Remedial Options Analysis and Remedial Action Plan, Coral Harbour Fossil Creek Bridge Decommissioning and Remediation

Final Report

Prepared for:

Public Services and Procurement Canada for Crown-Indigenous Relations and Northern Affairs Canada

Prepared by:

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NUNAMI
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Limitations and Sign-off

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Executive Summary

Nunami Stantec Ltd. (Nunami Stantec) was retained by Public Services and Procurement Canada (PSPC) on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to prepare a Remedial Options Analysis (ROA) and a Remedial Action Plan (RAP) for the decommissioning and remediation of the Fossil Creek Bridge Community Identified Additional Area located near the Hamlet of Coral Harbour, Nunavut (NU) (the Site).

The Fossil Creek Bridge is located approximately 400 metres (m) west of Coral Harbour Airport Road and consists of the remnants of a bridge structure reported to have been built in the 1950-60s to transport military vehicles over Fossil Creek. The bridge infrastructure consists of two timber abutments, one each located on the eastern and western creek banks, and a central pier located in the middle of Fossil Creek. Previous investigations have identified approximately 81.5 cubic metres (m^3) of contaminated soil, 23.8 m^3 of hazardous waste (i.e., creosote-treated timbers and treated wood debris), and 14.7 m^3 of non-hazardous waste (i.e., central pier infrastructure and surface, partially buried and buried debris) at the Site that requires remediation.

The objective of the ROA and RAP is to identify remedial activities that will be undertaken to address environmental impacts in soil and remove hazardous and non-hazardous materials. This ROA and RAP has been developed to meet the following overall project remedial objectives as indicated by PSPC and CIRNAC:

- Minimize health and environmental impacts to humans or local ecosystems at the Site
- Reduce federal liabilities
- Bring benefits to Northerners and northern businesses
- Execute the Project in accordance with Government of Canada policies
- Comply with legal obligations

A remedial options analysis (ROA) was completed to evaluate potential remedial options for the Fossil Creek Bridge infrastructure, associated contaminated soil, and miscellaneous hazardous and non-hazardous debris identified at the Site. A variety of potential remedial options were evaluated that considered their effectiveness relative to the site-specific conditions and overall project objectives. Consideration of factors such as technical practicability, duration, feasibility, and documented success for remediation/risk management of the contaminants of concern identified at the Site were initially reviewed. From this preliminary review, and based on discussions with PSPC and CIRNAC, the following four remedial options (ROs) were carried forward for evaluation in this ROA:

- RO1: Leave existing infrastructure, debris, and contaminated soil in place.
- RO2: Remove visible infrastructure above ground surface (i.e., central pier and visible above ground timbers on the eastern and western abutments), while buried infrastructure, debris, and contaminated soil remains in place.

- RO3: Full removal of bridge infrastructure (i.e., central pier, visible above ground timbers on the eastern and western abutments, buried timbers within the eastern and western abutments), and debris, while leaving contaminated soil in place.
- RO4: Full removal of bridge infrastructure, debris, and contaminated soil.

Each of the four ROs were evaluated against the following weighted criteria as provided by CIRNAC:

- Effectiveness (25%)
- Execution Risk (20%)
- Environmental Impacts (10%)
- Socio-Economic Impacts (25%)
- Regulatory (10%)
- Cost (10%)

Based on the results of the ROA, RO4 – Full Removal of Bridge Infrastructure (Including the Debris and Contaminated Soil) – had the highest total score and is therefore the recommended approach for remediation of the Fossil Creek Bridge. Following discussions with Canada, RO4 is the recommended remedial option for implementation at the Site.

The RAP provides a detailed review of the selected remedial options and describes disposal methods for each category/component of waste. A summary of the recommended remedial approaches is provided in Table 1.

Table ES-1 Summary of Proposed Remedial Approaches

Waste Category	Estimated In-situ Volume (m^3)	Recommended Remedial Approach
Contaminated Soil, including Mixed Hardened Tar/Rock Material	81.5	To be excavated, bagged, and disposed of at a licensed contaminated soil disposal facility in southern Canada.
Hazardous Waste (creosote-treated timbers, treated-wood debris)	23.8	To be fully removed, including both the above ground and buried portions of timbers, packaged, and disposed of at a licensed hazardous waste disposal facility in southern Canada.
Non-Hazardous Waste (central pier infrastructure, surface, partially buried, and buried debris)	14.7	To be excavated and/or collected, packaged, and disposed of at licensed disposal facility in southern Canada.

CIRNAC has indicated that remediation should be completed prior to the end of fiscal year 2026/2027. Based on the northern location and on previous remediation experience on the Site, it is assumed that active remediation will be completed in the summer of 2026 (i.e., June – September).

The statements made in this Executive Summary text are subject to the limitations included in Section 8 and are to be read in conjunction with the remainder of this report.

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Abbreviations

AEC ..... Area of Environmental Concern
AHJ ..... Authorities Having Jurisdiction
AMSRP ..... Abandoned Military Site Remediation Protocol
CCME ..... Canadian Council of Ministers of the Environment
CWS ..... Canada-Wide Standards
CIAA ..... Community Identified Additional Area
CIRNAC ..... Crown-Indigenous Relations and Northern Affairs Canada
COC ..... Contaminant of Concern
DEW ..... Distant Early Warning
DFO ..... Fisheries and Oceans Canada
DMF ..... Decision-Making Framework
ECCC ..... Environmental and Climate Change Canada
FCSAP ..... Federal Contaminated Sites Action Plan
FY ..... Fiscal Year
HHERE ..... Human Health and Ecological Risk Evaluation
km ..... kilometre
LTM ..... Long-Term Monitoring
LTMP ..... Long-Term Monitoring Plan
m ..... metre
mm ..... millimetres
m^3 ..... cubic metres
NU ..... Nunavut
PSPC ..... Public Services and Procurement Canada
RAP ..... Remedial Action Plan
ROA ..... Remedial Options Analysis
RO ..... Remedial Option
R/RM ..... Remediation / Risk Management
SA ..... Supplemental Assessment
SQG ..... Soil Quality Guidelines

1 Introduction

Nunami Stantec Ltd. (Nunami Stantec) was retained by Public Services and Procurement Canada (PSPC) on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) (herein collectively referred to as Canada) to prepare a Remedial Options Analysis (ROA) and a Remedial Action Plan (RAP) for the decommissioning and remediation of the Fossil Creek Bridge Community Identified Additional Area (CIAA) (the Project) located near the Hamlet of Coral Harbour, Nunavut (NU) (the Site). The Fossil Creek Bridge is also known as Area of Environmental Concern (AEC) 11. The location of AEC 11 is provided on Figure 1, Appendix A.

This report presents the proposed ROA and RAP for the Site that was developed based on the results and findings of the 2024 Fossil Creek Bridge Remediation Assessment (Nunami Stantec, 2025a), 2025 Supplemental Assessment (SA) (Nunami Stantec, 2025f), and the 2025 Human Health and Ecological Risk Evaluation (HHERE) (Nunami Stantec, 2025d).

1.1 Objective

The objectives of the ROA and RAP are to identify remedial activities that will be undertaken to address environmental impacts in soil and remove hazardous and non-hazardous materials previously identified on the Site. This ROA and RAP have been developed to meet the following project remedial objectives as indicated by Canada:

- Minimize health and environmental impacts to humans or local ecosystems at the Site
- Reduce federal liabilities
- Bring benefits to Northerners and northern businesses
- Execute the Project in accordance with Government of Canada policies
- Comply with legal obligations

2 Background

The Coral Harbour 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 and for various other northern projects. The Coral Harbour site was active from the 1940s until the 1970s and the on-site infrastructure included an airstrip, hospital, and housing for military personnel. The military base was decommissioned in the 1970s which included the decommissioning of most buildings, burial of waste materials, and the abandonment of remaining equipment and waste materials.

Eight AECs were discovered at the Coral Harbour Site during previous assessment work, but only five AECs were recommended for remediation. The Hamlet of Coral Harbour had active operations in the three remaining AECs and they were therefore not recommended for remediation. To address the environmental impacts and physical hazards associated with the waste items remaining on-site, a remediation program was initiated in 2023 to remediate the remaining waste items and contaminated soil and reduce environmental risks associated with the Coral Harbour site. The main remediation program was completed in March 2025.

In addition to the five AECs recommended for remediation on the Coral Harbour site, nine additional areas of concern were identified by members of the Coral Harbour community during a community consultation in March 2021, known collectively as the CIAAs. The CIAAs were further investigated by Nunami Stantec through interviews with community members and the completion of the 2021 SA (Stantec, 2022a) to gather information on the historical site activities for each CIAA.

Upon review of the 2021 SA findings and recommendations, CIRNAC concluded that four CIAAs (Creek Drums Area, Fossil Creek Bridge, Gravel Pit Area, and Unnamed Creek Area) were likely related to previous military activity and should be carried forward for additional assessment.

During the 2024 main remediation construction season, Nunami Stantec completed the 2024 CIAA Assessment and Remediation (Nunami Stantec, 2025b) to further assess the Creek Drums Area (AEC 9), Fossil Creek Bridge Area (AEC 11), and Gravel Pit Area (AEC 12). The Unnamed Creek Area was remediated prior to the 2024 CIAA Assessment under the main remediation contract. The objective of the 2024 CIAA Assessment was to complete a field assessment of AEC 9, AEC 11, and AEC 12 and identify preliminary remediation strategies for the waste located within these areas.

Preliminary remediation of the three CIAAs was completed by Sudliq Developments Ltd. of Coral Harbour, NU, in 2024 under the main remediation contract. This work included consolidation and off-site disposal of surficial hazardous and non-hazardous waste from the three CIAAs, and excavation and off-site disposal of contaminated soil from the AEC 12. Remediation of the Fossil Creek Bridge infrastructure was not completed as part of the 2024 preliminary remediation program as a more intrusive investigation was required to support detailed remedial planning.

2.1 Site Description

The Fossil Creek Bridge is located approximately 400 metres west of Coral Harbour Airport Road and consists of the remnants of a bridge structure reported to have been built in the 1950-60s to transport military vehicles over Fossil Creek. The bridge infrastructure consists of two timber abutments, one each located on the eastern and western creek banks, and a central pier located in the middle of Fossil Creek. A Photographic Log of the Site is provided in Appendix B.

It is speculated that much of the former eastern abutment cribbing had been previously removed leading to erosion of the abutment fill material and the adjacent creek bank. The majority of the western abutment timbers are intact, and fill material consisting of large boulders, cobbles, gravel, and sand remains in place within the visible timber structure. Fill material around the eastern and western abutments generally consists of sand, gravel, and cobbles, likely derived from the underlying limestone bedrock present at the Site. The vertical extent of the buried timbers appears to be limited by the presence of bedrock throughout the investigation area, which is present along the creek bed and at higher elevations throughout sections of the creek banks. The lateral extent of the timbers is mostly visible at the surface, with only a portion of timbers extending into the creek banks. Minor amounts of surface, partially buried, and buried debris were identified during previous assessments including empty barrels, scrap metal, and both treated and untreated wood debris; however, the quantity was minimal and no evidence of larger buried debris areas was identified. No evidence of concrete bridge anchors was identified during previous assessments at the Site.

Based on visual field observations, the central pier consists of a concrete base, four columns with each constructed from three metal barrels welded together (end on end) and filled with concrete, and a concrete cap. The concrete base is sitting on exposed bedrock in the middle of Fossil Creek. Nunami Stantec was unable to determine if the concrete base is anchored into bedrock. The constructed concrete columns appear to be reinforced with steel angle iron, while the concrete cap appears to be reinforced with steel rebar.

2.1.1 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 mean summer temperature of approximately 6.9°C (June, July, and August).

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 rainfall in Coral Harbour is 169 mm, while average annual snowfall is 1,180 mm (ECCC, 2020).

2.1.2 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).

2.1.3 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).

2.1.4 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).

2.1.5 Topography and Drainage

Regional surface drainage at the Site is generally toward Fossil Creek, which flows south towards Hudson's Bay (Stantec, 2021a).

2.3 Previous Environmental Investigations

Since 2021, numerous environmental investigations and assessments have been completed at Fossil Creek Bridge. A summary of the relevant documents is provided in Table 2, below.

Table 2 Fossil Creek Bridge Document Review Summary

Report	Summary of Findings Relevant to AEC 11
Memo: Additional Information for Community Identified Additional Areas, Coral Harbour Site, Coral Harbour, NU (Stantec, 2021c)	• Compiled information related to the CIAAs collected during the 2021 Supplemental Assessment for the Coral Harbour site, including interviews with community members knowledgeable on the CIAAs. • Community members indicated that the bridge was historically used to transport vehicles over Fossil Creek. • The remnants of a bridge footing constructed from logs are located adjacent to Fossil Creek. Drums and metal debris were scattered around the former bridge. A drum with hardened tar was also observed in the creek.
Supplemental Assessment Technical Memo, Coral Harbour Site, Coral Harbour, Nunavut (Stantec, 2022a)	• A CIAA assessment was completed to gather information on the historical site activities for the nine CIAAs identified by members of the community during the March 2021 community meeting. Stantec performed site reconnaissance and an aerial photograph review of the CIAAs, including the Fossil Creek Bridge area. • The bridge appears to have been constructed prior to 1974 and its construction is likely related to military operations. The bridge was removed prior to 1995; however, the exact timing is uncertain. • Drums and metal debris were scattered around the former bridge and a drum with hardened tar was observed in the Fossil Creek.
Updated Remedial Action Plan, Coral Harbour Site, Nunavut (Stantec, 2022b)	• CIRNAC determined that the assessment of the CIAAs (including AEC 11) should be included as part of the Coral Harbour Remediation Project as they are likely associated with military operations. • AEC 11 has potential environmental concerns including physical hazards and potential contamination sources related to unconsolidated surface debris; however, AEC 11 was not considered in the RAP as additional assessment was recommended at this location. • No known historical analytical data was available for AEC 11.
Memo: Fossil Creek Bridge Remediation Assessment – Community Identified Additional Area (CIAA) Assessment and Remediation (Nunami Stantec, 2025a)	• A remediation assessment and waste survey were completed to inventory, quantify, and classify waste that would be generated if Fossil Creek Bridge were demolished. The assessment was non-intrusive and was therefore limited to visible infrastructure only. • Approximately 13 cubic m (m^3) of visible timbers and approximately 81 m^3 of visible fill material were present in the eastern and western abutments. Approximately 14 m^3 of concrete and metal was present within the central pier. Note that volumes represent in-situ quantities and do not account for bulking during demolition. Volumes also do not account for the potential for buried materials within the creek banks (timbers, fill, potential debris, etc.). • One composite wood sample was collected from several exposed timbers in the eastern abutment. Analytical results indicated the sample closely resembled weathered creosote. As such, it was assumed that any timbers associated with the Fossil Creek Bridge are creosote-treated and should be considered hazardous waste. • Soil samples were not collected from the material surrounding the newly exposed timbers. There is the potential that contaminated soil is present around the buried timbers and/or within the eastern and western abutment fill material due to the presence of the creosote timbers.

Table 2 Fossil Creek Bridge Document Review Summary

Report	Summary of Findings Relevant to AEC 11
2024 Community Identified Additional Areas (CIAAs) Assessment and Remediation, Coral Harbour, Nunavut (Nunami Stantec, 2025b)	• Five surface water samples from Fossil Creek including one upstream, one at the creek crossing, two downstream, and one background sample were submitted for analysis. No exceedances of the applicable guidelines were identified. It is unlikely that the Fossil Creek Bridge infrastructure and the debris present within/alongside Fossil Creek are adversely impacting surface water quality. • Sediment samples could not be collected from Fossil Creek due to the rocky substrate and exposed bedrock present in the creek (i.e., minimal sediment present). • The eastern and western abutment timbers were assumed to be treated with creosote due to analytical results for one composite wood sample that closely resembles weathered creosote. • No evidence of fish was identified by Nunami Stantec during the visual assessment, which aligns with Traditional Knowledge from local Inuit and the conclusions of the desktop study completed by Nunami Stantec's professional biologist that indicate Fossil Creek is unlikely to be fish-bearing. • Hazardous and non-hazardous surface debris that was identified throughout AEC 11 was removed as part of the main remediation contract. The area was inspected by Nunami Stantec following remediation and no deficiencies were observed. • Fossil Creek Bridge infrastructure remains in place and requires further investigation to support remedial planning.
Coral Harbour Remediation Project: Final 2024 Annual Remediation Report, Coral Harbour, Nunavut (Nunami Stantec, 2025c).	• Refer to the 2024 CIAA Assessment and Remediation report findings, above (the 2024 Annual Remediation report simply provides a summary of the 2024 CIAA Assessment and Remediation report).
2025 Supplemental Assessment – Coral Harbour Fossil Creek Bridge (Nunami Stantec, 2025f)	• The 2025 SA included a subsurface geophysical survey, test pit and soil sampling program, a detailed site topographic survey, a remediation assessment and waste survey, and a hazardous and non-hazardous materials inventory. • Three soil samples from three separate test pits exceeded the applicable guidelines for several petroleum hydrocarbon (PHC) and/or polycyclic aromatic hydrocarbon (PAH) parameters. The contamination at two locations is likely associated with creosote and a halo of contaminated soil is assumed to be present around any buried timbers. The third sample was collected from mixed hardened tar/rock material identified in the western abutment. • Debris was identified in several targeted test pits and included non-hazardous drum debris and treated wood debris. Overall, buried debris appears to be minimal and no evidence of larger BDAs were identified from the subsurface geophysical survey. • The wood debris identified in select test pits was treated with a hydrocarbon source and should be handled and disposed of as such. • The vertical extent of the buried bridge timbers appears to be limited by the presence of bedrock throughout the investigation area, which is present along the creek bed and at higher elevations throughout sections of the creek banks. The lateral extent of the timbers is mostly visible at the surface, with only a portion of timbers extending into the creek banks.

Table 2 Fossil Creek Bridge Document Review Summary

Report	Summary of Findings Relevant to AEC 11
	• An estimated 14.7 m^3 of non-hazardous waste (i.e., central pier infrastructure, and surface, partially buried, and buried debris including empty barrels, scrap metal, and untreated wood debris), 23.8 m^3 of hazardous waste (i.e., creosote-treated timbers), and 81.5 m^3 of PAH contaminated soil and hardened tar is present in AEC 11, which includes the bridge infrastructure, test pit debris, and miscellaneous surface debris.
Coral Harbour Remediation Project – Human Health and Ecological Risk Evaluation, Fossil Creek Bridge, Coral Harbour, Nunavut (Nunami Stantec, 2025d)	• One sample exceeded the human health guideline for Benzo[a]Pyrene Total Potency Equivalent, and no further remediation or long-term soil management was recommended given the conservative risk evaluation and anticipated recreational land use. • Due to the disturbed nature of the Site, limited vegetation, absence of sensitive habitats, and lack of detected contaminants of potential concern in Fossil Creek, the ecological risk is considered low to negligible and no further assessment or remediation is recommended. • Removal of the source of the PAH contamination (i.e., the creosote treated timbers) would further reduce uncertainty and risk associated with PAH impacted soil. The practical implication of removal of the timbers and associated soil should be considered in the ROA. • Should the site conditions or applicable exposure pathways at AEC 11 change (i.e., buildings are constructed, groundwater is used as a potable source, or contaminated soil is no longer buried), human health and ecological risks should be re-evaluated to determine if risk management or remediation is required to address the change in exposure conditions.

3 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 ROA and RAP include:

- Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) (CCME, 2025)
- CCME Canada Wide Standards (CWS) for PHC in Soil (CCME, 2008)
- Abandoned Military Site Remediation Protocol (AMSRP) (INAC, 2009)
- Federal Contaminated Sites Action Plan (FCSAP) Decision-Making Framework (DMF) (FCSAP, 2016)

The land use at the Site is considered to be residential / parkland due to the proximity of the Fossil Creek Trail to the Site, which is listed as a Nunavut Park and Special Place.

3.1 CCME SQG

The CCME SQG (CCME, 2025) provide limits for contaminants in soil and 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). The CCME SQG for residential/parkland land use are considered applicable for the Site. The HHERE (Nunami Stantec, 2025d) indicated that the potentially operable exposure pathways at the Site are direct soil contact for both human and ecological receptors.

3.2 CCME CWS

The CCME has produced the CWS for PHCs in Soil (CCME, 2008) to provide generic Tier 1 criteria intended to protect environmental quality and human health, reported against four PHC fractions (F) (F1 through F4). The CCME CWS Tier 1 criteria for residential/parkland land use are considered applicable for the Site. The HHERE (Nunami Stantec, 2025d) indicated that the potentially operable exposure pathways at the Site are direct soil contact for both human and ecological receptors.

3.3 AMSRP

The AMSRP was developed by CIRNAC (formerly Indian and Northern Affairs Canada [INAC]) in 2009 to provide a consistent approach for remediation of remote military 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 ROA and RAP.

3.4 FCSAP Decision Making Framework

The FCSAP 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. 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. The Project Team ultimately determined that a guideline approach (i.e., CCME SQG, CCME CWS, AMSRP) would be used to define impacted soil and remedial targets for the Site.

3.5 Regulatory Permits and Authorizations

Prior to completing the 2023 and 2024 main remediation program, several permits and authorizations from authorities having jurisdiction (AHJ) were issued for the Coral Harbour Remediation Project. Previous permits/authorizations that may be applicable to the Fossil Creek Bridge include the following:

- Water Licence (1BR-COR2325) issued to CIRNAC by the Nunavut Water Board.
- Land Use Permit (01-600-24) issued to CIRNAC by the Lands Administration of the Department of Community and Government Services, Government of Nunavut.
- Fisheries and Oceans Canada (DFO) authorization of work to proceed, issued to CIRNAC.
- DFO Letter of Advice – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat, issued to CIRNAC.
- Hamlet of Coral Harbour authorization of work to proceed, issued to CIRNAC from the Hamlet's Senior Administrative Officer.
- Authorization for work to proceed in the proximity of an airport, issued to CIRNAC from Nunavut Airports.
- No objection / authorization to proceed issued to CIRNAC by NAV Canada.

Nunami Stantec has assumed that applications for new permits and/or requests for extensions to existing permits will be required to capture the planned remedial activities at the Fossil Creek Bridge. Preparation of the permit applications/extensions will start prior to the remedial program to allow AHJs time to review and approve prior to initiation of on-site activity. Prior to the remedial program, CIRNAC will acquire an updated Water Licence and Land Use Permit. Nunami Stantec has acquired an updated Letter of Advice from DFO (refer to Appendix C).

4 Remedial Options Analysis

This ROA has been prepared to evaluate potential remedial options for the Site infrastructure, associated PAH-contaminated soil, and miscellaneous hazardous (i.e., creosote treated timbers, treated wood debris) and non-hazardous debris (i.e., central pier infrastructure and surface, partially buried, and buried debris including empty barrels, scrap metal, and untreated wood debris) identified at the Site. A variety of potential remedial options were evaluated that considered their effectiveness relative to the site-specific conditions and project objectives. Consideration of factors such as technical practicability, duration, feasibility, and documented success for remediation/risk management (R/RM) of the contaminants of concern (COCs) identified at the Site were initially reviewed.

The ROA was prepared to provide Canada with information on the relative costs, benefits, and feasibility of the potential remedial options and allow CIRNAC to make informed decisions regarding future R/RM activities.

On-site disposal of waste materials was not considered a viable remedial option as the on-site non-hazardous waste facility constructed for the main Coral Harbour Remediation Project was capped in 2024, and re-opening this facility is not feasible. A local non-hazardous waste landfill and a contaminated soil landfill exist in Coral Harbour; however, Nunami Stantec understands that these locations are not viable disposal options for waste materials associated with the Project.

The option for on-site treatment and disposal of contaminated soil via a land treatment unit is not considered a feasible remedial option as CIRNAC has indicated that the Project must be completed prior to the end of fiscal year 2026/27 (i.e., March 31, 2027), and successful soil treatment within this limited timeframe is either not technically feasible or not cost effective.

Given the above on-site treatment and/or disposal constraints, the following preliminary disposal options for the various waste materials identified in AEC 11 were considered for evaluation:

- Removal of waste for off-site disposal
- Leave in place

Removal for off-site disposal assumes the waste materials would be consolidated, packaged, and transported via sea lift to southern Canada and then trucked to a permitted waste disposal facility.

Based on the preliminary disposal options, considerations, and constraints described above, along with discussions with Canada, the following four remedial options (ROs) were considered for evaluation in this ROA:

- RO1: Leave existing infrastructure, contaminated soil, and the debris in place.
- RO2: Remove visible infrastructure above ground surface (i.e., central pier including concrete base, and visible above ground timbers on the eastern and western abutments), and the debris, while buried infrastructure and contaminated soil remains in place.
- RO3: Full removal of bridge infrastructure (i.e., central pier including concrete base, visible above ground timbers on the eastern and western abutments, buried timbers within the eastern and western abutments), and the debris, while contaminated soil remains in place.
- RO4: Full removal of bridge infrastructure, the debris, and contaminated soil.

Additional details on each of the ROs are provided in the following sub-sections.

4.1 RO1: Leave Existing Infrastructure, Contaminated Soil, and the Debris in Place

RO1 involves leaving the existing Fossil Creek Bridge infrastructure in place, which includes the eastern and western abutments, associated contaminated soil around the buried timbers, and the central pier. The debris identified during the 2025 SA would also remain in place.

This option would have no contractor costs, requires no disturbance to the creek banks, requires no diversion of the creek to facilitate demolition activities, and requires no disposal of demolition waste. This option is the most aesthetically undesirable as the bridge infrastructure and associated waste would remain in place, including approximately 81.5 m^3 of contaminated soil, 23.8 m^3 of hazardous waste (i.e., creosote-treated timbers), and 14.7 m^3 of non-hazardous waste; thereby failing to meet the project objectives of reducing the risk to environmental and human health, returning the Site as close as possible to pre-development conditions.

While contaminated soil would remain in place with RO1, the HHERE (Nunami Stantec, 2025d) recommended no further remediation or long-term management of AEC 11 given the conservative risk evaluation associated with the contaminated soil and anticipated recreational land use; however, the HHERE evaluated risk associated with contaminated soil at depth. Future erosion of the creek banks could expose the contaminated soil to the surface, thereby potentially introducing complete exposure pathways (including direct contact) indicating the presence of risk. Long-term monitoring (LTM) would likely be required to confirm the HHERE assumptions, and if future site conditions changed, the risk to site receptors would likely need to be re-evaluated.

4.1.1 Climate Change Considerations

Climate change could have an effect on RO1 as the existing infrastructure and contaminated soil would remain on-site. Increased precipitation, increased stream flows during freshet, and an increased number of windy days could all contribute to additional erosion of the creek banks, thereby exposing contaminated soil and remaining infrastructure, and potentially transporting COCs further from the Site. As such, if RO1 is implemented, a screening level review of the potential impacts of climate change should be undertaken as part of the LTM process to identify specific climate hazards and their overall risks to the site receptors.

4.1.2 RO1 Assumptions

The assumptions incorporated into the evaluation of RO1 include the following:

- LTM would be required to confirm contaminated soil does not become exposed to the surface and/or transported downstream in the future. As well, LTM would be required to confirm that the bridge infrastructure remains intact in its current state and does not pose a liability risk. It is assumed that LTM may be required for a period of 25 years and would include visual monitoring and potential surface water and soil sampling if contaminated soil became exposed due to erosion. A period of 25 years is a conservative estimate taking into account the time the contamination has currently been in the ground and the length of time that may still be required for natural attenuation to occur. If contamination was shown to still be present after 25 years, additional monitoring may be required.

4.1.3 RO1 Execution Schedule

As no further decommissioning / remediation work is required for RO1, an execution schedule for remediation is not provided. LTM will be required to confirm the remaining infrastructure does not pose a physical hazard/liability risk and that contaminated soil is not exposed at the surface and/or transported downstream due to future erosion of the creek banks. LTM is assumed to be required for a period of 25 years (frequency of LTM site visits may be reduced depending on the findings of annual inspections; however, annual monitoring has been conservatively assumed for the 25-year LTM period).

4.2 RO2: Remove Visible Infrastructure Above Ground Surface and the Debris (Leaving Buried Infrastructure and Contaminated Soil in Place)

RO2 involves removing visible infrastructure including the central pier, the visible above ground timbers, and fill material contained within the visible western abutment cribbing. Visible timbers would be cut at the existing ground surface. The buried portions of creosote-treated timbers and associated contaminated soil would remain in place. The 2025 SA (Nunami Stantec, 2025f) indicated that the lateral extent of the creosote-treated timbers is mostly visible at the surface, with a portion of timbers extending into the eastern and western creek banks. Similar to RO1, LTM would likely be required to confirm the remaining

infrastructure does not pose a physical hazard/liability risk and that contaminated soil is not exposed at the surface and/or transported downstream due to future erosion of the creek banks

The western abutment cribbing fill material appears to consist of mostly large cobbles and boulders; however, a small amount of contaminated soil may be present in a halo around the existing creosote-treated timbers. Any contaminated soil encountered during removal of the creosote-treated timbers would require re-burial in the timber excavations to avoid having contaminated soil exposed at the surface. The remaining western abutment fill material would be re-graded to blend in with the existing banks.

The central pier infrastructure would be demolished and the demolition waste transported and disposed of as non-hazardous waste in southern Canada. The surface, partially buried, and buried debris identified during the 2025 SA would also require off-site transport and disposal in southern Canada.

4.2.1 Climate Change Considerations

Similar to RO1, climate change could have an effect on RO2 as some existing infrastructure and contaminated soil would remain on-site. Increased precipitation, increased stream flows during freshet, and an increased number of windy days could all contribute to additional erosion of the creek banks, thereby exposing contaminated soil and remaining infrastructure to the surface. While it is anticipated that less infrastructure would remain on-site when compared with RO1, a screening level review of the potential impacts of climate change should be undertaken to guide LTM planning if RO2 is implemented.

4.2.2 RO2 Assumptions

Assumptions used during evaluation of RO2 include:

- Remediation tasks will take place during the summer months (i.e., July – September) when the stream flow in the creek is minimal.
- Accessing the central pier would require diversion of at least one side of Fossil Creek if water is present at the time of demolition. Diversion of Fossil Creek may also be required during removal of the eastern and/or western creek abutments, depending on water levels in the creek during the time of demolition.
- Approximately 13 m^3 of above ground creosote-treated timbers would require transport and disposal as hazardous waste in southern Canada. This represents an in-situ volume and does not account for potential bulking during demolition activities.
- Approximately 14.7 m^3 (in-situ volume) of non-hazardous waste would require off-site disposal in southern Canada, which includes the central pier demolition waste (including the concrete base) and the debris identified during the 2025 SA.
- Materials requiring off-site disposal would need to be packaged and transported via sealift to southern Canada, which is assumed to arrive in Coral Harbour during the fall months (i.e., October – November).
- Following timber and contaminated soil removal (if encountered), the area would be re-graded using existing on-site materials, including re-burial of any contaminated soil encountered.

- Duration of remediation work is assumed to be 20 days, which includes mobilization, on-site remediation work, and demobilization.
- Decommissioning/remediation activities would be completed in accordance with the measures outlined in the DFO Letter of Advice (DFO, 2025) (refer to Appendix C).
- LTM would be required following remediation activities to confirm contaminated soil does not become exposed to the surface in the future and that the remaining buried infrastructure does not become a physical hazard/liability risk. It is assumed that annual visual monitoring and potential surface water and soil sampling (if PAH-contaminated soil and/or creosote treated timbers become exposed) are required for a period of 15 years.

4.2.3 RO2 Execution Schedule

Table 3 provides a summary of the steps required to execute RO2 and their schedule.

Table 3 Summary of Execution and Schedule for RO2

Main Task / Deliverable	Duration	Completion Date
Project planning, RAP, and permitting. Tender specifications and drawings and tendering/award of work to contractor.	Ongoing	Q1 fiscal year (FY) 2026/27
Site remediation, including: Removal of above ground bridge timbers Removal of central pier infrastructure Removal of the debris	20 days	Summer FY2026/27
Off-site transportation and disposal of waste materials in southern Canada via sealift.	1 month	Q3/Q4 FY2026/27
Preparation of Summary of Remediation Report	3 months	Q4 FY2026/27
Preparation and submittal of closure documents including development of LTM Plan (LTMP)	3 months	Q4 FY2026/27
LTMP annual field program, which includes visual monitoring and potential surface water and/or soil sampling.	4 days for 15 years	Yearly from FY2027/28 – 2042/43[1]

Notes:

1. Frequency of annual LTMP site visits may be reduced depending on the findings of annual inspections; however, annual monitoring has been conservatively assumed for the 15-year LTM period.

4.3 RO3: Full Removal of Former Bridge Infrastructure and the Debris (Leaving Contaminated Soil in Place)

RO3 involves removing any infrastructure associated with the former bridge, which includes the central pier, the visible above ground timber abutments, associated fill material contained within the visible western abutment cribbing, and any bridge infrastructure buried within the existing eastern and western abutments.

Non-hazardous waste generated during demolition activities would be transported and disposed off-site in southern Canada. This includes demolition waste from the central pier, as well as the debris identified during the 2025 SA.

Contaminated soil identified during the 2025 SA would remain place. Any contaminated soil brought to surface during removal of the creosote-treated timbers would require re-burial in the timber excavations to avoid having contaminated soil present at the surface. The remaining fill material would be regraded. Similar to RO1 and RO2, the risk to receptors associated with exposure of contaminated soil at the surface was not evaluated in the HHERE. The contaminated soil remaining in place within the creek banks would be susceptible to erosion and could become exposed to the surface in the future. As such, LTM would likely be required to confirm the contaminated soil remains buried within the existing creek banks.

Hazardous waste would require off-site transport and disposal in southern Canada and includes the entire volume of creosote-timbers associated with the bridge, along with the treated wood debris identified in TP7 and TP12 during the 2025 SA.

4.3.1 Climate Change Considerations

Climate change could have an effect on RO3 where contaminated soil is left in place. While it is anticipated that the risks of the contaminated soil can be managed if it remains at depth, certain climate change hazards such as increased heavy rain events, increased stream flows during freshet, and increased windy days may pose an erosion risk. Monitoring for changes to the cover/containment of the contaminated soil and site conditions such as erosion/washouts would need to be included within the LTMP to manage the risks.

4.3.2 RO3 Assumptions

Assumptions used during evaluation of RO3 include:

- Remediation tasks will take place during the summer months (i.e., July – September) when the stream flow in the creek is minimal.
- Accessing the central pier would require diversion of at least one side of Fossil Creek if water is present at the time of removal. Diversion of Fossil Creek may also be required during removal of the eastern and/or western creek abutments, depending on water levels in the creek during the time of removal.
- Approximately 23.8 m^3 of creosote-treated timbers would require transport and disposal as hazardous waste in southern Canada. This represents in-situ volume and does not account for potential bulking during demolition activities.
- Approximately 14.7 m^3 (in-situ volume) of non-hazardous waste would require transport and off-site disposal in southern Canada, which includes the central pier demolition waste and the debris identified during the 2025 SA.

- Materials requiring transport and off-site disposal would be packaged and transported via sealift to southern Canada, which is assumed to arrive in Coral Harbour during the fall months (i.e., October – November).
- Following timber removal, the area would be re-graded using existing on-site materials.
- Duration of remediation work is assumed to be 40 days, which includes mobilization, on-site remediation work, and demobilization.
- Decommissioning/remediation activities would be completed in accordance with the measures outlined in the DFO Letter of Advice (DFO, 2025) (refer to Appendix C).
- LTM would be required following remediation activities to confirm contaminated soil does not become exposed to the surface in the future. It is assumed that annual visual monitoring and potential surface water and soil sampling (if contaminated becomes exposed) are required for a period of 15 years.

4.3.3 RO3 Execution Schedule

Table 4 provides a summary of the steps required to execute RO3 and their schedule.

Table 4 Summary of Execution and Schedule for RO3

Main Task / Deliverable	Duration	Completion Date
Project planning, RAP, and permitting. Tender specifications and drawings and tendering/award of work to contractor.	Ongoing	Q1 FY2026/27
Site remediation, including: Removal of above ground and buried timbers Removal of central pier infrastructure Removal of the debris	40 days	Summer FY2026/27
Off-site transportation and disposal of waste materials in southern Canada via sealift.	1 month	Q3/Q4 FY2026/27
Preparation of Summary of Remediation Report	3 months	Q4 FY2026/27
Preparation and submittal of closure documents including development of LTMP	3 months	Q4 FY2026/27
LTMP annual field program, which will include visual monitoring and potential surface water and/or soil sampling.	4 days for 15 years	Yearly from FY2027/28 – 2042/43[1]

Notes:
1. Frequency of annual LTMP site visits may be reduced depending on the findings of annual inspections; however, annual monitoring has been conservatively assumed for the 15-year LTM period.

4.4 RO4: Full Removal of Bridge Infrastructure (Including the Debris and Contaminated Soil)

RO4 would involve removing any infrastructure associated with the former bridge, which includes the central pier, the above ground and buried timber abutments, associated fill material within the visible western abutment cribbing, the debris, and the contaminated soil associated with buried timbers at the eastern and western abutments.

The estimated 14.7 m^3 of non-hazardous waste identified at the Site would be transported and disposed off-site in southern Canada. This includes demolition waste from the central pier, as well as the debris identified during the 2025 SA. Accessing the central pier would require diversion of at least one side of Fossil Creek if water is present at the time of removal. Diversion of Fossil Creek may also be required during removal of the eastern and western creek abutments, depending on water levels in the creek during the time of demolition.

Contaminated soil identified during the 2025 SA would be excavated, transported and disposed of in southern Canada. As discussed in the 2025 SA, an estimated 81.5 m^3 of contaminated soil is present around the buried sections of creosote timbers and within the identified tar soils. Following the removal of contaminated soil, the areas will be re-graded using existing on-site materials.

The estimated 23.8 m^3 of hazardous waste identified at the Site would require off-site disposal in southern Canada and includes the creosote-timbers associated with the bridge, along with the treated wood debris identified in test pits TP7 and TP12 during the 2025 SA.

4.4.1 Climate Change Considerations

Climate change is expected to have little effect on RO4 as all known site infrastructure and contaminated soil would be removed over a short time frame.

4.4.2 RO4 Assumptions

Assumptions used during evaluation of RO4 include:

- Remediation tasks will take place during the summer months (i.e., July – September) when the stream flow in the creek is minimal.
- Accessing the central pier would require diversion of at least one side of Fossil Creek if water is present at the time of removal. Diversion of Fossil Creek may also be required during removal of the eastern and/or western creek abutments, depending on water levels in the creek during the time of removal.
- Approximately 23.8 m^3 of creosote-treated timbers would require transport and disposal as hazardous waste in southern Canada. This represents in-situ volume and does not account for potential bulking during demolition activities.

- Approximately 14.7 m^3 (in-situ volume) of non-hazardous waste would require transport and off-site disposal in southern Canada, which includes the central pier demolition waste and the debris identified during the 2025 SA.
- Approximately 81.5 m^3 (in-situ volume) of contaminated soil would require transport and off-site disposal in southern Canada.
- Materials requiring off-site disposal would be packaged and transported via sealift to southern Canada, which is assumed to arrive in Coral Harbour during the fall months (i.e., October – November).
- Following timber and contaminated soil removal, the area would be re-graded using existing on-site materials. No additional stabilization or armoring of the creek banks is required.
- Duration of remediation work is assumed to be 60 days, which includes mobilization, on-site remediation work, and demobilization.
- Decommissioning/remediation activities would be completed in accordance with the measures outlined in the DFO Letter of Advice (DFO, 2025) (refer to Appendix C).
- LTM would not be required as known infrastructure and contaminated soil would be removed. While some future erosion of the creek banks is anticipated, Nunami Stantec understands that natural recontouring of the creek banks due to erosion is preferable compared to bank stabilization/armouring.

4.4.3 RO4 Execution Schedule

Table 5 provides a summary of the steps required to execute RO4 and their schedule.

Table 5 Summary of Execution and Schedule for RO4

Main Task / Deliverable	Duration	Completion Date
Project planning, RAP, and permitting. Tender specifications and drawings and tendering/award of work to contractor.	Ongoing	Q1 FY2026/27
Site remediation, including: Removal above ground and buried timbers Excavation of contaminated soil Removal of central pier infrastructure Removal of the debris	60 days	Summer FY2026/27
Off-site transportation and disposal of waste materials in southern Canada via sealift.	1 month	Q3/Q4 FY2026/27
Preparation of Summary of Remediation Report	3 months	Q4 FY2026/27
Preparation and submittal of closure documents	3 months	Q4 FY2026/27

4.5 Remedial Options Evaluation

4.5.1 ROA Evaluation Criteria

Each of the four ROs were evaluated to provide Canada with information to support making an informed recommendation for a remedial approach. The four ROs were assessed against the following evaluation criteria and associated weightings, provided by Canada, to identify the optimal approach:

- **Effectiveness (25%):** The degree to which the alternative meets the project objectives, namely, reducing the risk to environmental and human health, returning the Site as close as possible to pre-development conditions, and re-establishment of habitat and natural drainage conditions. This criterion also includes duration (i.e., the time required to complete the option from mobilization to completion of LTM).
- **Execution Risk (20%):** The potential risk associated with successfully executing the alternative, considering factors such as technical difficulty, sequencing and logistics, location, availability of equipment and materials, use of new methods or technologies, and health and safety.
- **Environmental Impacts (10%):** The potential environmental effects of the alternative, based on professional judgement and quantitative assessment, where available. This criterion also includes climate change and its potential effect on the long-term environmental impact of the remedial options.
- **Socio-Economic Impacts (25%):** The potential effects to socio-economic components of the alternative, including consideration of benefits (i.e., does this option bring benefits to Northerners and northern businesses, such as job creation, training opportunities, and business opportunities).
- **Regulatory (10%):** Reflects the ability to be executed in a manner that meets Nunavut regulatory frameworks.
- **Cost (10%):** The estimated total capital cost of completing the alternative, from mobilization to completion of long-term monitoring, to an estimated accuracy of +/- 40%.

A detailed description of the ROA Evaluation Criteria and the rationale for scoring factors is provided in Table D.1, Appendix D.

4.5.2 Analysis of Options

4.5.2.1 RO1: Leave Existing Infrastructure, Contaminated Soil, and the Debris in Place

A qualitative description of RO1 compared to the ROA Evaluation Criteria is provided as follows:

- **Effectiveness**: RO1 would be the least effective option as it does not return the Site to near pre-development conditions. RO1 also requires LTM which extends the overall duration of the Project.

- **Execution Risk**: RO1 has no execution risk as there are no remedial activities required for this option.
- **Environmental Impacts**: The potential environmental impacts associated with RO1 are high relative to the other remedial options as known creosote-treated timbers and contaminated soil would remain in place. The contaminated media would also be subject to potential future exposure from climate effects (e.g., wind and water erosion), which may be exacerbated due to climate change.
- **Socio-Economic Impacts**: RO1 provides no socio-economic benefits. No remediation work is required and therefore no job, training, and business opportunities for Northerners and/or businesses.
- **Regulatory:** There are no Nunavut regulatory considerations for the on-site execution of RO1 since no remedial works are required; however, leaving contaminated materials (i.e., creosote-treated timbers and contaminated soil) in place may not receive regulatory approval.
- **Cost:** RO1 would have minimal cost as no remediation work is required for this option. The majority of the cost associated with RO1 would be associated with LTM requirements.

4.5.2.2 RO2: Remove Visible Infrastructure Above ground Surface and the Debris (Leaving Buried Infrastructure and Contaminated Soil in Place)

A qualitative description of RO2 compared to the ROA Evaluation Criteria is provided as follows:

- **Effectiveness**: RO2 would be more effective than RO1, but less than RO3 and RO4 due to the buried sections creosote-treated timbers and all known contaminated soil remaining in place (i.e., does not fully return the Site to near pre-development conditions). Similar to RO1, RO2 also requires LTM which extends the overall duration of the Project.
- **Execution Risk**: RO2 has less execution risk than RO3 and RO4 as less material requires removal and off-site disposal. Overall, the execution risk of RO2 is expected to be low.
- **Environmental Impacts**: The potential environmental impacts associated with RO2 are lower than RO1 as most of the creosote-treated timbers would be removed, but higher than RO3 and RO4 as the buried timbers and contaminated soil would remain in place. The contaminated media would also be subject to potential future exposure from climate effects (e.g., wind and water erosion), which may be exacerbated due to climate change.
- **Socio-Economic Impacts**: As on-site remediation works are required, RO2 provides job, training, and business opportunities for northern people and/or businesses (e.g., labourers, equipment operators, contractors, etc.). RO2 would provide less socio-economic benefits compared to RO3 and RO4 due to the shorter duration of remediation works.
- **Regulatory:** RO2 is more likely to receive regulatory approval compared to RO1 as some creosote-treated timbers would be removed, but less likely compared to RO4 as some timbers and known contaminated would remain in place. RO2 and RO3 have a similar probability of receiving regulatory approval

- **Cost:** RO2 would be more expensive than RO1, would have a similar cost to RO3, and be less expensive than RO4.

4.5.2.3 RO3: Full Removal of Former Bridge Infrastructure and the Debris (Leaving Contaminated Soil in Place)

A qualitative description of RO3 compared to the ROA Evaluation Criteria is provided as follows:

- **Effectiveness**: RO3 would be more effective than RO1 and RO2, but less than RO4 due to contaminated soil remaining in place (i.e., does not fully return the Site to near pre-development conditions). Similar to RO1 and RO2, RO3 also requires LTM which extends the overall duration of the Project.
- **Execution Risk**: RO3 has a similar execution risk to RO2, and less risk than RO4 as less material requires removal and off-site disposal. Overall, the execution risk of RO3 is expected to be low.
- **Environmental Impacts**: The potential environmental impacts associated with RO3 are lower than RO1 and similar to RO2, as the creosote-treated timbers would be removed, but higher than RO4 as the contaminated soil would remain in place. The contaminated soil would also be subject to potential future exposure from climate effects (e.g., wind and water erosion), which may be exacerbated due to climate change.
- **Socio-Economic Impacts**: As on-site remediation works are required, RO3 provides job training, and business opportunities for northern people and/or businesses (e.g., labourers, equipment operators, contractors, etc.). RO3 would provide more socio-economic benefits compared to RO2, but less than RO4 due to relative duration of remediation works for each option.
- **Regulatory:** RO3 is more likely to receive regulatory approval compared to RO1 as the creosote-treated timbers would be removed, but less likely than RO4 as known contaminated soil would remain in place. RO2 and RO3 have a similar probability of receiving regulatory approval.
- **Cost:** RO3 would be more expensive than RO1, would have a similar cost to RO2, and be less expensive than RO4.

4.5.2.4 RO4: Full Removal of Bridge Infrastructure (Including the Debris and Contaminated Soil)

A qualitative description of RO3 compared to the ROA Evaluation Criteria is provided as follows:

- **Effectiveness**: RO4 would be the most effective option as it removes known waste associated with the bridge, returning the Site to near pre-development conditions. Further, RO4 does not require LTM and therefore has the shortest overall project duration.
- **Execution Risk**: RO4 has the highest execution risk as it requires the most physical earthworks and the greatest number of waste streams requiring off-site disposal (i.e., hazardous and non-hazardous waste, and contaminated soil). Overall, the execution risk of RO4 is expected to be moderate.

- **Environmental Impacts**: RO4 has the lowest risk of potential environmental impacts as it removes known contaminated material associated with the bridge, and minimal potential effects associated with climate change.
- **Socio-Economic Impacts**: As on-site remediation works are required, RO4 provides job, training, and business opportunities for northern people and/or businesses (e.g., labourers, equipment operators, contractors, etc.). RO4 provides more socio-economic benefits compared to RO2 and RO3 due to the longer duration of remediation works.
- **Regulatory:** RO4 has the highest regulatory score as this option removes known waste associated with the bridge, including contaminated soil, and is likely to receive regulatory approval.
- **Cost:** RO4 would be the most expensive option as it requires the most physical earthworks and the greatest volume of material requiring off-site transport and disposal.

4.5.3 Analysis Scoring Matrix

To identify the most suitable remedial option for the Site, the potential remedial options were scored using the evaluation matrix. The evaluation scores were multiplied by the weighting for each individual criterion (refer to Section 4.5.1 for weightings), and each criterion score was summed to get an overall RO score.

The detailed scoring of the four ROs is provided in Table 6, below.

Based on the results, RO4 has the highest total score followed by RO3, then RO2, and finally RO1. As such, RO4 (Full Removal of Bridge Infrastructure Including Debris and Contaminated Soil) is the recommended approach for remediation of the Fossil Creek Bridge (AEC 11).

Table 6 Detailed Remedial Options Evaluation Matrix

Criteria (weighting factor)	RO1: Leave Existing Infrastructure in Place		RO2: Remove Visible Infrastructure Above ground Surface		RO3: Full Removal of Former Bridge Infrastructure		RO4: Full Removal of Bridge Infrastructure (Including Contaminated Soil)	
	Evaluation Score	Weighted Score	Evaluation Score	Weighted Score	Evaluation Score	Weighted Score	Evaluation Score	Weighted Score
Effectiveness (5)	1	5	3	15	4	20	5	25
Execution Risk (4)	5	20	4	16	3	12	2	8
Environmental Impacts (2)	1	2	2	4	3	6	5	10
Socio-Economic Impacts (5)	1	5	2	10	3	15	4	20
Regulatory (2)	2	4	3	6	3	6	5	10
Cost (2)	5	10	4	8	3	6	1	2
Total Score:	**15**	**46**	**18**	**59**	**19**	**65**	**22**	**75**

Note:

1. Dividing the individual weighting factor by the total sum of weighting factors (i.e., 20) matches the ROA evaluation criteria percentages provided in Section 4.5.1. For example, for the Effectiveness Criteria: Individual Weighting Factor (5) ÷ Sum of Weighting Factors (20) = 25%.

4.6 Remedial Options Analysis Conclusion

Based on the evaluation, RO4 has the highest total score followed by RO3, then RO2, and finally RO1.

Although RO4 is the most expensive option and has the greatest execution risk, it has the highest effectiveness (i.e., restores Site to near pre-disturbance conditions), has the least amount of environmental impacts as known contaminated materials would be removed, provides socio-economic benefits in the form of job creation during the on-site remediation work, and is the most likely option to receive regulatory approval. RO4 is also the only option that does not require LTM and therefore has the shortest overall duration for project completion and is expected to have minimal impact from potential climate change effects.

As such, RO4 – Full Removal of Bridge Infrastructure (Including the Debris and Contaminated Soil) – is the recommended approach for remediation of the Fossil Creek Bridge. Following discussions with Canada, RO4 is the preferred remedial option for implementation at the Site.

5 Recommended Remedial Actions

Based on the ROA (refer to Section 4), the preferred remedial option for the decommissioning and remediation of AEC 11 is RO4, which includes the full removal of bridge infrastructure (creosote-treated timbers and non-hazardous building materials), associated contaminated soil, and the buried, partially buried, and surface debris consisting of both hazardous and non-hazardous materials. The estimated in-situ volumes of waste requiring remediation are provided as follows:

- 14.7 cubic metres (m^3) of non-hazardous waste
- 23.8 m^3 of hazardous waste (i.e., creosote-treated wood bridge timbers and buried treated wood debris)
- 81.5 m^3 of contaminated soil/hardened tar (approximately 76.3 m^3 of contaminated soil and 5 m^3 of mixed hardened tar/rock material)

The locations of the materials to be remediated are presented on Figures 2, 3, and 4, Appendix A. Further details on the recommended remedial options for the various waste streams are provided in the following sub-sections.

5.1 Non-Hazardous Waste

Non-hazardous waste consists of the central pier infrastructure requiring demolition, and buried, partially buried, and surface debris (refer to Figure 2, Appendix A). RO4 requires off-site disposal of non-hazardous waste in southern Canada due to restrictions on using the local landfill for the Hamlet of Coral Harbour.

Demolition of the central pier infrastructure may require diversion of at least one side of Fossil Creek if water is present at the time of removal to facilitate access with heavy equipment. The selected contractor will be responsible for designing the creek diversion method as well as the location to be installed. A Creek Diversion Plan will be a requirement for the contractor within the technical specifications. Demolition debris would be consolidated in appropriate containers (e.g., mega bags, sea containers, etc.) for future off-site transport and disposal.

The debris identified in select test pits during the 2025 SA requires excavation. Nunami Stantec field staff have indicated that the test pit debris was placed just below the surface during backfilling of the test pits and minimal excavation is anticipated to remove these items. The remaining partially buried and surface debris identified during the 2025 SA (i.e., not test pit debris) would be consolidated manually or with heavy equipment. Following consolidation, the debris would be packaged in an appropriate container.

Consolidated and packaged non-hazardous waste would be transported via sealift to a licensed disposal facility in southern Canada (anticipated to be Quebec based on previous remediation work completed at the Site). A retrograde sea lift is assumed to arrive in Coral Harbour during the fall months (i.e., October – November), consistent with previous retrograde sea lifts during the 2023 and 2024 main remediation program.

5.2 Hazardous Waste

Hazardous waste consists of the creosote-treated timbers in the eastern and western bridge abutments, and the additional treated wood debris identified in select test pits during the 2025 SA (refer to Figure 2, Appendix A). RO4 requires off-site disposal of hazardous waste in southern Canada.

The creosote-treated timbers require full removal, including both the above ground and buried portions of the timbers. Portions of the creek bank will require excavation to access the buried portions of timbers and associated contaminated soil (refer to Section 5.3); however, minimal excavation is anticipated as the vertical extent of the buried timbers appears to be limited by the presence of bedrock throughout the investigation area, while the lateral extent of the timbers is mostly visible at the surface with only a portion of timbers extending into the creek banks. Both sides of Fossil Creek may require diversion to facilitate heavy equipment access, depending on creek water levels at the time of construction.

The treated wood debris identified in select test pits requires excavation. Similar to the non-hazardous test pit debris (refer to Section 5.1), hazardous test pit debris was placed near the surface during backfilling and minimal excavation is anticipated.

The consolidated hazardous wood debris would be packaged in appropriate containers and transported via sealift to a licensed hazardous waste disposal facility in southern Canada (anticipated to be Quebec based on previous remediation work completed at the Site). The sea lift is assumed to arrive in Coral Harbour during the fall months (i.e., October – November).

5.3 Contaminated Soil

Contaminated soil is present surrounding the buried portions of the creosote-treated timbers in the eastern and western abutments and includes the mixed tar/rock material identified in the western abutment (refer to Figures 3 and 4, Appendix A). RO4 requires off-site disposal of contaminated soil in southern Canada.

The 2025 SA assumed that contaminated soil was present in a 1 m by 1 m square surrounding each timber and extends along the length of each buried section of timber. These dimensions correspond to the approximate width and depth of an excavator bucket and correlate with the assumed feasible methodology for contaminated soil removal (i.e., excavation). Prior to timber removal, the mixed hardened tar/rock material should be excavated from the western abutment first. Following the hardened tar removal, any soil that is in contact with creosote-treated timbers will be excavated in a trench along the length of the timbers. Excavated soil will be bagged for off-site transport and disposal. Following excavation, confirmatory soil sampling will be completed along the walls and the base of the excavation areas to confirm that impacted soil was removed to meet the remedial targets (refer to Section 3). Excavated areas will be re-graded using existing on-site materials (i.e., no bank stabilization/armouring required).

The bagged contaminated soil will be transported via sealift to a licensed contaminated soil disposal facility in southern Canada (anticipated to be Quebec based on previous remediation work completed at the Site). The sea lift is assumed to arrive in Coral Harbour during the fall months (i.e., October – November).

The 2025 SA indicated that the horizontal extent of the hardened tar/rock mix could not be determined to the south due to the presence of the existing timber cribbing that limited visibility during the field program, and it is possible that additional hardened tar material is present within the existing cribbing. Should additional hardened tar/rock material be encountered within the western abutment cribbing during decommissioning activities, potential remedial options will be discussed with Canada at that time.

5.4 Proposed Remedial Approach Summary

Table 7 summarizes the recommended remedial approach for the waste streams identified on the Site.

Table 7 Summary of Proposed Remedial Approaches

Waste Category	Estimated In-situ Volume (m^3)	Recommended Remedial Approach
Contaminated Soil, including Mixed Hardened Tar/Rock Material	81.5	To be excavated, bagged, and disposed of off-site at a licensed contaminated soil disposal facility in southern Canada.
Hazardous Waste (creosote-treated timbers, treated-wood debris)	23.8	To be fully removed, including both the above ground and buried portions of timbers, packaged, and disposed of off-site at a licensed hazardous waste disposal facility in southern Canada.
Non-Hazardous Waste (central pier infrastructure, surface, partially buried, and buried debris)	14.7	To be excavated and/or collected, packaged, and disposed of off-site at licensed disposal facility in southern Canada.

5.5 Additional Considerations

If RO4 was implemented, LTM would not be required as known infrastructure and contaminated soil would be removed. While some future erosion of the creek banks is anticipated, Nunami Stantec understands that natural recontouring of the creek banks due to erosion is preferable compared to bank stabilization/armouring. As such, no additional bank stabilization or armouring methods are required following re-grading of the disturbed areas.

The boulders removed from the western abutment timber cribbing can be buried in the timber/contaminated soil excavation areas prior to regrading the area. The buried boulders may behave similarly to the surrounding natural bedrock in terms of resistance to erosion; therefore, the addition is not expected to significantly alter the characteristics of the creek banks.

To facilitate access of heavy equipment to the bridge abutments, the existing Fossil Creek information placards may need to be temporarily re-located. If re-location is required, the placards should be preserved and returned to their original location following completion of remediation activities.

6 Schedule and Logistics

6.1 Schedule

A proposed schedule for implementation of the remediation is presented in Table 8. Canada has indicated that remediation should be completed prior to the end of FY2026/2027 (i.e., March 31, 2027). Based on the northern location and previous remediation experience on the Site, it is assumed that active remediation can only be completed in the summer months (i.e., June to September). Due to the requirement for working in and around Fossil Creek, it is recommended that remediation occur during peak summer months (i.e., July and August) when the water levels within the creek are expected to be low.

Table 8 Proposed Schedule

Activity	Proposed Schedule
Community Meeting in Coral Harbour	October 16, 2025
Detailed Design, Specifications, and Supporting Permitting Documents	October 1, 2025 – March 15, 2025
Application for Permits/Permit Extensions	December 1, 2025 – April 30, 2026
Tendering Process	December 1, 2025 – March 15, 2026
Virtual Bidders Conference	January 30, 2026
Virtual Bidders Site Tour	February 18, 2026
Mobilize Personnel, Equipment, and Supplies to Site (as applicable)	July 2026
Conduct Active Remediation, including: - Collection and containerization of non-hazardous materials, including buried, partially buried, and surface debris. - Excavation and containerization of hazardous materials, including creosote-treated timbers in the eastern and western bridge abutments, and treated wood debris in select test pit locations. - Excavation and containerization of contaminated soil, including soil around the creosote-treated abutment timbers and the mixed hardened tar/rock material. - Re-grading the excavation areas with existing on-site materials to the surrounding topography. - Staging containerized waste materials at the existing barge landing area.	July 2026 – September 2026
Demobilize Personnel from Site	September 2026
Demobilize Equipment, Supplies, and Consolidated Wastes from Site via Sealift	October 2026
Final Community Meeting	November 2026
Final Site Closure	March 2027

6.2 Potential Logistical Constraints

No additional site development is anticipated to complete remediation at the Fossil Creek Bridge; however, there are several potential logistical constraints to consider, as discussed in the following sub-sections.

6.2.1 Access Roads

Access to the Site is via an existing access road connected to the Coral Harbour Airport Road, the latter of which connects to the Hamlet of Coral Harbour. Coral Harbour Airport Road also connects to an existing access road that connects to the Hamlet's barge landing area south of the Site. Coral Harbour Airport Road and associated access roads will be the primary route for equipment and vehicles required for the remedial program. During the 2023 and 2024 main remediation program, as well as during the 2025 SA, the roads were generally noted to be in good condition and passable by vehicles. Coral Harbour Airport Road is two lanes wide and allows for the safe passing of vehicles/equipment moving in opposite directions (refer to Figure 1, Appendix A).

Crossing of Fossil Creek with vehicles and heavy equipment will be required during the remediation program to access the western abutment. High water levels in Fossil Creek and adjacent tributaries could limit access around the Site; however, based on experience from previous assessments and remediation work in the area, as well as input from members of the local community, water levels are expected to be low during the expected remediation program dates (i.e., July – September 2026). Further, if the water level is high, a local community member has indicated that an alternate route to the western abutment is available.

There were no access issues with vehicles and heavy equipment during the 2025 SA field program.

6.2.2 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 staff. 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, 2025). During the 2023 and 2024 main remediation program, the airstrip was used to bring in workers, materials, and small pieces of equipment, as required, and it is anticipated that it can be used again during the Fossil Creek Bridge remediation program.

As this is a commercially maintained runway, information for appropriate aircraft and authorizations can be obtained from the Coral Harbour airport authority.

6.2.3 Barge Landing Area and Sealift

There is a barge landing area located approximately 5 km west of the Hamet of Coral Harbour and approximately 6 km south of the Site. Coral Harbour is a location that is routinely accessed by various sealift companies that transport goods, construction materials, and heavy equipment to Coral Harbour and other northern communities.

As the sealift transporting waste materials off-site is expected to arrive in the fall (i.e., October/ November), packaged waste materials from the remediation program will need to be staged for approximately one to three months prior to sealift arrival. It is assumed that the existing barge landing area, used to stage waste materials during the 2023 and 2024 main remediation program, can be used to stage waste materials from the Site prior to sealift arrival. Many of the sealift and barge companies require advanced booking up to several months in advance.

6.2.4 Accommodation

It is anticipated that remediation contractor staff and Nunami Stantec field staff will be housed in local accommodations available in the Hamlet of Coral Harbour during the remediation program. Local accommodations include Leonie's Place, Ulu House, and Katudgevik Hotel Inns North.

The limited local accommodations available in Coral Harbour often book out many weeks or months in advance during the summer construction season, and it is recommended that local accommodations are arranged well in advance prior to the 2026 remediation program.

7 Stakeholder Consultation

A community meeting was held in the Hamlet of Coral Harbour on October 16, 2025. The community meeting was facilitated by PSPC, CIRNAC, and Nunami Stantec and attended, in person, by project team members from PSPC and Nunami Stantec, as well as members of the local community. The meeting was also attended virtually by additional project team members from CIRNAC, PSPC, and Nunami Stantec.

The purpose of the community meeting was to share updates on the remediation of the Fossil Creek Bridge, gather community input to improve the remediation plan, and outline the project scope, schedule, and procurement process. The meeting included a discussion on project background, previous environmental assessment findings, remediation plan, anticipated project timelines, procurement process, and potential community benefits. The community meeting presentation slides were presented in English and Inuktitut.

It is anticipated that a final community meeting will be held following the completion of remediation activities.

8 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 portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Nunami 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 Nunami Stantec to be correct. Nunami 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 Nunami Stantec's assessment may have significantly altered the property's condition. Nunami Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Nunami 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. Nunami 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 Nunami Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Nunami 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, Nunami 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, Nunami Stantec specifically disclaims any responsibility to update the conclusions in this report.

9 References

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Appendix A Figures

Stantec

Legend

- Creek Crossing Area Used by the Community
- Gravel Roads
- Community Identified Additional Area / Area of Environmental Concern (AEC)
- Municipal Boundary

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

N

0 1 2 Kilometres

(At original document size of 11x17)
1:60,000

Notes

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

Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2025-11-05
Technical Review by SC on 2025-11-05

Client/Project
123515435
Public Service and Procurement Canada
Coral Harbour Remediation Project

Figure No.
1

DRAFT

Title
Site Overview

Stantec

Legend

- Estimated Location of Debris Identified During 2025 Supplemental Assessment
- Approximate Location of Buried Timbers
- Location of Fossil Creek Information Placards

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

N

0 20 40 Metres

(At original document size of 11x17)
1:1,250

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

Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2025-09-26
Technical Review by SC on 2025-09-26

Client/Project
123515435
Public Service and Procurement Canada
Coral Harbour Remediation Project

Figure No.
2

FINAL

Title
Estimated Debris Locations

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Summer2025_FieldProgram\123515435_002_Estimated_Debris_Locations_AEC11_FossilCreek_CIAA_20250926.mxd Revised: 2025-09-26 By: ACampigotto

386520 386530 386540

7118500

7118490

Fossil Creek

Information Placard

Stantec

Legend

- Approximate Location of Buried Timbers
- Estimated Location of Contaminated Soil
- Approximate Location of Hardened Tar/Rock Material
- Location of Fossil Creek Information Placards

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

N

0 1 2 Metres

(At original document size of 11x17)
1:100

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

Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2025-09-26
Technical Review by SC on 2025-09-26

Client/Project 123515435
Public Service and Procurement Canada
Coral Harbour Remediation Project

Figure No.
3

FINAL

Title
Estimated Extent of Infrastructure and Contaminated Soil – Western Abutment

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Summer2025_FieldProgram\123515435_003_WesternArea_AEC11_FossilCreek_CIAA_20250926.mxd Revised: 2025-09-26 By: ACampigotto

386550 386560 386570

7118510 7118500 7118490

Fossil Creek

Buried crushed drum (TP3)

Buried treated wood debris (TP7)

Treated wood debris (TP12)

Stantec

Legend

- Estimated Location of Debris Identified During 2025 Supplemental Assessment
- Approximate Location of Buried Timbers
- Estimated Location of Contaminated Soil

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

N

0 1 2 Metres

(At original document size of 11x17)
1:100

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

Project Location
Coral Harbour, Nunavut

Prepared by ACampigotto on 2025-09-26
Technical Review by SC on 2025-09-26

Client/Project
Public Service and Procurement Canada
Coral Harbour Remediation Project

123515435

Figure No.
4

FINAL

Title
Estimated Extent of Infrastructure and Contaminated Soil – Eastern Abutment

G:_GIS_Project_Folder\121416787_Coral_Harbour\ArcMaps\Summer2025_FieldProgram\123515435_004_EasternArea_AEC11_FossilCreek_CIAA_20250926.mxd Revised: 2025-09-26 By: ACampigotto

Appendix B Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 1 **Photo Location:** Fossil Creek Bridge Infrastructure **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the remaining infrastructure, facing upstream.	
Photograph ID: 2 **Photo Location:** Central Pier **Direction:** Southeast **Survey Date:** 7/15/2025 **Comments:** View of the central pier infrastructure.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 3 **Photo Location:** Central Pier **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the central pier infrastructure.	
Photograph ID: 4 **Photo Location:** Central Pier **Direction:** Southeast **Survey Date:** 7/15/2025 **Comments:** View of the central pier infrastructure.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 5 **Photo Location:** Central Pier **Direction:** West **Survey Date:** 7/15/2025 **Comments:** View of steel plate bolted to central pier.	
Photograph ID: 6 **Photo Location:** Central Pier **Direction:** Northeast **Survey Date:** 7/15/2025 **Comments:** View of steel plate bolted to central pier.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 7

Photo Location:
Central Pier

Direction:
Southwest

Survey Date:
7/15/2025

Comments:
View of concrete in the welded barrel columns.

Photograph ID: 8

Photo Location:
Central Pier

Direction:
Southwest

Survey Date:
7/15/2025

Comments:
View of bottom of welded barrel column recessed into concrete base.

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 9 **Photo Location:** Eastern Abutment **Direction:** South **Survey Date:** 7/15/2025 **Comments:** View of the north side and front of the eastern abutment.	
Photograph ID: 10 **Photo Location:** Eastern Abutment **Direction:** South **Survey Date:** 7/15/2025 **Comments:** View of the north side of the eastern abutment.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 11 **Photo Location:** Eastern Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the front side of the eastern abutment.	
Photograph ID: 12 **Photo Location:** Eastern Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the south and front side of the eastern abutment.	

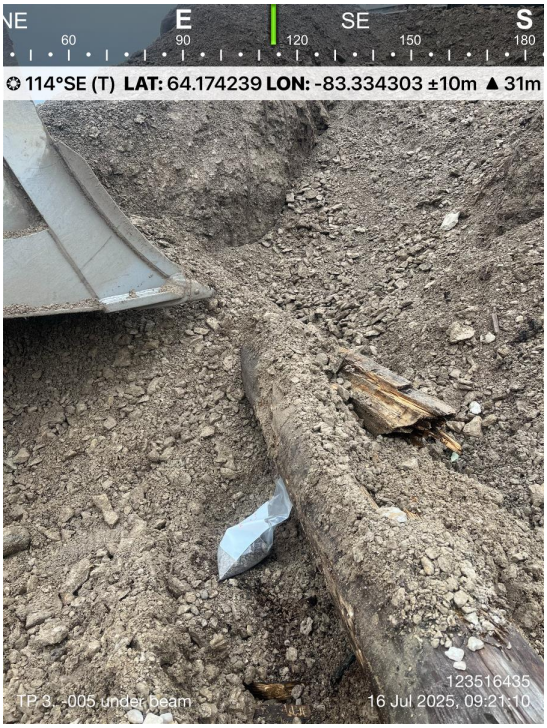
Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 13 **Photo Location:** Eastern Abutment **Direction:** Southwest **Survey Date:** 7/15/2025 **Comments:** View of the eastern abutment.	
Photograph ID: 14 **Photo Location:** Eastern Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the single information placard on the eastern side of Fossil Creek.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 15 **Photo Location:** Eastern Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** Base of eastern abutment placard, constructed of 4x4 timbers and filled with granular material.	
Photograph ID: 16 **Photo Location:** Eastern Abutment **Direction:** East **Survey Date:** 7/16/2025 **Comments:** View of crushed, empty drum encountered in TP3 during 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 17 **Photo Location:** Eastern Abutment **Direction:** East **Survey Date:** 7/16/2025 **Comments:** View of unearthed timber in TP3 during 2025 SA test pit program.	
Photograph ID: 18 **Photo Location:** Eastern Abutment **Direction:** West **Survey Date:** 7/16/2025 **Comments:** Hydrocarbon-treated wood debris encountered in TP7 during 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 19

Photo Location:
Eastern Abutment

Direction:
South

Survey Date:
7/16/2025

Comments:
View of drum top encountered in TP8 during 2025 SA test pit program.

Photograph ID: 20

Photo Location:
Eastern Abutment

Direction:
Northeast

Survey Date:
7/16/2025

Comments:
Hydrocarbon-treated wood debris encountered in TP12 during 2025 SA test pit program.

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 21 **Photo Location:** Western Abutment **Direction:** South **Survey Date:** 7/15/2025 **Comments:** View of the north side of the western abutment.	
Photograph ID: 22 **Photo Location:** Western Abutment **Direction:** Southwest **Survey Date:** 7/15/2025 **Comments:** View of the north side of the western abutment. The mixed hardened tar/rock material is visible in middle of photo.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 23 **Photo Location:** Western Abutment **Direction:** South **Survey Date:** 7/15/2025 **Comments:** A closer view of the mixed hardened tar/rock material.	
Photograph ID: 24 **Photo Location:** Western Abutment **Direction:** South **Survey Date:** 7/15/2025 **Comments:** View of the front side of the western abutment. Bottom timbers are sitting on exposed limestone bedrock.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 25 **Photo Location:** Western Abutment **Direction:** Southwest **Survey Date:** 7/15/2025 **Comments:** Interior of western abutment cribbing appears to be comprised of mostly cobbles/boulders.	
Photograph ID: 26 **Photo Location:** Western Abutment **Direction:** East **Survey Date:** 7/15/2025 **Comments:** View of the top of the western abutment cribbing. Large boulders are present within the top layer of cribbing fill.	

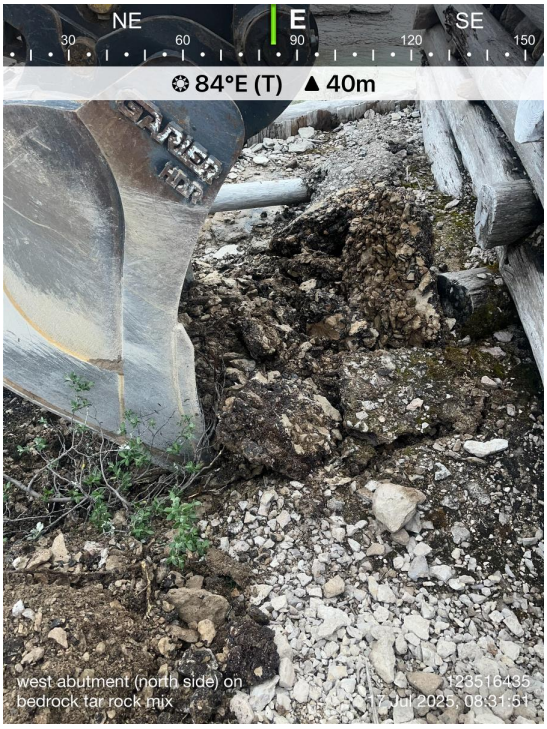
Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 27 **Photo Location:** Western Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the top of the western abutment cribbing. Large boulders are present within the top layer of cribbing fill.	
Photograph ID: 28 **Photo Location:** Western Abutment **Direction:** North **Survey Date:** 7/15/2025 **Comments:** View of the south side of the western abutment.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 29 **Photo Location:** Western Abutment **Direction:** Northwest **Survey Date:** 7/16/2025 **Comments:** End of timber encountered in TP13 during 2025 SA test pit program.	
Photograph ID: 30 **Photo Location:** Western Abutment **Direction:** South **Survey Date:** 7/16/2025 **Comments:** End of timber encountered in TP17 during 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 31 **Photo Location:** Western Abutment **Direction:** East **Survey Date:** 7/17/2025 **Comments:** TP18 being advanced in the mixed hardened tar/rock material during the 2025 SA test pit program.	
Photograph ID: 32 **Photo Location:** Western Abutment **Direction:** East **Survey Date:** 7/17/2025 **Comments:** Buried timber encountered in TP21 during the 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 33 **Photo Location:** Western Abutment **Direction:** Northeast **Survey Date:** 7/17/2025 **Comments:** End of timber encountered in TP24 during the 2025 SA test pit program.	
Photograph ID: 34 **Photo Location:** Western Abutment **Direction:** West **Survey Date:** 7/17/2025 **Comments:** Another view of buried timber encountered in TP21 during the 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 35 **Photo Location:** Western Abutment **Direction:** East **Survey Date:** 7/17/2025 **Comments:** TP25 being advanced in the western abutment cribbing fill material.	
Photograph ID: 36 **Photo Location:** Western Abutment **Direction:** East **Survey Date:** 7/17/2025 **Comments:** Attempting TP26 in the western abutment cribbing fill material during the 2025 SA test pit program.	

Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 37

Photo Location:
Western Abutment

Direction:
Northeast

Survey Date:
7/15/2025

Comments:
View of the three information placards on the western side of Fossil Creek. Fossils from the creek are placed along the wooden bases for display.

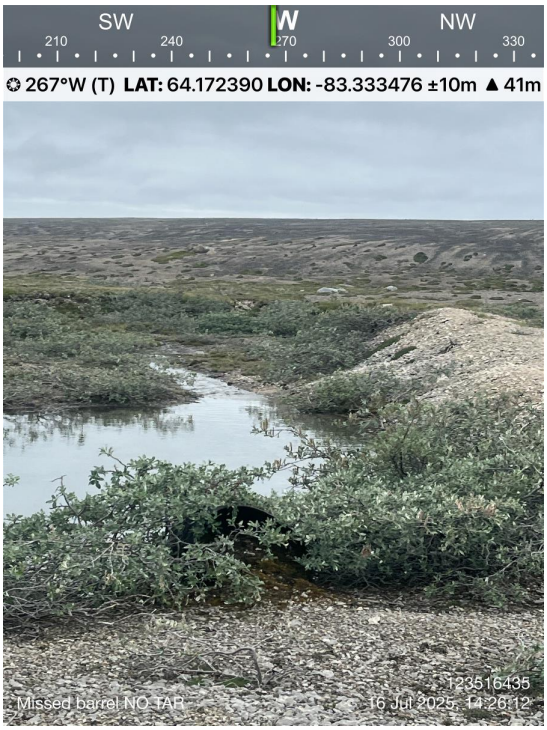
Photograph ID: 38

Photo Location:
Non-Hazardous Debris

Direction:
West

Survey Date:
7/16/2025

Comments:
Partially buried empty drum identified on western creek bank, located approximately 200m south of the bridge.



Client:	**Public Services and Procurement Canada**	**Project:**	**Coral Harbour Fossil Creek Bridge Remedial Action Plan**
Site Name:	**Fossil Creek Bridge**	**Site Location:**	**Coral Harbour, NU**

Photograph ID: 39 **Photo Location:** Non-Hazardous Debris **Direction:** Southeast **Survey Date:** 7/15/2025 **Comments:** Wooden construction debris identified on western creek bank, located approximately 60m north of the bridge.	
Photograph ID: 40 **Photo Location:** Non-Hazardous Debris **Direction:** East **Survey Date:** 7/15/2025 **Comments:** A steel pipe identified in Fossil Creek, located approximately 100m north of the bridge.	

Appendix C DFO Letter of Advice

Fisheries and Oceans Canada | Pêches et Océans Canada

Arctic Region
Fish and Fish Habitat Protection Program
301 – 5204 50th Ave. (Franklin)
Yellowknife, Northwest Territories
X1A 1E2

Régions de l'Arctique
Programme de protection du poisson et de son habitat
301 – 5204 50th Ave. (Franklin)
Yellowknife, Territoires du Nord-Ouest
X1A 1E2

December 12, 2025

Our file *Notre référence*

24-HCAA-01414

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
ATTENTION: Doug Chiperzak and Charlotte Lamontagne
929 Federal Rd
Iqaluit, NU
X0A 0H0
Sent via e-mail: doug.chiperzak@stantec.com; charlotte.lamontagne@rcaanc-cirnac.gc.ca

Subject: Coral Harbour, NU, Former Military Site Remediation Project – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Dear Doug Chiperzak and Charlotte Lamontagne:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal amendment on December 10, 2025. We understand that you propose to conduct the following works between July 1, 2026 and September 30, 2026:

- Remove and dispose of remaining bridge infrastructure at Fossil Creek, close to Coral Harbour, NU, using aquadam or bladder, excavation, and fording.
- Recontour of Fossil Creek after bridge removal.
- Work within a total footprint of 261 m^2.
- Conduct work from July 1 to September 30, 2026, overlapping with the Nunavut Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat (Zone 2).

Our review considered the following information:

- Request for Review amendment form, received on December 10, 2025.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*; and
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*.

The aforementioned outcomes are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Apply DFO's Measures to Protect Fish and Fish Habitat and applicable Standards and Codes of Practice.
- Ensure effective measures are in use during construction and operation to prevent deleterious substances (e.g. sediment, fresh concrete and concrete wash water, fuel oil etc.) from entering the water.
- Ensure proper sediment and erosion control during works.
- Conduct turbidity monitoring during the works to demonstrate the sediment and erosion control measures are functioning as intended.
    - If turbidity levels exceed water quality thresholds, all works should be halted until turbidity returns below threshold conditions.
    - It remains your responsibility to adhere to all applicable federal or provincial water quality guidelines and thresholds.
- Follow the measures described in the Interim standard: in-water site isolation.
- Follow the Code of practice: Temporary fords.
- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas.
- Screen intake pipes to prevent entrainment or impingement of fish as per the Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater.
- Replace/restore any other disturbed habitat features and remediate any areas impacted by the work, undertaking or activity.
- Conduct in-water undertakings and activities during periods of low flow or in the dry.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, the *Species at Risk Act* and the *Aquatic Invasive Species Regulations.*

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to (http://www.dfo-mpo.gc.ca/pnw-ppe/contact-eng.html).

…/3

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Natalie Grishaber at our Yellowknife office at 867-444-0317, or by email at Natalie.Grishaber@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Natalie Grishaber
Biologist
Fish and Fish Habitat Protection Program
Fisheries and Oceans Canada

Appendix D ROA Scoring Evaluation Matrix

TABLE D.1: SCORING EVALUATION MATRIX - SUPPORTING CRITERIA AND RATIONALE
Fossil Creek Bridge Remedial Options Analysis, Coral Harbour, NU

#	Comparison Criteria	Criteria Description	Weighting Factor	Maximum Score	Rationale for Scoring Factors (Scoring Guidance 1-5 Scale)
1	**Effectiveness**	The degree to which the alternative meets the project remediation and project objectives (e.g., reducing the risk to environmental and human health, returning the Site as close as possible to pre-development conditions, and re-establishment of habitat and natural drainage conditions, contaminant reduction, risk mitigation). Also is a measure of the option's long-term ability to protect human and ecological receptors from potential risk from chemical contamination and potential risk of harm from hazardous and non-hazardous physical waste. This criterion also includes duration (i.e., the time required to complete the option from mobilization to completion of LTM). A measure of requirements for monitoring, maintenance, and institutional controls. A measurement of how resilient the option is when considering its ability to maintain the intended protections over the long term without failure. Is also an estimate of the option's financial and environmental liability, i.e., a prediction of the severity of the results associated with a failure of the option to meet its objective.	5	25	1 = Fails to meet remediation goals and closure objectives or leaves residual risk. 3 = Partially meets goals with some residual risk. 5 = Fully meets or exceeds remediation and closure objectives.
2	**Execution Risk**	The potential risk associated with successfully executing the alternative, considering factors such as technical difficulty, sequencing and logistics, location, availability of equipment and materials, use of new methods or technologies, and health and safety. Evaluates challenges faced when implementing this option compared to the other options. Factors considered include logistical challenges associated with acquisition or mobilization of required workers, equipment, or materials; challenges due to physical work conditions; and anticipated technical challenges in successful implementation of this option.	4	20	1 = Major technical/logistical barriers; unproven technology. 3 = Moderate complexity; some uncertainty. 5 = Readily implementable with proven methods and minimal disruption.
3	**Environmental Impacts**	The potential environmental effects of the alternative, based on professional judgement and quantitative assessment, where available. This criterion also includes climate change and its potential effect on the long-term environmental impact of the remedial options.	2	10	1 = High potential for future impacts. 3 = Moderate potential for future impacts. 5 = No anticipated environmental impacts.
4	**Socio-Economic Impacts**	The potential effects to socio-economic components of the alternative, including consideration of benefits (i.e., does this option bring benefits to Northerners and businesses, such as job creation, training opportunities, and business opportunities).	5	25	1 = No significant short or long term job creation or local community benefits 3 = Good potential for short-term job creation and/or local community benefits 5 = Good potential for both short- and long-term job creation and/or local community benefits
5	**Regulatory**	Reflects the ability to be executed in a manner that meets Nunavut regulatory frameworks.	2	10	1 = Unlikely to meet regulatory standards. 3 = Meets minimum requirements with conditions. 5 = Fully compliant and aligns with best practices.
6	**Cost**	A measure of the capital cost of remediation. Also a measure of the life cycle costs -operations, maintenance and monitoring costs until project completion.	2	10	1 = High capital costs; poor cost-benefit. 3 = Moderate cost; acceptable trade-offs. 5 = Low cost or best value for performance.