located within GMD C, on the east side of Airport Road. Location 4 and GMD C are in general bordered by wetlands to the north and south, and a creek 200 m to the east. A gravel road traverses Location 4, which appears to provide an alternate route to the Airport Road to the Coral Harbour townsite. The terrain appears to consist of raised beach deposits with sparse to no vegetative groundcover observed. Signs of historical human activities are limited to possible disturbance of the ground surface with machinery, and presence of occasional wood and metal debris.
Location 5	Location 5 is located at the remnants of a concrete bunker, on the east side of Airport Road. Location 5 is bordered by wetlands to the north and south and east, and Airport Road to the west. Wood and metal debris are scattered throughout the surface of Location 5. Signs of historical human activities are limited to possible disturbance of the ground surface with machinery, and presence of occasional wood and metal debris. This location is furthest from a water body.

The five Potential NHW Facility Locations were evaluated based on their ability to meet the following criteria: proximity to borrow source(s), distance to water, proximity to remediation area, location (public visibility and access), and site conditions (existing level of disturbance). Based on the scoring of criteria, Potential NHW Facility Location 3 is proposed as the location for the NHW facility. There are two locations identified within Location 3 (GMD B) that meet the criteria: 3A and 3B. The locations are within close proximity to each other (within 550 m) and have similar conditions, however 3A has a higher flood potential and as a result 3B is the preferred location within GMD B. Details on the evaluation criteria and scoring are provided in the Design Basis Report (Stantec 2022d).

The AMSRP will be used as a guidance document for the construction of the on-site NHW facility and the design will be completed by a qualified geotechnical engineer prior to implementation. Monitoring wells will be installed around the perimeter of the waste facility and baseline conditions of the groundwater will be established prior to use. These will be further detailed and refined in the design stage of the project.

8.3.7 Remediation Equipment

An inventory of heavy and other equipment that will need to be mobilized to the Site for the duration or for an extended period of the work will be developed following selection of the final remedial approaches. AEC 4 is the proposed designated laydown area for equipment storage. The list below identifies most of the equipment, based on Stantec's experience, that will be required to successfully complete the proposed remedial plan; however, it is not to be considered an exhaustive list.

- Excavator(s) to load borrow material
- Front-end loader to consolidate materials and surface debris
- Haul truck(s) to move borrow and waste materials to staging areas and the on-site NHW facility
- Tilling attachment for the dozer to scarify the areas of surficial staining
- Dozer or other grading equipment to be used for the construction of the on-site NHW facility
- Smooth drum compactor for the construction of the on-site NHW facility
- Waste incinerator(s)for incineration of organic liquids, unpainted wood and applicable camp waste
- Waste compactor
- Drum crusher
- Water treatment system for treatment of wash water generated by the on-site washing of barrels
- Generators for remedial equipment and camp operation
- Site vehicles for transportation of the site workers
- A refueling vehicle and/or aboveground storage tank for fuel storage
- Other miscellaneous equipment as determined by the contractor

9.0 ADDITIONAL ACTIVITIES

9.1 PRE-REMEDIAL ACTIVITIES

The following data gaps require action prior to, or during the early stages of the remedial program:

- Tank Farm Assessment - Assessment of the tank farm at AEC 6 and associated sampling of remaining contents.
- Hazardous materials assessment at the Former Maintenance Building
- Visually assess the access roads, including the one from the barge landing to the Site to determine the state of the conditions prior to remedial activities.
- Complete soil sampling and visual inspection of the temporary storage areas (TSAs) and camp area to determine baseline site conditions, prior to Remediation Program.

9.2 DURING REMEDIATION ACTIVITIES

The active remediation and the construction of the on-site NHW facility will occur simultaneously to shorten the length of the remediation. The following activities will be undertaken during the remediation phase:

- Composite barrel contents, sample and analyze, and incinerate or dispose, as appropriate.
- Wash barrels containing residual product and compact/crush clean barrels.
- Composite remaining tank farm contents for incineration. Sample consolidated contents to determine characteristics of contents. Clean inside if residual product is present. Abate painted materials, if necessary. Dismantle tank farm.
- Remove contents of buried concrete structure and incinerate or dispose as appropriate. Fill buried concrete structure with borrow material and compact, level to match surrounding grade.
- Abate and dispose of ACMs in the on-site NHW facility. Mark designated area with appropriate signage.
- Abate materials with loose/flaking lead containing paint and dispose of in NHW facility.
- Collect, segregate, compact and dispose of surface debris off-site and/or in the on-site NHW facility.
- Collect, compact, and dispose of exposed buried debris materials or cover with borrow material to eliminate physical hazard.
- Leave existing concrete foundations and slabs in place, and place borrow material to match top-of-concrete to final surface grades.
- Remove the assumed concrete slab underneath the Former Maintenance Building (AEC 6). Sample soil beneath the slab to assess COPCs identified in the hazardous material assessment. Place borrow material to match the surrounding surface grade.
- Deconstruct the temporary camp once the remedial activities have been completed. Re-grade areas disturbed during the remedial activities (i.e., work areas, access roads and lay down areas) to match existing surface grades. The contractor(s) will be responsible for transporting the equipment off-site.
- Complete confirmatory soil sampling of the TSAs and camp area once all materials have been removed from Site to determine the site conditions, following the Remediation Program.

The above is not an extensive list of activities to be conducted during the remedial phase and will be further developed in the detailed design of the remediation program.

9.3 POST REMEDIAL ACTIVITIES

Residual contamination may be present at barrel processing areas, hazardous materials processing areas, amended paint abatement areas, and stockpile lay down areas following the completion of the remedial program. These areas will be visually assessed for contamination indicators such as staining, debris, or paint chips, and sampled for COCs related to the processing activities. Confirmatory soil sampling will be completed at all TSAs once the contractor has removed all waste and equipment.

The on-site NHW facility will require post-remedial monitoring. Currently, it is assumed that this will include:

- Visual monitoring to observe the physical integrity of the facility including observations for possible settling, erosion, frost action, vegetation, leachate, staining, etc.
- Long-term groundwater monitoring of three to four groundwater monitoring wells.

9.4 ADDITIONAL ASSESSMENT ACTIVITIES

There are areas of the Site that have not adequately been assessed to determine what remedial activities they may require. As such, the following additional assessment activities will be conducted:

- Phase II ESA at AEC 10. Recommended additional assessment includes delineation of soil impacted with PHCs and/or PAHs, assessment of groundwater/active zone water to characterize the Site conditions and determination of locations of potential historical underground utilities and infrastructure.
- Phase III ESA at AEC 14. Recommended additional assessment includes delineation of soil impacts identified in the SA, and potential assessment of groundwater/active zone water.
- Phase I/II ESA of APECs 9, 11, 12, 13 and the former pipeline location and historical barrel cache locations. Recommended assessment includes a test pit program to determine the presence/absence of COPCs in soil, and assessment of groundwater/active zone water, surface water and sediment to characterize Site conditions, where required

Once adequate additional assessment has been conducted, a separate RAP will be completed to address any environmental concerns identified.

10.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified areas of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the Site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, Site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire Site. As the purpose of this report is to identify Site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the Site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

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APPENDIX A

Figures

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Legend

- Area of Environmental Concern (AEC)
- 1 Potential Non-Hazardous Waste Facility Locations
- Gravel Roads
- Fossil Creek
- Transport Canada Land Parcel
- Municipal Boundary

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

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(At original document size of 11x17)
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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Data Sources: Government of Nunavut

Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2022-03-30
Technical Review by CB on 2022-03-30

Client/Project
121417087
Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.
1 **FINAL**

Title
Overview Map

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Legend

- Asbestos Containing Material (ACM)
- Approximate Area of Surficial Soil Staining
- Existing Waste Disposal Area
- Consolidated Surface Debris Area
- Buried Debris Area
- Barrel Cache Area
- Watercourse

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

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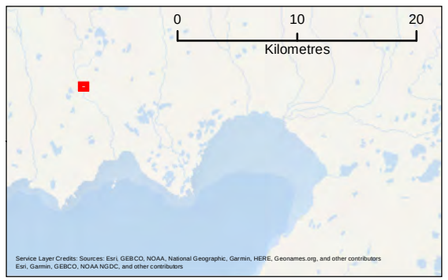

Project Location

Coral Harbour, Nunavut

Prepared by ACampigotto on 2022-03-07
Technical Review by CB on 2022-03-07

Client/Project 121417087

Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.

2

FINAL

Title

Remedial Action Plan - AEC 1 Tar Barrels

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure2_RemedialActionPlanUpdate_APEC1_TarBarrels_SampleResults_20220307.mxd Revised: 2022-03-07 By: acampigotto

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Legend

- Existing Waste Disposal Area
- Consolidated Surface Debris Area
- Approximate Area of Surficial Soil Staining
- Gravel Roads

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

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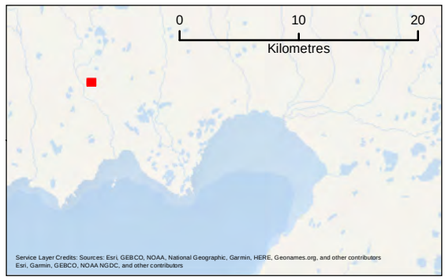

Project Location
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Prepared by ACampigotto on 2022-03-30
Technical Review by CB on 2022-03-30

Client/Project 121417087
Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.
3 **FINAL**

Title
Remedial Action PLan - AEC 2 Full Barrels

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure3_RemedialActionPlanUpdate_APEC2_Full_Barrels_20220330.mxd Revised: 2022-03-30 By: acampigotto

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Legend

- Location of Demolition Item
- Lead Amended Paint
- Approximate Area of Surficial Soil Staining
- Buried Debris Area
- Existing Waste Disposal Area
- Consolidated Surface Debris Area
- PHC Contaminated Soil
- Municipal Boundary
- Gravel Roads

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

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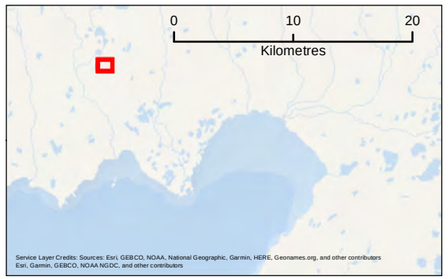
2. Data Sources: Government of Nunavut



Project Location
Coral Harbour, Nunavut

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Technical Review by CB on 2022-03-30

Client/Project 121417087
Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.
4 **FINAL**

Title
Remedial Action Plan - AEC 3 Barrel Cache

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure4_RemedialActionPlanUpdate_APEC3_BarrelCache_20220330.mxd Revised: 2022-03-30 By: acampigotto

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Legend

- Asbestos containing material (ACM)
- Remnants of historic infrastructure
- Buried Concrete Structure (location and size approximate)
- Buried Debris Area
- Existing Waste Disposal Area
- Consolidated Surface Debris Area
- Gravel Roads
- Fossil Creek

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

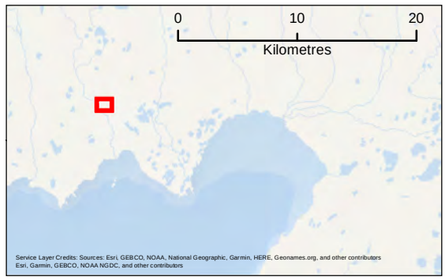
N

0 40 80 Metres

(At original document size of 11x17)
1:4,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Data Sources: Government of Nunavut



Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2022-02-25
Technical Review by CB on 2022-02-25

Client/Project 121417087

Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.
5 **FINAL**

Title
Remedial Action Plan - AEC 4 Former Army Base

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure5_RemedialAction PLanUpdate_APEC4_FormerArmyBase_20220225.mxd Revised: 2022-02-25 By: acampigotto

Stantec

Legend

- Existing Waste Disposal Area
- Suspected area of underground infrastructure and utilities
- Consolidated Surface Debris Area
- Barrel Cache Area
- Approximate Areas of Surficial Soil Staining
- PHC Contaminated Soil
- Abandoned Site Building
- Airport Weather Station (Restricted)
- Electrical/Power Lines
- Gravel Roads

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

N

0 40 80 Metres

(At original document size of 11x17)
1:3,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Data Sources: Government of Nunavut

Service Layer Credits: Sources: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributors
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

Project Location
Coral Harbour,
Nunavut

Prepared by ACampigotto on 2022-03-30
Technical Review by CB on 2022-03-30

Client/Project
Public Service and Procurement Canada
Updated Remedial Action Plan

121417087

Figure No.
6A

FINAL

Title
Remedial Action Plan -
AEC 6 Former Airport Debris

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure6A_RemedialActionPlanUpdate_APEC6_Former_Airport_Debris_20220330.mxd Revised: 2022-03-30 By: acampigotto

386000 386100 386200 386300

7120300 7120200 7120100

Former Maintenance Building

Lead Amended Paint

Lead Amended Paint

Dilapidated Building

Empty Tanks

Tank Farm (Seven Vertical Tanks)

Lead Amended Paint

Horizontal AST

Concrete Anchors

Stantec

Legend

- Location of Heavy Equipment
- Location of Demolition Item
- Lead Amended Paint
- Suspected area of underground infrastructure and utilities
- Consolidated Surface Debris Area
- Approximate Areas of Surficial Soil Staining
- Gravel Roads
- Electrical/Power Lines
- Abandoned Site Building

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

N

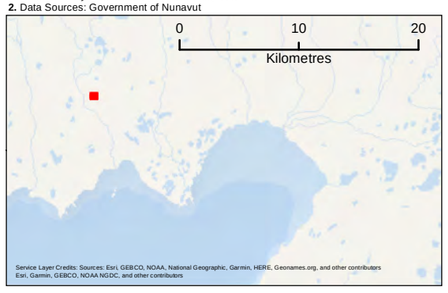
0 10 20 Metres

(At original document size of 11x17)
1:1,200

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N

2. Data Sources: Government of Nunavut



Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2022-03-28
Technical Review by CB on 2022-03-28

Client/Project
121417087
Public Service and Procurement Canada
Updated Remedial Action Plan

Figure No.
6B

FINAL

Title
Remedial Action Plan
Debris Pile Near Tank Farm - AEC 6 Former Airport Debris

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure6B_RemedialActionPlanUpdate_AEC6_Former_Airport_Debris_20220323.mxd Revised: 2022-03-28 By: acampigotto

Stantec

Legend

- Location of Demolition Item
- Location of Heavy Equipment
- Consolidated Surface Debris Area
- Approximate Areas of Surficial Soil Staining
- Existing Waste Disposal Area
- PHC Contaminated Soil

Note: Interpretation of this Figure is dependent on coloured symbols. View in colour.

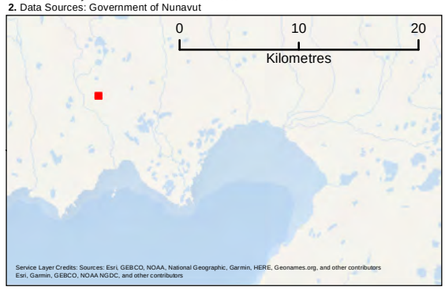
N

0 10 20 Metres

(At original document size of 11x17)
1:1,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Data Sources: Government of Nunavut



Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2022-02-28
Technical Review by CB on 2022-02-28

Client/Project
Public Service and Procurement Canada
Updated Remedial Action Plan

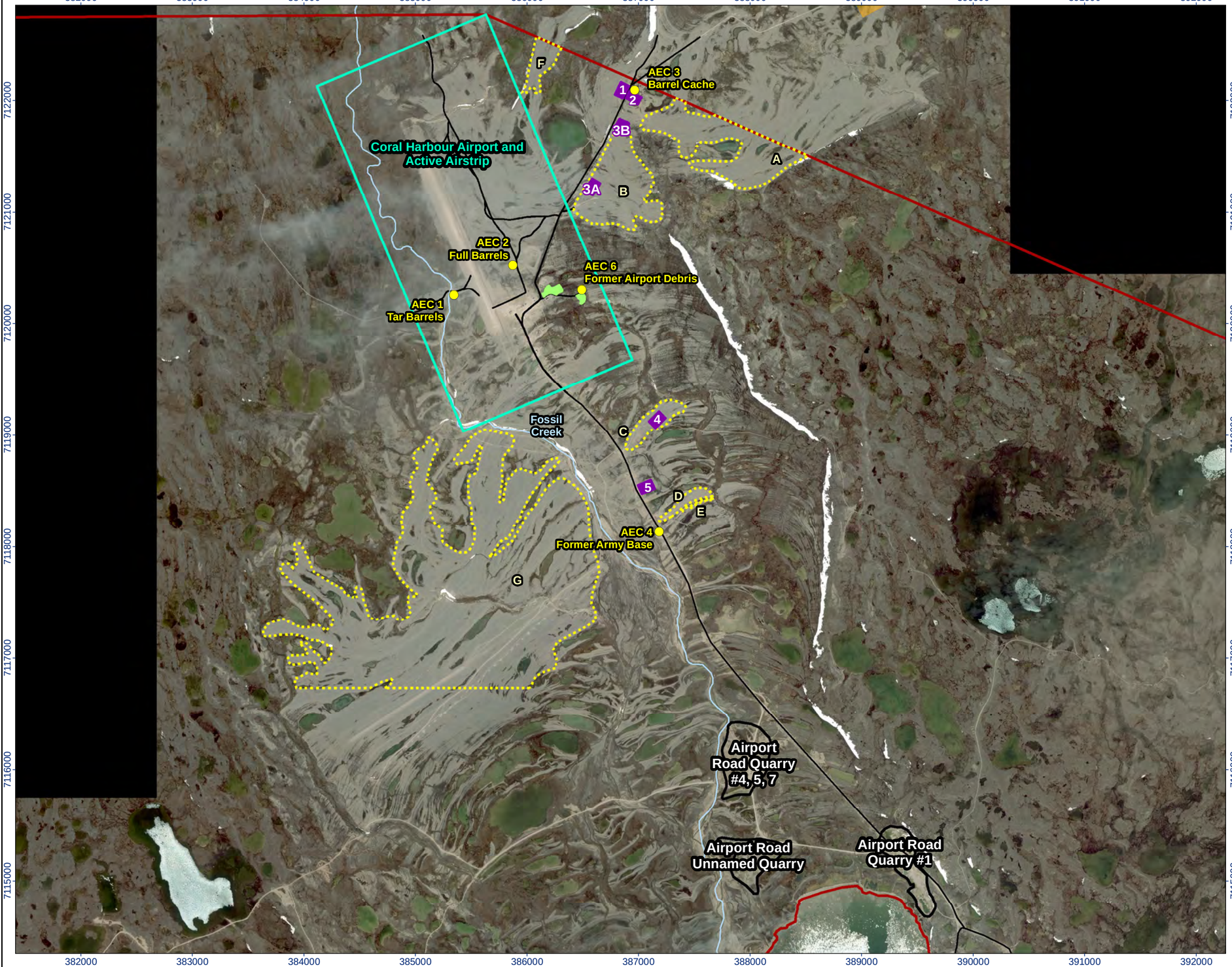
121417087

Figure No.
6C

FINAL

Title
Remedial Action Plan
East Debris Pile -
AEC 6 Former Airport Debris

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure6C_RemedialActionPlanUpdate_APEC6_Former_Airport_Debris_20220225.mxd Revised: 2022-02-28 By: acampigotto



Stantec

Legend

- Area of Environmental Concern (AEC)
- Existing Borrow sources
- Granular Material Deposit
- Surface Debris Area
- 1 Potential Non-Hazardous Waste Facility Locations
- Transport Canada Land Parcel
- Parcel
- Municipal Boundary
- Gravel Roads
- Fossil Creek

N

0 500 1,000 Metres

(At original document size of 11x17)
1:35,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Data Sources: Government of Nunavut

Project Location
Coral Harbour, Nunavut

Prepared by AC on 2022-03-30
Technical Review by CB on 2022-03-30

Client/Project
Public Service and Procurement Canada
Updated Remedial Action Plan

121417087

Figure No.
7

FINAL

Title
Remedial Action Plan
Borrow Source Assessment - Overview

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Remedial Action Plan\Figure7_RemedialActionPlanUpdate_Borrow_Source_Assessment_20220330.mxd Revised: 2022-03-30 By: acampigotto

APPENDIX B

Remedial Options Weighting Tables

Table B-1: Non-Hazardous Waste Remedial Option Weighting (General NHW Debris)

		Method Ranking				Weighted Alternative Score			
Screening Criteria	**Factor Weighting**	**Leave In Place**	**On-Site NHW Facility**	**Disposal Off-Site in Coral Harbour**	**Disposal Off-Site in southern Canada**	**Leave in Place**	**On-Site NHW Facility**	**Disposal Off-Site in Coral Harbour**	**Disposal Off-Site in southern Canada**
Cost	0.3	3	2	2	1	0.9	0.6	0.6	0.3
Effectiveness	0.2	1	3	3	3	0.2	0.6	0.6	0.6
Ease of Implementation and Timeliness	0.15	3	2	1	2	0.45	0.30	0.15	0.30
Indigenous Participation	0.35	1	3	3	2	0.35	1.05	1.05	0.70
					Total Weighted Score:	1.9	2.55	2.4	1.9

Scoring Notes:

	3	**2**	1
Cost Effectiveness	Cost for this option is less than 70% of the most expensive option.	Cost for this option is between 70% and 99% of the most expensive option.	Most expensive option
Effectiveness	Completely eliminates the risk to receptors, fully removes source of contamination or exposure pathway. Aesthetics of Site are similar to pre-disturbance conditions.	Reduces risk to receptors. Reduces or contains source of contamination. Aesthetics of Site are moderately improved.	Does not reduce risks. Sources of contamination remain in place. Aesthetics of Site remain the same.
Ease of Implementation and Timeliness	Can be completed well within the estimated time frame of the project, may shorten overall schedule. Will require minimal material imported to Site.	Can be completed within the estimated time frame of the project. Will require moderate effort and/or material imported to Site.	Could impact overall project schedule, will be on the critical path. Requires most material to be imported to Site or requires or may require permission by other agencies.
Indigenous Participation	This remedial option maximizes local and Indigenous employment and subcontracting opportunities.	This remedial option will include some local and Indigenous employment and subcontracting opportunities but a significant portion of the work will be completed by southern companies and subcontractors.	This remedial option will be completed mainly by southern labour and subcontractors with minimal opportunities for local and Indigenous employees and companies, or requires no labour (leave in place options).

Table B-2: Non-Hazardous Waste Remedial Option Weighting (Buried Debris)

		Method Ranking				Weighted Alternative Score			
Screening Criteria	**Factor Weighting**	**Leave In Place**	**Partial Excavation and Disposal**	**Full Excavation and Disposal**	**Cover**	**Leave in Place**	**Partial Excavation and Disposal**	**Full Excavation and Disposal**	**Cover**
Cost	0.3	3	2	1	2	0.9	0.6	0.3	0.6
Effectiveness	0.2	1	2	3	2	0.2	0.4	0.6	0.4
Ease of Implementation and Timeliness	0.15	3	2	2	2	0.45	0.3	0.3	0.3
Indigenous Participation	0.35	1	3	3	3	0.35	1.05	1.05	1.05
					Total Weighted Score:	1.9	2.35	2.25	2.35

Scoring Notes:

	3	**2**	1
Cost Effectiveness	Cost for this option is less than 70% of the most expensive option.	Cost for this option is between 70% and 99% of the most expensive option.	Most expensive option
Effectiveness	Completely eliminates the risk to receptors, fully removes source of contamination or exposure pathway. Aesthetics of Site are similar to pre-disturbance conditions.	Reduces risk to receptors. Reduces or contains source of contamination. Aesthetics of Site are \moderately improved.	Does not reduce risks. Sources of contamination remain in place. Aesthetics of Site remain the same.
Ease of Implementation and Timeliness	Can be completed well within the estimated time frame of the project, may shorten overall schedule. Will require minimal material imported to Site.	Can be completed within the estimated time frame of the project. Will require moderate effort and/or material imported to Site.	Could impact overall project schedule, will be on the critical path. Requires most material to be imported to Site or requires or may require permission by other agencies.
Indigenous Participation	This remedial option maximizes local and Indigenous employment and subcontracting opportunities.	This remedial option will include some local and Indigenous employment and subcontracting opportunities but a significant portion of the work will be completed by southern companies and subcontractors.	This remedial option will be completed mainly by southern labour and subcontractors with minimal opportunities for local and Indigenous employees and companies, or requires no labour (leave in place options).

Table B-3: Non-Hazardous Waste Remedial Option Weighting (Buried Infrastructure)

		Method Ranking				Weighted Alternative Score			
Screening Criteria	**Factor Weighting**	**Leave In Place**	**Partial Excavation and Dispose**	**Excavation and Dispose**	**Regrading**	**Leave in Place**	**Partial Excavation and Dispose**	**Excavation and Dispose**	**Regrading**
Cost	0.3	3	2	1	3	0.9	0.6	0.3	0.9
Effectiveness	0.2	1	3	3	2	0.2	0.6	0.6	0.4
Ease of Implementation and Timeliness	0.15	3	2	2	3	0.45	0.3	0.3	0.45
Indigenous Participation	0.35	1	3	3	3	0.35	1.05	1.05	1.05
					Total Weighted Score:	1.9	2.55	2.25	2.8

Scoring Notes:

	3	**2**		1
Cost Effectiveness	Cost for this option is less than 70% of the most expensive option.	Cost for this option is between 70% and 99% of the most expensive option.		Most expensive option
Effectiveness	Completely eliminates the risk to receptors, fully removes source of contamination or exposure pathway. Aesthetics of Site are similar to pre-disturbance conditions.	Reduces risk to receptors. Reduces or contains source of contamination. Aesthetics of Site are \moderately improved.		Does not reduce risks. Sources of contamination remain in place. Aesthetics of Site remain the same.
Ease of Implementation and Timeliness	Can be completed well within the estimated time frame of the project, may shorten overall schedule. Will require minimal material imported to Site.	Can be completed within the estimated time frame of the project. Will require moderate effort and/or material imported to Site.		Could impact overall project schedule, will be on the critical path. Requires most material to be imported to Site or requires or may require permission by other agencies.
Indigenous Participation	This remedial option maximizes local and Indigenous employment and subcontracting opportunities.	This remedial option will include some local and Indigenous employment and subcontracting opportunities but a significant portion of the work will be completed by southern companies and subcontractors.		This remedial option will be completed mainly by southern labour and subcontractors with minimal opportunities for local and Indigenous employees and companies, or requires no labour (leave in place options).

Table B-4: Non-Hazardous Waste Remedial Option Weighting (Stained Surficial Soil)

		Method Ranking						Weighted Alternative Score					
Screening Criteria	**Factor Weighting**	**Leave In Place**	**On-Site NHW Facility**	**Disposal Off-Site in Coral Harbour**	**Disposal Off-Site in South**	**Cover**	**Scarification**	**Leave in Place**	**On-Site NHW Facility**	**Disposal Off-Site in Coral Harbour**	**Disposal Off-Site in South**	**Cover**	**Scarification**
Cost	0.3	3	2	2	1	3	3	0.9	0.6	0.6	0.3	0.9	0.9
Effectiveness	0.2	1	3	3	3	1	1	0.2	0.6	0.6	0.6	0.2	0.2
Ease of Implementation and Timeliness	0.15	3	2	2	1	2	2	0.45	0.3	0.3	0.15	0.3	0.3
Indigenous Participation	0.35	1	3	2	2	2	2	0.35	1.05	0.7	0.7	0.7	0.7
							Total Weighted Score:	1.9	2.55	2.2	1.75	2.1	2.1

Scoring Notes:

	3	**2**	1
Cost Effectiveness	Cost for this option is less than 70% of the most expensive option.	Cost for this option is between 70% and 99% of the most expensive option.	Most expensive option
Effectiveness	Completely eliminates the risk to receptors, fully removes source of contamination or exposure pathway. Aesthetics of Site are similar to pre-disturbance conditions.	Reduces risk to receptors. Reduces or contains source of contamination. Aesthetics of Site are moderately improved.	Does not reduce risks. Sources of contamination remain in place. Aesthetics of Site remain the same.
Ease of Implementation and Timeliness	Can be completed well within the estimated time frame of the project, may shorten overall schedule. Will require minimal material imported to Site.	Can be completed within the estimated time frame of the project. Will require moderate effort and/or material imported to Site.	Could impact overall project schedule, will be on the critical path. Requires most material to be imported to Site or requires or may require permission by other agencies.
Indigenous Participation	This remedial option maximizes local and Indigenous employment and subcontracting opportunities.	This remedial option will include some local and Indigenous employment and subcontracting opportunities but a significant portion of the work will be completed by southern companies and subcontractors.	This remedial option will be completed mainly by southern labour and subcontractors with minimal opportunities for local and Indigenous employees and companies, or requires no labour (leave in place options).

APPENDIX C

PHC Soil Screening Tables

TABLE C-1
Summary of AEC 1 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 1 - Tar Barrels													
Sample ID			KW005-SS-001	KW005-SS-002	KW005-SS-003	KW005-SS-004	KW005-SS-005	01-SO-2020-023	01-SO-2020-024	01-SO-2020-997	01-SO-2020-025	01-SO-2020-026	01-SO-2020-027	01-SO-2020-028	01-SO-2020-029	01-SO-2020-030
Sample Date			31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20
Sample Depth (m)			0.2	0.0	0.05	0.2	0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Sampling Company			WESA	WESA	WESA	WESA	WESA	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			PARA	PARA	PARA	PARA	PARA	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order			1137099	1137099	1137099	1137099	1137099	YI1030	YI1031	YI1038	YI1032	YI1033	YI1034	YI1035	YI1036	YI1037
Laboratory Sample ID		CCME	1137099-01	1137099-02	1137099-03	1137099-04	1137099-05	YI1030	YI1031	YI1038	YI1032	YI1033	YI1034	YI1035	YI1036	YI1037
Sample Type	**Units**	**CWS**		Tar						BFD						
BTEX and Petroleum Hydrocarbons																
Benzene	mg/kg	n/v	<0.002	<0.02	<0.002	<0.002	<0.002	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.025 EC
Toluene	mg/kg	n/v	<0.002	1.2	<0.002	<0.002	<0.002	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.12 EC
Ethylbenzene	mg/kg	n/v	<0.002	1.8	<0.002	<0.002	<0.002	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050 EC
Xylene, m & p-	mg/kg	n/v	<0.002	9.9	<0.002	<0.002	<0.002	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.20 EC
Xylene, o-	mg/kg	n/v	<0.002	7	<0.002	<0.002	<0.002	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.099 EC
Xylenes, Total	mg/kg	n/v	<0.002	16.9	<0.002	<0.002	<0.002	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.22
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	696	<10	<10	12	<10	<10	<10	<10	<10	<10	<10	<10	<24
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	785	34	<10	<10	<10	<10	<10	<10	<10	<10	<10	11	54
PHC F3 (>C16-C34 range)	mg/kg	23,000	<10	2,690	93	<10	276	64	<50	<50	<50	<50	77	59	140	1,100
PHC F4 (>C34-C50 range)	mg/kg	n/v	<10	14,900	374	<10	1,110	180	<50	<50	<50	<50	230	180	67	370
Chromatogram to baseline at nC50	mg/kg	n/v	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	17,590	467	-	1,386	244	-	-	-	-	307	239	207	1,470
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	4,171	132	-	293	74	-	-	-	-	87	69	156	1,166
Total TPH Concentration	mg/kg	n/v	-	19,071	506	-	1,403	254	-	-	-	-	317	249	223	1,536
(Type A/Total TPH)*100	%	n/v	-	92%	92%	-	99%	96%	-	-	-	-	97%	96%	93%	96%
F2<F4 (Y/N)			-	Y	Y	-	Y	Y	-	-	-	-	Y	Y	Y	Y
Hydrocarbon Type:			-	A	A	-	A	A	-	-	-	-	A	A	A	A

Notes:

CCME	Canadian Council of Ministers of the Environment
CWS	CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2008) - commercial land use, coarse-grained surface soil, Tier 1 (revised Jan 2008, Table 3), Direct Contact (Ingestion + Dermal Contact)
6.5	Concentration exceeds the CWS
15	Concentration was detected but did not exceed the CWS
< 0.50	Laboratory's Reportable Detection Limit (RDL) exceeded standard. Right justified in cell for improved readability.
< 0.03	The analyte was not detected above the laboratory's RDL. Right justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
BFD	Blind field duplicate
[1]	Refer to Section 6.2.4; conducted following Abandonded Military Site Remediation Protocol (AMSRP) guidance (INAC, 2009)

TABLE C-2
Summary of AEC 2 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 2 - Full Barrels															
Sample ID			KW005-SS-006	KW005-SS-007	KW005-SS-008	KW005-SS-009	KW005-SS-010	KW005-SS-011	KW005-SS-012	KW005-SS-013	02-SO-2020-009	02-SO-2020-010	02-SO-2020-011B	02-SO-2020-012	02-SO-2020-013	02-SO-2020-014	02-SO-2020-015	02-SO-2020-998
Sample Date			31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	15-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20
Sample Depth (m)			0.15	0.05	0.10	0.15	0.15	0.15	0.1	0.00	0.0 - 0.25	0.25 - 0.5	0.1 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25
Sampling Company			WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order			1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	YI1009	YI1010	YI1011	YI1012	YI1013	YI1014	YI1015	YI1026
Laboratory Sample ID		CCME	1137099-06	1137099-07	1137099-08	1137099-09	1137099-10	1137099-11	1137099-12	1137099-13	YI1009	YI1010	YI1011	YI1012	YI1013	YI1014	YI1015	YI1026
Sample Type	**Units**	**CWS**						BFD										BFD
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.002	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.002	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.002	0.5	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.002	2.9	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.002	1.6	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.002	4.5	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	79	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	3,750	1,810	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	3,650	14,900	8,510	7,860	4,490	4,310	1,900	7,980	150	<50	<50	<50	<50	<50	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	5,230	470	<10	2,690	8,720	9,330	7,300	25,100	<50	<50	<50	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	-	-	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	8,880	15,370	8,515	10,550	13,210	13,640	9,200	33,080	175	-	-	-	-	-	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	3,660	18,729	10,325	7,870	4,500	4,320	1,910	8,035	160	-	-	-	-	-	-	-
Total TPH Concentration	mg/kg	n/v	8,890	19,199	10,330	10,560	13,220	13,650	9,210	33,135	185	-	-	-	-	-	-	-
(Type A/Total TPH)*100	%	n/v	100%	80%	82%	100%	100%	100%	100%	100%	95%	-	-	-	-	-	-	-
F2<F4 (Y/N)			Y	N	N	Y	Y	Y	Y	Y	n/a	-	-	-	-	-	-	-
		Hydrocarbon Type:	A	B	B	A	A	A	A	A	-	-	-	-	-	-	-	-

See Notes on next page

TABLE C-2
Summary of AEC 2 Soil Analytical Results - BTEX-PH(
Coral Harbour Updated Remedial Action Plan, Coral H
PSPC
Stantec Project No. 121417087

			AEC 2 - Full Barrels								
Sample ID			02-SO-2020-016	02-SO-2020-017	02-SO-2020-018	02-SO-2020-019	02-SO-2020-020	02-SO-2020-021	02-SO-2020-022	02-SO-2020-BG1	02-SO-2020-BG2
Sample Date			16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20	16-Aug-20
Sample Depth (m)			0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.0 - 0.25	0.5 - 1.0	0.65 - 1.0	0.5 - 1.0	0.0 - 0.25	0.0 - 0.25
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order			YI1016	YI1017	YI1018	YI1022	YI1023	YI1024	YI1025	YI1027	YI1028
Laboratory Sample ID		CCME	YI1016	YI1017	YI1018	YI1022	YI1023	YI1024	YI1025	YI1027	YI1028
Sample Type	**Units**	**CWS**								BG	BG
BTEX and Petroleum Hydrocarbons											
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	23	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	29	<10	5,500	36	13	<10	27	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	1,900	<50	2,800	2,900	<50	<50	<50	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	3,900	<50	430	1,100	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]											
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	5,800	-	3,230	4,000	50	-	50	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	1,934	-	8,305	2,941	43	-	75	-	-
Total TPH Concentration	mg/kg	n/v	5,834	-	8,735	4,041	68	-	100	-	-
(Type A/Total TPH)*100	%	n/v	99%	-	37%	99%	74%	-	50%	-	-
F2<F4 (Y/N)			Y	-	N	Y	N	-	N	-	-
		Hydrocarbon Type:	A	-	B	A	B	-	B	-	-

Notes:

CCME	Canadian Council of Ministers of the Environment
CWS	CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2008) - commercial land use, coarse-grained surface soil, Tier 1 (revised Jan 2008, Table 3), Direct Contact (Ingestion + Dermal Contact)
6.5	Concentration exceeds the CWS
15	Concentration was detected but did not exceed the CWS
< 0.50	Laboratory's Reportable Detection Limit (RDL) exceeded standard. Right justified in cell for improved readability.
< 0.03	The analyte was not detected above the laboratory's RDL. Right justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
BFD	Blind field duplicate. BG Background sample
[1]	Refer to Section 6.2.4; conducted following Abandonded Military Site Remediation Protocol (AMSRP) guidance (INAC, 2009)

TABLE C-3
Summary of AEC 3 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 3 - Barrel Cache															
Sample ID			KW005-SS-015	KW005-SS-016	KW005-SS-017	KW005-SS-018	KW005-SS-019	KW005-SS-020	KW005-SS-021	KW005-SS-022	17-SED-01* @0-30	17-SED-02* @0-30	17-SED-03* @0-30	17-SED-04* @0-30	17-SED-05* @0-30	17-SED-05* @0-30	17-SED-10* @0-30	17-TP-01 @0-50
Sample Date			31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	28-Aug-17	28-Aug-17	28-Aug-17	28-Aug-17	28-Aug-17	28-Aug-17	28-Aug-17	29-Aug-17
Sample Depth (m)			0.05	0.15	0.1	0.05	0.05	0.2	0.2	0.15	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.5
Sampling Company			WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order			1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	B775098	B775098	B775098	B775098	B775098	B775098	B775098	B775102
Laboratory Sample ID		CCME	1137099-14	1137099-15	1137099-16	1137099-17	1137099-18	1137099-19	1137099-20	1137099-21	RW3944	RW3945	RW3946	RW3947	RW3948	RW3948	RW3953	RW3959
Sample Type	**Units**	**CWS**							BFD							BFD		
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	487	<10	91	89	287	<10	<10	<10	12	<10	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	**25,400**	18	8,050	11,200	332	1,070	964	<10	990	95	51	<50	<50	<50	150	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	23,600	13	5,170	10,200	<10	770	649	<10	350	<50	<50	<50	<50	<50	120	<50
Chromatogram to baseline at nC50	mg/kg	n/v	-	-	-	-	-	-	-	-	YES	YES	YES	YES	YES	YES	YES	YES
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	49,000	31	13,220	21,400	337	1,840	1,613	-	1,340	120	76	-	-	-	270	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	25,892	28	8,146	11,294	624	1,080	974	-	1,007	105	61	-	-	-	160	-
Total TPH Concentration	mg/kg	n/v	49,492	41	13,316	21,494	629	1,850	1,623	-	1,357	130	86	-	-	-	280	-
(Type A/Total TPH)*100	%	n/v	99%	76%	99%	100%	54%	99%	99%	-	99%	92%	88%	-	-	-	96%	-
F2<F4 (Y/N)			Y	Y	Y	Y	N	Y	Y	-	Y	Y	Y	-	-	-	Y	-
		Hydrocarbon Type:	A	B	A	A	B	A	A	-	A	A	A	-	-	-	A	-

See Notes on last page

TABLE C-3
Summary of AEC 3 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harl
PSPC
Stantec Project No. 121417087

			AEC 3 - Barrel Cache															
Sample ID			17-TP-01 @50-100	17-TP-02@0-50	17-TP-02@50-100	17-TP-03 @0-50	17-TP-03 @50-100	17-TP-04 @0-50	17-TP-04 @50-100	17-TP-05 @0-50	17-TP-05 @75-125	17-TP-06@0-50	17-TP-06@50-80	17-TP-06 @80-150	17-TP-07 @0-50	17-TP-07 @130-180	17-TP-08 @0-50	17-TP-08 @50-100
Sample Date			29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	29-Aug-17	30-Aug-17	30-Aug-17
Sample Depth (m)			0.5 - 1.0	0 - 0.5	0.5 - 1.0	0 - 0.5	0.5 - 1.0	0 - 0.5	0.5 - 1.0	0 - 0.5	0.75 - 1.25	0 - 0.5	0.5 - 0.80	0.8 - 1.5	0 - 0.5	1.3 - 1.8	0 - 0.5	0.5 - 1.0
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order			B775102	B775102	B775102	B775102	B775102	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429
Laboratory Sample ID		CCME	RW3960	RW3961	RW3962	RW3963	RW3964	RX2440	RX2441	RX2442	RX2443	RX2444	RX2445	RX2446	RX2447	RX2448	RX2449	RX2450
Sample Type	**Units**	**CWS**																
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.016	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	0.45	0.054	0.34	0.22	0.15	0.035	0.53	0.51	<0.020	0.26	<0.020
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.064	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.39	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.28	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.67	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	37	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	4,700	29	130	<10	<10	<10	14
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	<50	<50	<50	<50	130	<50	<50	<50	22,000	170	630	<50	<50	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50	<50	<50	<50	<50	440	<50	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	-	-	-	-	155	-	-	-	22,440	195	655	-	-	-	50
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	-	-	-	-	140	-	-	-	26,737	204	765	-	-	-	44
Total TPH Concentration	mg/kg	n/v	-	-	-	-	-	165	-	-	-	27,177	229	790	-	-	-	69
(Type A/Total TPH)*100	%	n/v	-	-	-	-	-	94%	-	-	-	83%	85%	83%	-	-	-	72%
F2<F4 (Y/N)			-	-	-	-	-	Y	-	-	-	N	N	N	-	-	-	N
		Hydrocarbon Type:	-	-	-	-	-	A	-	-	-	B	B	B	-	-	-	B

See Notes on last page

TABLE C-3
Summary of AEC 3 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harl
PSPC
Stantec Project No. 121417087

			AEC 3 - Barrel Cache														
Sample ID			17-TP-09 @0-50	17-TP-09 @50-100	17-TP-10 @0-50	17-TP-10 @50-100	17-TP-11 @0-50	17-TP-11@50-100	17-TP-12 @0-50	17-TP-12 @50-100	17-TP-13 @30-160	DUP-02	17-TP-13 @160-200	17-TP-14 @70-100	DUP-03	17-TP-14 @110-130	17-TP-15 @0-150	17-TP-15 @150-220
Sample Date			30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17	30-Aug-17
Sample Depth (m)			0 - 0.5	0.5 - 1.0	0 - 0.5	0.5 - 1.0	0 - 0.5	0.5 - 1.0	0 - 0.5	0.5 - 1.0	0.3 - 1.6	0.3 - 1.6	1.6 - 2.0	0.7 - 1.0	0.7 - 1.0	1.1 - 1.3	0 - 1.5	1.5 - 2.2
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order			B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429
Laboratory Sample ID		CCME	RX2451	RX2452	RX2453	RX2454	RX2455	RX2456	RX2457	RX2458	RX2459	RX2480	RX2460	RX2461	RX2481	RX2462	RX2463	RX2464
Sample Type	**Units**	**CWS**										BFD			BFD			
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	0.081	<0.020	<0.020	<0.020	0.046	<0.020	4.3	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	20	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	76	270	<50	<50	<50	<50	<50	150	350	72	56	180	<50	<50	84
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	120	<50	<50	53	<50	<50	<50	140	<50	<50	52	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	101	390	-	-	78	-	-	175	490	97	81	232	-	-	109
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	86	343	-	-	35	-	-	160	360	82	66	190	-	-	94
Total TPH Concentration	mg/kg	n/v	-	111	463	-	-	88	-	-	185	500	107	91	242	-	-	119
(Type A/Total TPH)*100	%	n/v	-	91%	84%	-	-	89%	-	-	95%	98%	91%	89%	96%	-	-	92%
F2<F4 (Y/N)			-	Y	Y	-	-	Y	-	-	Y	Y	Y	Y	Y	-	-	Y
		Hydrocarbon Type:	-	A	A	-	-	A	-	-	A	A	A	A	A	-	-	A

See Notes on last page

TABLE C-3
Summary of AEC 3 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harl
PSPC
Stantec Project No. 121417087

			AEC 3 - Barrel Cache														
Sample ID			17-TP-16 @0-40	17-TP-16 @50-100	17-TP-17 @0-25	17-TP-17 @100-120	17-TP-18@20-60	17-TP-18 @100-130	17-TP-19 @0-30	17-TP-19 @100-150	17-TP-20 @0-50	17-TP-20 @50-100	17-TP-21 @0-50	17-TP-21 @100-150	17-TP-22 @0-50	17-TP-22 @50-100	03-SO-20 20-001
Sample Date			31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	31-Aug-17	15-Aug-20
Sample Depth (m)			0 - 0.4	0.5 - 1.0	0 - 0.25	1.0-1.2	0.2 - 0.6	1.1 - 1.3	0 - 0.3	1.0 - 1.5	0 - 0.5	0.5 - 1.0	0 - 0.5	1.0 - 1.5	0 - 0.5	0.5 - 1.0	0.4 - 0.5
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	BV LABS
Laboratory Work Order			B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	B776429	YI0994
Laboratory Sample ID		CCME	RX2465	RX2466	RX2467	RX2469	RX2470	RX2471	RX2472	RX2473	RX2474	RX2475	RX2476	RX2477	RX2478	RX2479	YI0994
Sample Type	**Units**	**CWS**															
BTEX and Petroleum Hydrocarbons																	
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.058	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.058	<0.040	<0.040	<0.040	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	200	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	<10	<10	<10	130	<10	<10	<10	<10	96	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	69	66	<50	<50	180	330	<50	<50	56	<50	1,600	<50	<50	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	130	190	<50	<50	<50	<50	1,500	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Yes
AMSRP Hydrocarbon Type Determination [1]																	
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	94	91	-	-	310	520	-	-	81	-	3,100	-	-	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	79	76	-	-	190	465	-	-	66	-	1,896	-	-	-	-
Total TPH Concentration	mg/kg	n/v	104	101	-	-	320	655	-	-	91	-	3,396	-	-	-	-
(Type A/Total TPH)*100	%	n/v	90%	90%	-	-	97%	79%	-	-	89%	-	91%	-	-	-	-
F2<F4 (Y/N)			Y	Y	-	-	Y	Y	-	-	Y	-	Y	-	-	-	-
		Hydrocarbon Type:	A	A	-	-	A	A	-	-	A	-	A	-	-	-	-

See Notes on last page

TABLE C-3
Summary of AEC 3 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harl
PSPC
Stantec Project No. 121417087

			AEC 3 - Barrel Cache							
Sample ID			03-SO-2020-002	03-SO-2020-003	03-SO-2020-004	03-SO-2020-005	03-SO-2020-006	03-SO-2020-007	03-SO-2020-999	03-SO-2020-008
Sample Date			15-Aug-20	15-Aug-20	15-Aug-20	15-Aug-20	15-Aug-20	15-Aug-20	15-Aug-20	15-Aug-20
Sample Depth (m)			0.4 - 0.5	0.4 - 0.5	1.0 - 1.5	1.0 - 1.8	0.05 - 0.5	0.05 - 0.5	0.05 - 0.5	0.05 - 0.5
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order			YI0995	YI0996	YI0997	YI0998	YI0999	YI1000	YI1002	YI1001
Laboratory Sample ID		CCME	YI0995	YI0996	YI0997	YI0998	YI0999	YI1000	YI1002	YI1001
Sample Type	**Units**	**CWS**							BFD	
BTEX and Petroleum Hydrocarbons										
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	<50	<50	<50	<50	140	220	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50	87	140	<50
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]										
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	-	-	-	-	227	360	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	-	-	-	-	150	230	-
Total TPH Concentration	mg/kg	n/v	-	-	-	-	-	237	370	-
(Type A/Total TPH)*100	%	n/v	-	-	-	-	-	96%	97%	-
F2<F4 (Y/N)			-	-	-	-	-	Y	Y	-
Hydrocarbon Type:			-	-	-	-	-	A	A	-

Notes:

CCME	Canadian Council of Ministers of the Environment
CWS	CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2008) - commercial land use, coarse-grained surface soil, Tier 1 (revised Jan 2008, Table 3), Direct Contact (Ingestion + Dermal Contact)
6.5	Concentration exceeds the CWS
15	Concentration was detected but did not exceed the CWS
< 0.50	Laboratory's Reportable Detection Limit (RDL) exceeded standard. Right justified in cell for improved readability.
< 0.03	The analyte was not detected above the laboratory's RDL. Right justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
BFD	Blind field duplicate.
*	It was concluded that these locations appeared to support terrestrial habitat and were reclassified as soil samples
[1]	Refer to Section 6.2.4; conducted following Abandonded Military Site Remediation Protocol (AMSRP) guidance (INAC, 2009)

TABLE C-4
Summary of AEC 4 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 4 - Former Army Base														
Sample ID			KW005-SS-023	KW005-SS-024	KW005-SS-025	KW005-SS-030	KW005-SS-031	KW005-SS-032	KW005-SS-033	KW005-SS-034	KW005-SS-035	KW005-SS-036	KW005-SS-037	KW005-SS-038	KW005-SS-039	KW005-SS-040	04-SO-2020-054	04-SO-2020-055
Sample Date			1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	1-Sep-11	19-Aug-20	19-Aug-20
Sample Depth (m)			0.2	0.2	0.15	0.25	0.25	0.3	0.15	0.1	0.25	0.05	0.15	0.2	0.15	0.15	0.0 - 0.2	0.0 - 0.25
Sampling Company			WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	WESA	STANTEC	STANTEC
Laboratory			PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	PARA	BV LABS	BV LABS
Laboratory Work Order			1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099	1137099		
Laboratory Sample ID		CCME	1137099-22	1137099-23	1137099-24	1137099-26	1137099-27	1137099-28	1137099-29	1137099-30	1137099-31	1137099-32	1137099-33	1137099-34	1137099-35	1137099-36	YI1087	YI1088
Sample Type	**Units**	**CWS**					BFD									BFD		
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	137	<10	259	240	<10	<10	<10	<10	<10	<10	800	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	<10	153	<10	44	38	<10	<10	9,130	<10	1,460	6,420	19,900	<10	<10	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	<10	<10	<10	<10	<10	<10	<10	923	<10	346	4,360	2,030	<10	<10	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	158	-	49	43	-	-	10,053	-	1,806	10,780	21,930	-	-	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	295	-	308	283	-	-	9,140	-	1,470	6,430	20,705	-	-	-	-
Total TPH Concentration	mg/kg	n/v	-	300	-	313	288	-	-	10,063	-	1,816	10,790	22,735	-	-	-	-
(Type A/Total TPH)*100	%	n/v	-	53%	-	16%	15%	-	-	100%	-	99%	100%	96%	-	-	-	-
F2<F4 (Y/N)			-	N	-	N	N	-	-	Y	-	Y	Y	Y	-	-	-	-
		Hydrocarbon Type:	-	B	-	B	B	-	-	A	-	A	A	A	-	-	-	-

See Notes on last page

TABLE C-4
Summary of AEC 4 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Ha
PSPC
Stantec Project No. 121417087

			AEC 4 - Former Army Base									
Sample ID			04-SO-2020-056	04-SO-2020-057	04-SO-2020-058	04-SO-2020-059	04-SO-2020-993	04-SO-2020-060	04-SO-2020-061	04-SO-2020-992	04-SO-2020-062	04-SO-2020-063
Sample Date			19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20
Sample Depth (m)			0.0 - 0.2	0.0 - 0.25	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.5	0.0 - 0.2
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order												
Laboratory Sample ID		**CCME**	**YI1089**	**YI1090**	**YI1091**	**YI1092**	**YI1132**	**YI1093**	**YI1094**	**YI1131**	**YI1095**	**YI1096**
Sample Type	**Units**	**CWS**					**BFD**			**BFD**		
BTEX and Petroleum Hydrocarbons												
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	<10	<10	<10	<10	<10	<10	300	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	<50	<50	<50	<50	<50	<50	<50	170	58
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50	<50	<50	<50	<50	160
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]												
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	-	-	-	-	-	-	-	195	218
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	-	-	-	-	-	-	-	475	68
Total TPH Concentration	mg/kg	n/v	-	-	-	-	-	-	-	-	500	228
(Type A/Total TPH)*100	%	n/v	-	-	-	-	-	-	-	-	39%	96%
F2<F4 (Y/N)			-	-	-	-	-	-	-	-	N	Y
		Hydrocarbon Type:	-	-	-	-	-	-	-	-	B	A

See Notes on last page

TABLE C-4
Summary of AEC 4 Soil Analytical Results - BTEX-PHCs
Coral Harbour Updated Remedial Action Plan, Coral Ha
PSPC
Stantec Project No. 121417087

			AEC 4 - Former Army Base							
Sample ID			04-SO-2020-64	04-SO-2020-65	04-SO-2020-66	04-SO-2020-67	04-SO-2020-68	04-SO-2020-69	04-SO-2020-70	04-SO-2020-BG1
Sample Date			19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20
Sample Depth (m)			0.0 - 0.5	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.1 - 0.5	0.0 - 0.2	0.0 - 0.2
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Work Order										
Laboratory Sample ID		CCME	YI1124	YI1125	YI1126	YI1127	YI1128	YI1129	YI1130	YI1133
Sample Type	**Units**	**CWS**								BG
BTEX and Petroleum Hydrocarbons										
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	190	<10	<10	<10	<10	33	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	4,600	68	<50	2,100	<50	10,000	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	410	<50	<50	250	<50	610	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]										
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	5,010	93	-	2,350	-	10,610	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	4,795	78	-	2,110	-	10,038	-	-
Total TPH Concentration	mg/kg	n/v	5,205	103	-	2,360	-	10,648	-	-
(Type A/Total TPH)*100	%	n/v	96%	90%	-	100%	-	100%	-	-
F2<F4 (Y/N)			Y	Y	-	Y	-	Y	-	-
		Hydrocarbon Type:	A	A	-	A	-	A	-	-

Notes:

CCME	Canadian Council of Ministers of the Environment
CWS	CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2008) - commercial land use, coarse-grained surface soil, Tier 1 (revised Jan 2008, Table 3), Direct Contact (Ingestion + Dermal Contact)
6.5	Concentration exceeds the CWS
15	Concentration was detected but did not exceed the CWS
< 0.50	Laboratory's Reportable Detection Limit (RDL) exceeded standard. Right justified in cell for improved readability.
< 0.03	The analyte was not detected above the laboratory's RDL. Right justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
BFD	Blind field duplicate.
BG	Background sample
[1]	Refer to Section 6.2.4; conducted following Abandonded Military Site Remediation Protocol (AMSRP) guidance (INAC, 2009)

TABLE C-5
Summary of AEC 6 Soil Analytical Results - BTEX-PHCs
Coral Harbour Phase III ESA, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			APEC 6 - Former Airport Debris															
Sample ID			06-SO-2020-031	06-SO-2020-032	06-SO-2020-033	06-SO-2020-034	06-SO-2020-035	06-SO-2020-036	06-SO-2020-037	06-SO-2020-996	06-SO-2020-038	06-SO-2020-995	06-SO-2020-039	06-SO-2020-040	06-SO-2020-041	06-SO-2020-042	06-SO-2020-043	06-SO-2020-044
Sample Date			17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20
Sample Depth (m)			0.1 - 0.5	0.0 - 0.5	0.1 - 0.3	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0-0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.4	0.2 - 0.4	0.05 - 0.2	0.3 - 0.9	0.2 - 0.4	0.0 - 0.4
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Sample ID		CCME																
Sample Type	**Units**	**CWS**								BFD		BFD						
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	<10	3,400	<10	<10	<10	<10	10	170	160	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	<50	**40,000**	<50	62	<50	<50	<50	110	100	<50	<50	83	<50	<50	<50
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	460	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	-	40,460	-	87	-	-	50	135	125	-	-	108	-	-	-
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	-	40,010	-	72	-	-	40	285	265	-	-	93	-	-	-
Total TPH Concentration	mg/kg	n/v	-	-	40,470	-	97	-	-	65	310	290	-	-	118	-	-	-
(Type A/Total TPH)*100	%	n/v	-	-	100%	-	90%	-	-	77%	44%	43%	-	-	92%	-	-	-
F2<F4 (Y/N)			-	-	N	-	Y	-	-	Y	N	N	-	-	Y	-	-	-
Hydrocarbon Type:			-	-	B	-	-	-	-	-	B	B	-	-	A	-	-	-

See Notes on last page

TABLE C-5
Summary of AEC 6 Soil Analytical Results - BTEX-PHCs
Coral Harbour Phase III ESA, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			APEC 6 - Former Airport Debris														
Sample ID			06-SO-2020-045	06-SO-2020-046	06-SO-2020-047	06-SO-2020-048	06-SO-2020-049	06-SO-2020-050	06-SO-2020-051	06-SO-2020-994	06-SO-2020-052	06-SO-2020-053	06-SO-2020-BG1	06-SO-2021-23-002	06-SO-2021-24-002	06-SO-2021-25-002	06-SO-2021-26-002	06-SO-2021-27-004
Sample Date			17-Aug-20	18-Aug-20	17-Aug-20	17-Aug-20	18-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	17-Aug-20	18-Aug-20	18-Aug-20	31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21	30-Aug-21
Sample Depth (m)			0.0 - 0.2	0.5 - 0.8	0.0 - 0.5	0.5 - 0.8	0.5 - 1.0	0.2 - 0.5	0.0-0.5	0.0-0.5	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.5	0.5	0.5	0.4	1.5
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Sample ID		CCME												AFM344	AFM342	AFM379	AFM381	AFM339
Sample Type	**Units**	**CWS**								BFD			BG					
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	97	13	27	48	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	44
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	3,900	<10	2,700	2,400	610	1,800	1,400	22	23	<10	<10	<10	<10	<10	1,300
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	750	<50	530	360	3,400	1200	840	260	88	<50	<50	<50	<50	<50	340
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50	1,600	<50	<50	95	<50	<50	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	775	50	555	385	5,000	1,225	865	355	113	-	-	-	-	-	365
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	4,747	43	3,257	2,808	4,015	3,005	2,245	287	116	-	-	-	-	-	1,684
Total TPH Concentration	mg/kg	n/v	-	4,772	68	3,282	2,833	5,615	3,030	2,270	382	141	-	-	-	-	-	1,709
(Type A/Total TPH)*100	%	n/v	-	16%	74%	17%	14%	89%	40%	38%	93%	80%	-	-	-	-	-	21%
F2<F4 (Y/N)			-	N	Y	N	N	Y	N	N	Yes	N	-	-	-	-	-	N
Hydrocarbon Type:			-	B	B	B	B	A	B	B	A	B	-	-	-	-	-	B

See Notes on last page

TABLE C-5
Summary of AEC 6 Soil Analytical Results - BTEX-PHCs
Coral Harbour Phase III ESA, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 6 - Former Airport Debris															
Sample ID			06-SO-2021-28-005	06-SO-2021-29-005	06-SO-2021-30-003	06-SO-2021-31-003	06-SO-2021-32-003	06-SO-2021-36-004	06-SO-2021-36-006	06-SO-2021-37-005		06-SO-2021-37-006	06-SO-2021-38-002	06-SO-2021-39-003	06-SO-2021-39-005	06-SO-2021-40-002	06-SO-2021-40-005	
Sample Date			30-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21
Sample Depth (m)			2	1.6	1	1	1	1.5	2.5	2		2.5	0.6	1	2	0.5	2	
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS	BV LABS
Laboratory Sample ID		CCME	AFM341	AFM347	AFM348	AFM350	AFM390	AFM317	AFM318	AFM314	AFM315	AFM316	AFM313	AFM319	AFM320	AFM321	AFM322	AFM332
Sample Type	**Units**	**CWS**									BFD							BFD
BTEX and Petroleum Hydrocarbons																		
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	<0.010	<0.010	<0.010	0.82	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	0.017	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	<0.040	7.2	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.055	<0.040	<0.040
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	9.6	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	<0.045	17	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	0.055	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	19,000	<10	24	<10	<10	1,500	22	32	94	180	200	<10	51	27	200	170	130
PHC F2 (>C10-C16 range)	mg/kg	10,000	<10	1,900	<10	<10	9,900	1,100	1,400	250	2,200	3,700	190	530	960	4,300	4,500	6,700
PHC F3 (>C16-C34 range)	mg/kg	23,000	<50	270	<50	<50	1,400	250	290	59	300	400	390	170	320	1,600	1,300	2,600
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	65	<50	<50	<50	<50	71
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]																		
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	-	295	-	-	1,425	275	315	84	325	425	455	195	345	1,625	1,325	2,671
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	-	2,194	-	-	12,800	1,372	1,722	403	2,680	4,300	585	751	1,307	6,100	5,970	9,430
Total TPH Concentration	mg/kg	n/v	-	2,219	-	-	12,825	1,397	1,747	428	2,705	4,325	650	776	1,332	6,125	5,995	9,501
(Type A/Total TPH)*100	%	n/v	-	13%	-	-	11%	20%	18%	20%	12%	10%	70%	25%	26%	27%	22%	28%
F2<F4 (Y/N)			-	N	-	-	N	N	N	N	N	N	N	N	N	N	N	N
Hydrocarbon Type:			-	B	-	-	B	B	B	B	B	B	B	B	B	B	B	B

See Notes on last page

TABLE C-5
Summary of AEC 6 Soil Analytical Results - BTEX-PHCs
Coral Harbour Phase III ESA, Coral Harbour, NU
PSPC
Stantec Project No. 121417087

			AEC 6 - Former Airport Debris				
Sample ID			**06-SO-2021-41-004**	**06-SO-2021-42-004**	**06-SO-2021-42-005**	**06-SO-2021-43-003**	**06-SO-2021-43-005**
Sample Date			**30-Aug-21**	**30-Aug-21**	**30-Aug-21**	**30-Aug-21**	**30-Aug-21**
Sample Depth (m)			**1.5**	**1.5**	**2**	**1**	**2**
Sampling Company			**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**
Laboratory			**BV LABS**	**BV LABS**	**BV LABS**	**BV LABS**	**BV LABS**
Laboratory Sample ID		**CCME**	**AFM333**	**AFM334**	**AFM335**	**AFM336**	**AFM337**
Sample Type	**Units**	**CWS**					
BTEX and Petroleum Hydrocarbons							
Benzene	mg/kg	n/v	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	n/v	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	mg/kg	n/v	<0.010	0.025	<0.010	0.016	0.46
Xylene, m & p-	mg/kg	n/v	<0.040	<0.040	<0.040	0.13	0.97
Xylene, o-	mg/kg	n/v	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	mg/kg	n/v	<0.045	<0.045	<0.045	0.13	0.97
PHC F1 (C6-C10 range)	mg/kg	19,000	140	130	93	140	570
PHC F2 (>C10-C16 range)	mg/kg	10,000	2,000	2,600	2,900	4,700	7,000
PHC F3 (>C16-C34 range)	mg/kg	23,000	530	540	750	700	1,000
PHC F4 (>C34-C50 range)	mg/kg	n/v	<50	<50	<50	<50	<50
Chromatogram to baseline at nC50	mg/kg	n/v	Yes	Yes	Yes	Yes	Yes
AMSRP Hydrocarbon Type Determination [1]							
Type A Hydrocarbons (F3 + F4)	mg/kg	n/v	555	565	775	725	1,025
Type B Hydrocarbons (F1 + F2+ F3)	mg/kg	n/v	2,670	3,270	3,743	5,540	8,570
Total TPH Concentration	mg/kg	n/v	2,695	3,295	3,768	5,565	8,595
(Type A/Total TPH)*100	%	n/v	21%	17%	21%	13%	12%
F2<F4 (Y/N)			N	N	N	N	N
Hydrocarbon Type:			B	B	B	B	B

Notes:

CCME	Canadian Council of Ministers of the Environment
CWS	CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2008) - commercial land use, coarse-grained surface soil, Tier 1 (revised Jan 2008, Table 3), Direct Contact (Ingestion + Dermal Contact)
6.5	Concentration exceeds the CWS
15	Concentration was detected but did not exceed the CWS
< 0.50	Laboratory's Reportable Detection Limit (RDL) exceeded standard. Right justified in cell for improved readability.
< 0.03	The analyte was not detected above the laboratory's RDL. Right justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
BFD	Blind field duplicate.
BG	Background sample
[1]	Refer to Section 6.2.4; conducted following Abandonded Military Site Remediation Protocol (AMSRP) guidance (INAC, 2009)