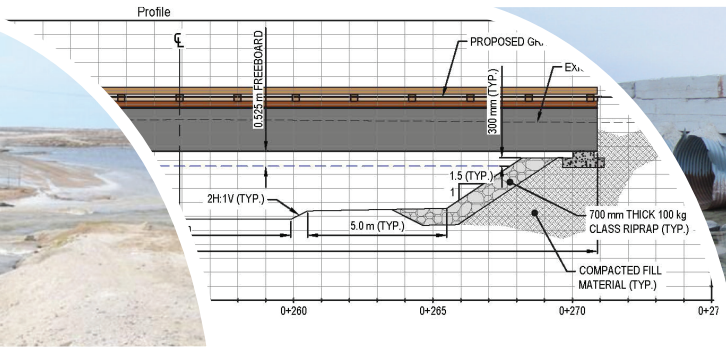
Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

AIRPORT COMMUNITY ROAD
WASHOUT REHABILITATION PROJECT
CORAL HARBOUR, NU

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

ISSUED FOR USE
APRIL 2016



TETRA TECH EBA

FILE NO.: 704-V13203282-01.001

This page intentionally left blank.

EXECUTIVE SUMMARY

This document is the Construction Environmental Management Plan (CEMP) for the proposed Airport Community Road Washout Rehabilitation Project located near Coral Harbour, on Southampton Island Nunavut. The CEMP was prepared by Tetra Tech EBA Inc. (Tetra Tech EBA) on behalf of the Department of Community and Government Services (CGS) of the Government of Nunavut for use by the contractor to be retained to implement the Project in 2016.

This CEMP is based on the known environmental conditions at the Site and the nature of the proposed Project. It provides recommendations to mitigate potential adverse effects of the Project on the aquatic and terrestrial environment based on available design plans. The CEMP is designed as a guidance document that provides general mitigation measures and best management practices (BMPs) for the Project construction phase to protect existing environmental values.

Supporting documents for this CEMP include:

- Supplemental Information Report (Tetra Tech EBA 2015a) for this project (Appendix B), which provides more detailed information regarding the environmental and physical characteristics of the Project area;
- Detailed Design Drawing Package (Tetra Tech EBA 2016a) for this project (Appendix C), which provides engineering and environmental specifications for the Project; and
- Spill Contingency and Emergency Response Plan (Tetra Tech EBA 2016b) for this Project (Appendix D).

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

APPENDIX SECTIONS

FIGURES

APPENDICES

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the Department of Community and Government Services (CGS) of the Government of Nunavut and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the CGS, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement. Tetra Tech EBA's General Conditions are provided in Appendix A of this report.

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech EBA) was retained by the Department of Community and Government Services (CGS) of the Government of Nunavut to prepare a Construction Environmental Management Plan (CEMP) for the proposed Airport Community Road Washout Rehabilitation Project ("Project") near Coral Harbour, Southampton Island, Nunavut ("Site").

This CEMP is based on the known environmental conditions at the Site and the nature of the proposed Project. It provides recommendations to mitigate potential adverse effects of the Project on the aquatic and terrestrial environment based on available design plans. The CEMP is designed as a guidance document that provides general mitigation measures and best management practices (BMPs) for the Project construction phase to protect existing environmental values.

This CEMP should be read in conjunction with the Supplemental Information Report (Tetra Tech EBA 2015a) for this project (Appendix B), which provides more detailed information regarding environmental and physical characteristics of the Project area, the Detailed Design Drawing Package (Tetra Tech EBA 2016a) provided in Appendix C, which provides engineering and environmental specifications for the Project, and the Spill Contingency and Emergency Response Plan provided in Appendix D (Tetra Tech EBA 2016 b).

2.0 PROJECT INFORMATION

2.1 Location

The Project is located near Coral Harbour, Southampton Island. Two specific watercourse crossing locations on the Post River comprise the main components of the project. The geographical coordinates at the approximate centre of these locations are 64° 07' 54" North, 83° 11' 09" West, and 64° 07' 52" North, 83° 11' 17" West, respectively. The attached Figures 1 and 2 identify the locations where construction is to occur.

2.2 Project Description

2.2.1 Background

The Airport Road has washed out four times in the past nine years during spring freshet. The last occurrence was in June 2012, when snowmelt and heavy rain caused the road to wash out in two places east and west of the fuel storage facility tank farm. The community was without access to the airport for approximately one week and the flooding also damaged the fuel tank farm's resupply pipeline. The airport and fuel tank farm are the community's lifelines; medevac services, food deliveries, and other basic provisions rely on the airport, and heating and power rely on fuel. The Project was therefore conceived to minimize or prevent future flooding and washout occurrences by replacing an eight culvert stream crossing with a bridge, the replacement of the existing bridge with a longer one, and the replacement of the existing culverts near the community fuel tank farm. These modifications are intended to increase flow capacity at the road crossings and direct flow away from the community fuel tank farm's resupply pipeline.

2.2.2 Project Alternatives

During the Feasibility Review, a total of four primary approaches were identified for CGS to consider when addressing the drainage issues along Airport Road, these included:

- **Approach 1 – Maintain Existing System:** Leave the Airport Community Road drainage system in its current configuration, performing repairs as failures take place;

- **Approach 2 – Augment Existing Capacity of the System:** Replace Crossing #4 with a new crossing able to increase the system's overall capacity to match the 100-year peak flow of 94.2 m³/s. This assumed the existing bridge at Crossing #7 will remain an integral component of the drainage system;
- **Approach 3 – Replace Existing System with One Crossing:** Construct a new crossing that is able to convey the entire 100-year peak flow of 94.2 m³/s and remove all the existing crossings including the eight culverts at Crossing #4 and the bridge at Crossing #7; and
- **Approach 4 – Replace Existing System with Two Crossings:** Construct two new crossings that are able to convey the entire 100-year peak flow of 94.2 m³/s and remove/replace the existing crossings.

Approach 4 has been recommended as being the most favourable design to consider.

2.2.3 Project Components

The proposed plan includes:

- Replacement of the existing eight culverts at Crossing #4 with the bridge currently in place at Crossing #7. This bridge will be founded on new bin-wall abutments;
- Construction of a new, 30 m long bridge at Crossing #7, founded on a pre-cast concrete sill and protected by an earth-filled abutment protected by rip-rap;
- Removal of the twin 1.2 m diameter culverts at Crossing #5 and the 1.2 m diameter culvert at Crossing #6, followed by re-installation of these three culverts at Crossings #9 and #9a to improve the hydraulic capacity of the East Basin;
- Removal of the existing culvert crossing at Crossing #10 to protect the existing fuel line to the Hamlet and forcing the flow in the East Basin through Crossings #9 and #9a; and
- Construction of temporary access roads around all crossings involved in the upgrades during construction to maintain 24-hour access between the Hamlet and airport.

A detailed description of the existing environment for the Project area is included in Section 4.0 of the Tetra Tech EBA Supplemental Information Report (Appendix B). This description identifies characteristics of the Project area related to: climate, terrain, permafrost, hydrology, water quality, aquatic resources, vegetation, and wildlife.

2.3 Project Schedule

The Project is expected to commence during the summer of 2016 and be completed by December 2016.

2.4 Site Description

A detailed description of the existing environment for the Project area is included in Section 4.0 of the Tetra Tech EBA Supplemental Information Report (Appendix B). This description identifies characteristics of the Project area related to: climate, terrain, permafrost, hydrology, water quality, aquatic resources, vegetation, and wildlife.

Based on existing information, there is no evidence that the Post River supports a fishery resource of commercial, recreational or Aboriginal value. However, it is known that coastal waters in the area provide habitat for such important species as Arctic Char (*Salvelinus alpinus*) as well as marine mammals, and that the Post River is therefore an important contributor of food and nutrients, which support coastal ecology. As such, the purpose of this CEMP is to avoid or minimize adverse effects on all terrestrial and aquatic environmental values. Tetra Tech

EBA biologists have concluded that once completed, the Project will result in environmental benefits by reducing or eliminating flooding and road washout risks and by improving fish passage opportunities, in the event that fish migration into the Post River does occur.

3.0 CONTACTS AND RESPONSIBILITIES

3.1 Key Project Personnel

The effective environmental management of this Project requires a coordinated effort from all individuals involved. The following sections outline the responsibilities of key personnel involved with the Project.

The Project contact list (Table 1) for the works proposed in this CEMP should be completed as soon as the information is known and made available to all parties.

Table 1: Contact List

Name	Role	Phone Number
TBD	Construction Foreman	TBD
TBD	Environmental Monitor	TBD
Ashwani Sharma	CGS Contact	867 645 8180
David Moschini	Construction Manager	778-875-4842

3.2 Environmental Monitor Responsibilities

On-site monitoring is a key component to ensure that the recommendations made in the CEMP are implemented properly and to identify ongoing or potential unanticipated adverse effects. A qualified environmental professional (QEP) should be retained as the Environmental Monitor (EM) to provide guidance on implementing the recommended measures and, if necessary, to advise on or direct the application of additional mitigation measures if the need arises.

Full time monitoring may not be necessary for this Project since much of the work will be conducted away from flowing water and because existing information indicates that fish presence or migrations in the Post River are unlikely. An appropriate monitoring schedule should be established among the EM, the proponent and the contractor undertaking the construction work. Notwithstanding the above, the extent and nature of the monitoring program must adhere to regulatory requirements, potentially issued by the Nunavut Water Board and/or Fisheries and Oceans Canada (DFO). The frequency of monitoring should also be adjusted according to ambient environmental conditions. It is equally or more important to take corrective action prior to inclement weather events as it is to react during or after the event. Monitoring should be conducted with greater frequency during periods of inclement weather (i.e., heavy precipitation, strong winds) and during critical stages of the Project. Key monitoring stages may include, but are not necessarily limited to:

- Works conducted directly within the wetted channel of the Post River;
- Installation of erosion and sediment control measures;
- Start-up of new phases of the Project; and
- The first freshet following the Project.

The primary responsibility of the EM is to ensure that the environmental protection objectives of the CGS are met by confirming that the requirements of this CEMP are enacted. The responsibilities of the EM include the following:

- The EM will monitor compliance with the CEMP;
- The EM will communicate the requirements of the CEMP to Project members during pre-construction and during the weekly meetings;
- The EM will be onsite as per the schedule established among parties prior to Project start. The EM will remain on-call during non-critical work periods to respond to emerging environmental issues;
- The EM will review the contractor's work procedures to ensure functionality and compliance with the CEMP and applicable regulations, standards, and BMPs;
- The EM has the authority to modify and/or halt any construction activity at any time if deemed necessary for the protection of the environment;
- The EM will advise Project members if project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action;
- The EM will liaise directly with Project members and provide technical advice for the purpose of resolving situations that may impact the environment as they arise;
- The EM will ensure that construction work is conducted in the absence of flow;
- If necessary or desired, the EM will conduct routine water quality data collection (turbidity, pH, temperature, conductivity) during construction activities in watercourses potentially affected by the project, using portable water quality meters. Such testing would be carried out: if required by regulatory agencies; as previously established as part of the monitoring protocol; or, as determined by the EM based on observed site conditions. Results will be compared to Approved Water Quality Guidelines for suspended solids (See Section 6.6, below). If a Guideline is exceeded, the EM will direct the Contractor to undertake corrective measures;
- The EM will maintain complete records of activities related to the implementation of the CEMP. This should include any readings or measurements taken, photographs and incident reports;
- The EM will provide environmental advisory support as appropriate for spill response and remediation activities; and
- The EM will complete and submit a monitoring report to CGS and will report any unanticipated adverse environmental effects to relevant regulatory agencies within 24 hours of occurrence. Such reports should include the nature of the effect, its cause, mitigation and/or remediation implemented, and whether a work stoppage was ordered, as well photographs, analyses, and measurements, if applicable.

3.3 Contractor Responsibilities

The Project contractor(s) undertakes and supervises construction activities and is responsible for adherence to the project design, including environmental mitigation measures. The following are the main responsibilities assumed by the contractor(s) with respect to environmental protection and management:

- The Contractor will review this CEMP with their staff and sub-contractors prior to undertaking any work;

- The Contractor will comply with all laws, orders, rules, regulations, and codes of Territorial or Federal environmental agencies or like authorities, which are applicable to the Project;
- The Contractor must cooperate with the EM appointed for the work by complying with written or verbal instructions regarding the implementation of the mitigation measures outlined in Section 6.0 of this document, and any other measures identified in permits or approvals issued by regulatory agencies;
- The Contractor must ensure that all work areas are effectively isolated from downstream habitat, as indicated in the Project design. The Contractor will co-ordinate isolation procedures with the EM;
- The Contractor is responsible for following and enforcing the BMPs and mitigation measures outlined herein;
- The Contractor will correct deficiencies and any non-compliance upon direction from the EM whether written or verbal. Corrections should be made as soon as reasonably possible, ideally within 24 hours of directions;
- The Contractor will arrange provision of appropriate on-site waste containers and appropriate disposal at approved locations; and
- The Contractor is responsible for the restoration of all disturbed areas resulting from any of the works they undertake. The Contractor is responsible for remediation of the Site after construction, to the satisfaction of the Project Manager and the EM.

4.0 REGULATORY ENVIRONMENT

4.1 Territorial

4.1.1 Nunavut Water Board

The Nunavut Water Board, established under the Nunavut Land Claims Agreement, has responsibilities and powers over the use, management and regulation of inland water in Nunavut. Its objective is to provide for the conservation and utilization of waters in Nunavut in a manner that will provide the optimum benefits for the residents of Nunavut in particular and Canadians in general. The Nunavut Water Board's primary function is to license uses of water and deposits of waste.

4.1.2 Environmental Protection Act

Nunavut's *Environmental Protection Act* (1988) and its regulations apply throughout Nunavut and is administered by the Department of Environment (DOE). The DOE mandate under that Act is the protection of the environment throughout the Territory. In addition, the 33 metre strip of land extending from the high water mark along the shoreline of the seacoast, navigable rivers and navigable lakes, is administered and controlled by the Commissioner of Nunavut. Activities taking place in these areas are subject to the *Environmental Protection Act* as well as the *Commissioner's Land Act* and the Spill Contingency Planning and Reporting Regulations.

4.2 Federal

4.2.1 Fisheries Act

The *Fisheries Act* (1985) is the main federal legislation providing protection for all fish, fish habitat, and water quality. The Act is administered federally by Fisheries and Oceans Canada (DFO) and Environment Canada. It requires that projects avoid causing serious harm to fish unless authorized by DFO. This applies to work being

conducted in or near waterbodies that support fish that are part of or that support a commercial, recreational or Aboriginal fishery.

Fish habitat is defined as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. This definition indicates that a watercourse (which includes but is not limited to streams, ditches, ponds and wetlands), which provides water, food or nutrients to a fish bearing stream, is considered fish habitat even if it does not contain fish and/or if it only has temporary or seasonal flows. The definition also indicates that not only the watercourse itself but also the vegetated stream side or riparian areas which provide nutrients and shade to the stream are considered fish habitat.

Under current policies and practices, DFO encourages and promotes project assessment by the proponent or their consultant, wherein the proponent is responsible for determining whether their project requires DFO review or not based on the nature of the watercourse and the type of proposed project. DFO provides a list of waterbodies and activities that do not require review and advises that if the proponent is unsure they should seek the advice of a qualified environmental professional. However, a Request for Review to DFO is available to proponents where there is uncertainty regarding the potential for the project to result in serious harm to fish or where it is important to the proponent to demonstrate that they have practiced due diligence pursuant to the *Fisheries Act*.

Following a review of the Project, the characteristics of the Post River, and the potential for fish presence in the Post River, it is the opinion of Tetra Tech EBA qualified professional biologists (R.P.Bio. status in BC) that the Project will not result in serious harm to fish, provided that appropriate mitigation measures are implemented, particularly in regard to erosion and sediment control and spill prevention.

Nonetheless, in regard to providing greater certainty to CGS, a Request for Review was submitted to DFO and on March 10, 2016 DFO communicated to the NWB that:

> *"the proposal has been identified as a project where a Fisheries Act authorization is not required given that serious harm to fish can be avoided by following standard measures".*

4.2.2 Species at Risk Act

The *Species at Risk Act* (SARA) (1994) prohibits the killing, harming, harassing, capturing or taking of species at risk, or destruction of their critical habitats. Species are designated 'at risk' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body of experts that assesses species according to a broad range of scientific data. The federal Cabinet then decides whether those species should receive legal protection under the Act.

It is not expected that any rare plants or viable rare plant communities, or rare wildlife, or rare aquatic life will be encountered or affected during this project.

Should a SARA-listed species or any other rare species be identified at the Site prior to or during the Project, Environment Canada, which administers SARA, should be notified immediately for direction on appropriate action as measures employed would vary greatly with the species encountered, its sensitivity to the project, and its proximity to the works.

On March 10, 2016 DFO also communicated to the NWB that:

> *"a Permit under the Species at Risk Act is not required since there are no Species at Risk near the Project Site".*

4.2.3 Migratory Birds Convention Act

This act restricts the disturbance or destruction of migratory birds and their nests, eggs, and shelters, except in accordance with a permit. The *Migratory Birds Convention Act* (1994) prohibits the taking or killing of migratory bird nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds.

No migratory birds, nests, eggs or shelters are anticipated to be present or affected by this Project.

4.3 Environmental Incident Reporting

Any incidents which result in non-compliance with any Act or Regulation must be reported immediately to CGS and within 12 hours to the relevant agency responsible for that Act or Regulation. Examples of Environmental Incidents include, but are not limited to:

- Discharge of deleterious substances into a watercourse, such as:
  - Spills of oil, fuel or chemicals
  - Sediment laden water entering a watercourse
  - Concrete materials (e.g., wet grout) spills into water
- Harmful alteration, disruption, or destruction of fish habitat.

The Spill Contingency and Emergency Response Plan for this Project, which identifies reportable spill quantities, is a stand-alone document but is also provided as Appendix D of this CEMP.

5.0 SENSITIVE HABITAT FEATURES AND POTENTIAL ENVIRONMENTAL IMPACTS

Based on the background review of environmental information and the Project description, potential environmental values that could be affected were identified for this Project and were assessed to determine if they are present at or near the Site and if they are subject to stakeholder or regulatory concern. Table 2 identifies Project components and their potential environmental effects. It should be noted, however, that some effects noted in Table 2 are unlikely to occur. For example, fish presence or fishing activities in the Post River have not been noted by informed individuals in Coral Harbour who were contacted during the Project assessment. Although unlikely, it is possible that some fish may be present in the vicinity of the project and therefore, potential effects should be considered.

Table 2: Summary of Potential Project Effects

Component	Impact
Site Access & Equipment Mobilization/Demobilization	▪ Potential release of deleterious substances (i.e., fuel, lubricants); ▪ Increased noise and vibration; ▪ Downstream fish disturbance.
Bridge Removal/Replacement Road Repairs	▪ Increased turbidity in water; ▪ Potential release of deleterious substances (i.e., fuel, lubricants, uncured concrete, etc.); ▪ Increased noise and vibration; ▪ Changes to aquatic habitat features/availability; ▪ Downstream fish disturbance.

Table 2: Summary of Potential Project Effects

Component	Impact
Culverts Removal/Replacements	▪ Increased turbidity in water; ▪ Potential release of deleterious substances (i.e., fuel, lubricants, etc.); ▪ Increased noise and vibration; ▪ Fish migration disturbance.

6.0 BEST MANAGEMENT PRACTICES

Throughout all phases of the Project, the proponent and all contractors are expected to comply with all Federal and Territorial regulations, permits, authorizations, conditions, and agreements with respect to environmental protection. Additional guidance for project-related environmental management practices and activities will be determined by the terms and conditions of relevant permits, licenses and approvals as they are acquired. Supplementary environmental standards, guidelines and best management practices are also contained in the following documents:

- Aboriginal Affairs and Northern Development Canada (AANDC). 2007. Guidelines for Spill Contingency Planning. http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-NWT/STAGING/texte-text/ntr_pubs_SCP_1330712728397_eng.pdf
- BC Ministry of Transportation and Infrastructure. 2013. Culverts and fish passage. http://www.th.gov.bc.ca/publications/eng_publications/environment/references/3824_CulvertFishPassage_InfoSheet.pdf
- DFO. 1992. Land Development Guidelines for the Protection of Aquatic Habitat. http://www.dfo-mpo.gc.ca/Library/165353.pdf
- Nunavut Dept. of Environment. 1999. Environmental guideline for the management of contaminated sites. Revised December 2014. http://gov.nu.ca/sites/default/files/contaminated_sites_remediation_2014.pdf
- Nunavut Dept. of Environment. Contingency planning and spill reporting in Nunavut. Accessed on December 15, 2015 at http://gov.nu.ca/sites/default/files/Spill%20Planning%20and%20Reporting%20Guide.pdf

The following sections outline general best management practices and mitigation measures that should be implemented to minimize potential environmental impacts.

6.1 General Practices

It is the responsibility of the contractor(s) to acquire and familiarize themselves with the requirements of the guideline documents listed above and of the legislation discussed in Section 4.0. These responsibilities include:

- Encouraging all contractors and site managers to review this CEMP and the applicable guidelines prior to each project phase or new activity;
- Monitoring the work carried out by their staff to determine whether protection measures were properly installed according to approved mitigation measures;

- Adherence to all relevant Federal and Territorial acts, regulations, guidelines and codes of good practice at all work sites and to all activities associated with the Project;
- Stockpiling (or have readily available), supplies of erosion and sediment control materials as appropriate on-site such as (but not limited to) rock, gravel, silt fencing, staking, and polyethylene sheeting;
- Planning and scheduling project activities for dry weather whenever possible and minimizing project works and equipment travel during periods of heavy precipitation; and
- Implementation of “adaptive management” strategies for the Project. Adaptive management evaluates and adjusts management decisions (i.e., mitigation measures) to reflect the actual interactions. Site managers and contractors should be prepared to change existing measures and BMPs should they fail or if additional measures are required. The EM should be notified of any changes to ensure they are adequate and installed properly.

6.2 Site Access and Laydown Areas

The following represent site access and construction laydown areas for the Project. These are subject to change depending on site characteristics at the time of construction:

- A temporary road, approximately 120 m in length, will be constructed north (upstream) of Crossing #7 to allow for continual flow of traffic throughout construction. This roadway will be constructed of crushed granular material placed onto filter fabric. No culverts or other openings will permit the passage of water through this temporary roadway during construction; instead, all water in the Post River will cross Airport Road via Crossing #4 Expected equipment to be utilized during this phase includes one excavator at the borrow pit, three dump/rock trucks, and one loader at Crossing #7 distributing the material;
- The temporary road, constructed around Crossing #7 in Phase 1, will be relocated north (upstream) of Crossing #4 to allow for continual flow of traffic throughout construction. This roadway will be constructed of crushed granular material placed onto filter fabric. No culverts or other openings will permit the passage of water through this temporary roadway during construction; instead, all water in the Post River will cross Airport Road via the new bridge at Crossing #7. Expected equipment to be utilized during this phase includes one excavator at Crossing #7, two/three dump/rock trucks, and one loader at Crossing #4 distributing the material; and
- A laydown area for storage of equipment and materials should be established. It should be located on a flat, stable area as far from the watercourse as possible.

6.3 Air Quality

The following are measures designed to reduce Project effects on air quality:

- Dust-generating activities should be minimized as much as possible especially during windy periods;
- Water should be used for dust suppression as required;
- No burning of oils, rubber, tires and any other material should take place at the Site;
- Stationary emission sources (e.g., portable diesel generators, compressors, etc.) should be used only as necessary and turned off when not in use;

- Equipment and vehicles should be turned off when not in active use, except under extremely cold conditions when equipment and vehicle may have to be left in idle;
- All equipment, vehicles and stationary emission sources should be well-maintained and used at optimal loads to encourage minimal emissions; and
- Vehicles or equipment producing excessive exhaust pollution should be repaired or replaced prior to being used on the Project.

6.4 Noise and Vibration

Short-term noise generation and vibrations will result from equipment and associated activities during the Project.

Because the Project will occur in a largely uninhabited area, typical noise concerns are not likely applicable to the Site. However, construction BMPs recommend that all equipment be properly maintained to limit noise emissions.

6.5 Machinery and Equipment

Equipment operation and maintenance should be carried out as follows to minimize potential environmental effects:

- Equipment and machinery should be in good operating condition (power washed), free of leaks, excess oil and grease. Equipment should be operated at optimum rated loads and be turned off when not in use to minimize exhaust emissions. Equipment producing excessive exhaust should be repaired or replaced;
- Equipment should operate above the high water mark of all watercourses. Where instream work is necessary (and has been approved through appropriate regulatory processes) equipment should work from a dry location such as a gravel bar or from an area that has been isolated and dewatered where possible;
- Machinery should be situated to minimize track movement;
- No equipment servicing should be undertaken within 30 m of any watercourse;
- Refueling of equipment should occur on land at least 30 m from any watercourse, where possible. Where 30 m is not possible, a location as far as possible from the watercourse should be chosen. Topographic features and slope should be considered. The refueling area should have a spill containment kit immediately accessible and personnel should be knowledgeable in its use (see Spill Contingency and Emergency Response Plan);
- A spill containment kit should be readily accessible onsite in the event of a release of a deleterious substance to the environment. All members of the construction team should be trained in its use;
- Any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities must immediately be reported to the Nunavut Spill Report Line at 867-920-8130 - 24 hours a day. It is also necessary to complete a spill report form[1] and fax it to 867-873-6924 or e-mail it to spills@gov.nt.ca; and
- Response to a spill incident should be conducted in general accordance with the project's Spill Contingency and Emergency Response Plan, a copy of which is provided in Appendix D of this CEMP.

[1] The Spill Report Form is available at http://gov.nu.ca/sites/default/files/NT%20NU%20Spill%20Report%20Form.pdf.

6.6 Erosion and Sediment Control

The Project involves activities, such as temporary road construction and demobilization, road repairs, culvert removal, and abutment construction, which have potential to contribute sediments to the Post River, which contributes to fish bearing waters. Sediment laden water entering a fish bearing watercourse can be considered an act that causes serious harm to fish and is a contravention of the Federal *Fisheries Act*. Therefore, managing soil and surface runoff is paramount.

According to DFO's Land Development Guidelines, water is considered sediment laden if it has more than 25 mg/L of total suspended solids (TSS) above background levels during dry weather or 75 mg/L above background levels during wet weather. Because TSS is not typically measured in the field (as it requires filtering the water sample and weighing the resulting solids), turbidity is often used as a field measurement to roughly correlate TSS levels. Ambient Water Quality Guidelines (developed by the BC Ministry of Environment) provides guidelines for both TSS and Turbidity. These guidelines consider sediment levels excessive when they exceed the levels shown in Table 3.

Table 3: Water Quality Guidelines for Turbidity and Total Suspended Solids

Water Use	Turbidity	Total Suspended Solids
Aquatic Life (freshwater, marine and estuarine)	Change from background of 8 NTU at any one time in a 24 hour period during low/clear flows (dry weather)[1]	Change from background of 25 mg/L at any one time in a 24 hour period during low/clear flows (dry weather)[1]
	Change from background of 2 NTU at any one time for a period of 30 days during low/clear flows (dry weather)[2]	Change from background of 5 mg/L at any one time for a period of 30 days during low/clear flows (dry weather)[2]
	Change from background of 5 NTU at any one time when background is 8 to 50 NTU during high/turbid flows (wet weather)[1]	Change from background of 10 mg/L at any one time when background is 25 to 100 mg/L during high/turbid flows (wet weather)[1]
	Change from background of >10% at any one time when background is > 50 NTU during high/turbid flows (wet weather)[2]	Change from background of >10% at any one time when background is >100 mg/L during high/turbid flows (wet weather)[2]
1. Turbidity should not exceed the level expressed in any single measurement.		
2. Average turbidity (minimum 5 measurements over 30 days) should not exceed the level expressed.		
Details available at: http://www.env.gov.bc.ca/wat/wq/BCguidelines/turbidity/turbiditytech.pdf		

6.6.1 Water Quality Monitoring

Water quality monitoring will be conducted by the EM in conjunction with proposed in-water work. The proposed water quality monitoring program will use standard multi-parameter instrumentation to measure and record real time values for temperature, dissolved oxygen, total suspended solids and turbidity in the streams to be temporarily impacted by construction activities. The water quality monitoring program will include:

- Establishment of background (upstream values) for streams to be crossed; and
- Measurement of real time values for monitoring parameters immediately upstream and downstream of construction activities to determine potential changes from background and conformance with guideline values (Table 3).

If downstream water quality values reach or exceed Table 3 guideline values:

- The EM will advise the Construction Foreman if project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action; and,
- The EM has the authority to modify and/or halt any construction activity at any time if deemed necessary for the protection of the environment.

All water quality monitoring data will be compiled and reported to the Project Contractor and Construction Manager. It is anticipated that the monitoring reports will be provided to the Nunavut Water Board for their review in accordance with the terms and conditions of the Water Licence.

6.6.2 Proposed Erosion and Sediment Control Measures

The following measures are recommended to minimize erosion and reduce sediment mobilization:

- Erosion and sediment control devices (such as, but not limited to, silt fencing, straw, mulch, gravel for check dams, etc.) should be available for use on-site. Project crew members should be trained in the installation and use of the devices;
- The Site should be prepared so that measures to reduce sediment from entering the Post River could be implemented quickly, if necessary. The overall goal is to isolate the work area and any potential sediment laden runoff from entering a watercourse;
- Minimize the area of soil exposed at any one time by phasing construction activities and, once construction works are completed, stabilizing the exposed soils as soon as possible using temporary measures such as mulch, erosion sediment control blankets, and/or plastic sheeting;
- Periods of heavy precipitation are possible during the proposed construction schedule. As much as possible, earthworks should be scheduled to be conducted and completed during dry weather. When significant wet weather is encountered, additional measures may be required to minimize erosion potential;
- Excavation or any earth works activities in or adjacent to the Post River should be halted during heavy rainfall events. Work may be stopped completely or works may require additional erosion and sediment control measures to be implemented in order to permit work to continue; and
- Erosion and sediment control measures should be routinely inspected. After a heavy rain event, it is likely that many of the controls will require repair, clean out, or reinforcement. A quick response to assess and correct damages of the controls is required, especially before subsequent precipitation events.

6.7 Concrete Works & Grouting

Wet concrete products typically have high pH and can negatively impact aquatic organisms. High pH may also increase the toxicity of other substances. Wet concrete products also have the potential to contribute fine sediments to a watercourse. In contrast, dry concrete is generally inert and not typically an environmental concern.

Although it is understood that this Project will not generally involve the pouring of concrete, proper housekeeping measures and appropriate work site isolation techniques should be employed to minimize the potential for chemical spills during concrete pouring and grouting, if such is required. Uncured or wet concrete must be prevented from entering a watercourse.

General BMPs to mitigate the effects of concrete grouting include:

- Concrete should be carefully poured and/or grout will be carefully applied to minimize spillage;
- Proper housekeeping practices and appropriate work site isolation techniques will be employed on-site to minimize the potential for chemical spills; and
- Appropriate spill cleanup materials will be readily available and easily accessible. Contractors will be aware of the materials required to clean up a concrete spill.

6.8 Cultural/Archaeological Resources

The work sites in question are those presently possessing watercourse structures and have therefore been previously modified. As such, no cultural or archaeological resources are known or expected in the Project Area. However, should any be encountered Project members should notify the EM immediately.

REFERENCES

Aboriginal Affairs and Northern Development Canada (AANDC). 2007. Guidelines for Spill Contingency Planning. http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-NWT/STAGING/texte-text/ntr_pubs_SCP_1330712728397_eng.pdf

BC Ministry of Transportation and Infrastructure. 2013. Culverts and Fish Passage. http://www.th.gov.bc.ca/publications/eng_publications/environment/references/3824_CulvertFishPassage_InfoSheet.pdf

Department of Fisheries and Oceans (DFO). 1985. *Fisheries Act*. Revised Feb. 2015.http://www.dfo-mpo.gc.ca/pnw-ppe/changes-changements/index-eng.html

Department of Fisheries and Oceans (DFO). 1992. Land Development Guidelines for the Protection of Aquatic Habitat. http://www.dfo-mpo.gc.ca/Library/165353.pdf

Environment and Climate Change Canada. Species at Risk Act. 2002. Revised May 2015. https://www.ec.gc.ca/alef-ewe/default.asp?lang=en&n=ED2FFC37-1

Environment and Climate Change Canada. Migratory Birds Convention Act. 1994. Revised Sept. 2015. https://www.ec.gc.ca/alef-ewe/default.asp?lang=en&n=3DF2F089-1

Nunavut Department of Environment. *Environmental Protection Act*. 1988. Revised March 2011. http://www.canlii.org/en/nu/laws/stat/rsnwt-nu-1988-c-e-7/latest/rsnwt-nu-1988-c-e-7.html

Nunavut Dept. of Environment. 1999. Environmental Guideline for the Management of Contaminated Sites. Revised Dec. 2014. http://gov.nu.ca/sites/default/files/contaminated_sites_remediation_2014.pdf

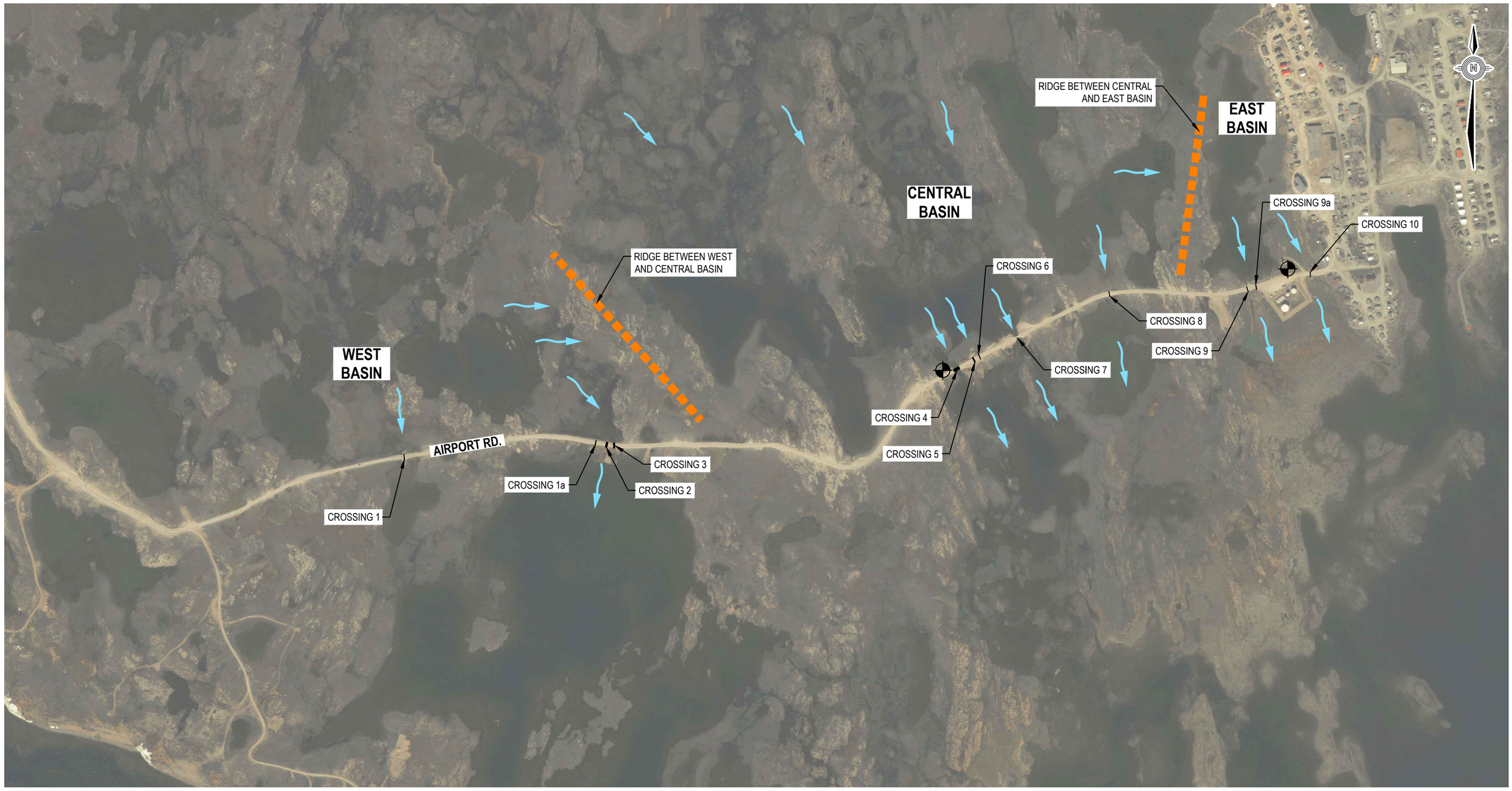
Nunavut Dept. of Environment. Contingency planning and spill reporting in Nunavut. Accessed on December 15, 2015 at http://gov.nu.ca/sites/default/files/Spill%20Planning%20and%20Reporting%20Guide.pdf

Tetra Tech EBA. 2015. Supplemental Information Report - Coral Harbour Airport Community Road Washout Rehabilitation Project, NU. Report prepared by Tetra Tech EBA for the Nunavut Department of Community and Government Services. December, 2015.

Tetra Tech EBA. 2016a. Airport Road Washout Rehabilitation, Coral Harbour NU, Detailed Design Drawings Package. Prepared by Tetra Tech EBA for the Government of Nunavut. February 2016.

Tetra Tech EBA. 2016b. Spill Contingency and Emergency Response Plan. Prepared by Tetra Tech EBA for the Government of Nunavut. April 2016.

FIGURES



DRAINAGE PLAN
SCALE: 1:10 000

LEGEND

Water Level Monitoring Location

NOTES

SCALE 1:10,000

100 0 100 200 400m

NUM	DATE	DWN	CKD	APR	DESCRIPTION

REVISIONS

PROFESSIONAL SEAL

CLIENT

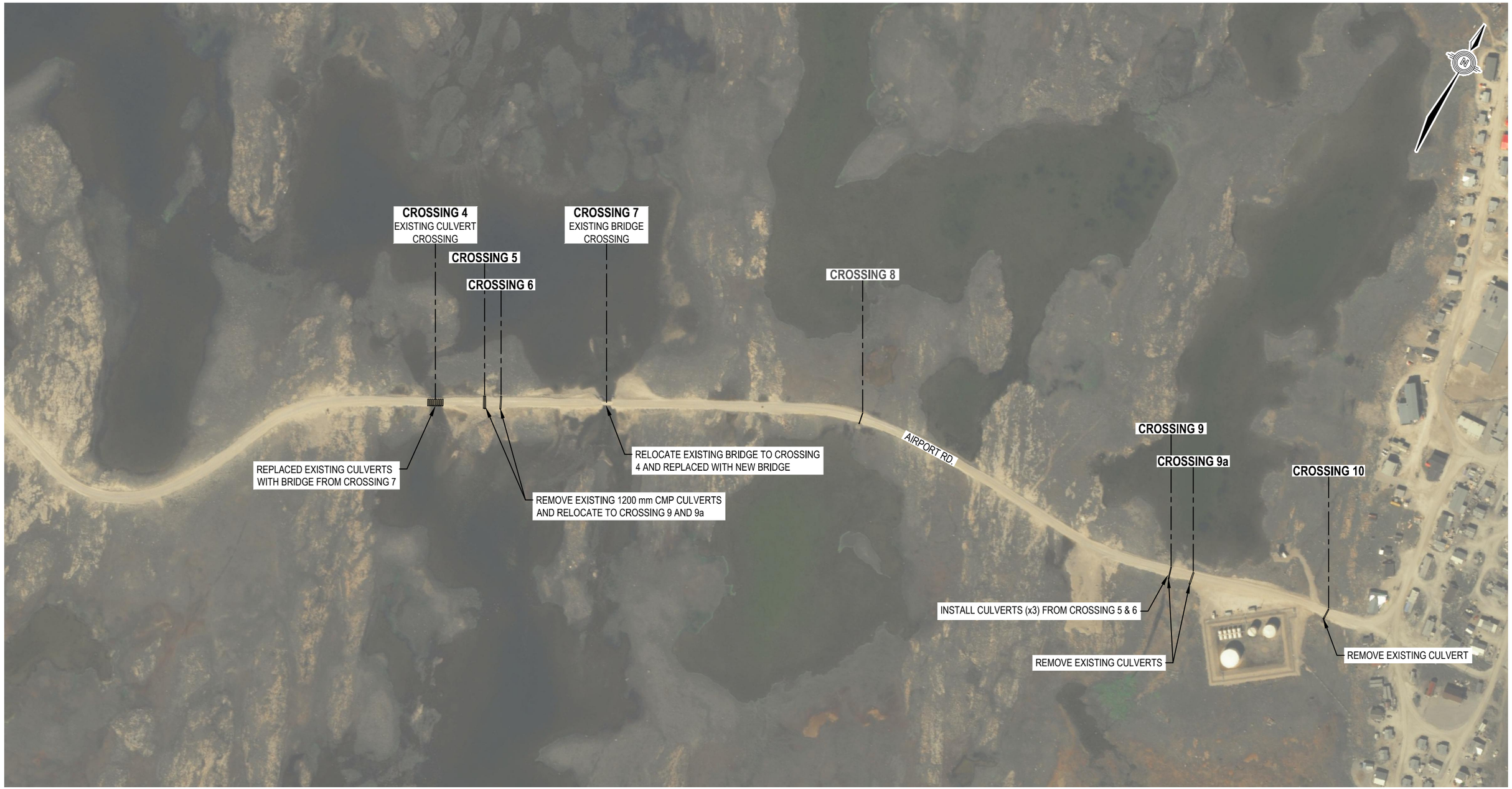
Nunavut

TETRA TECH EBA | BUCKLAND & TAYLOR | COWI

AIRPORT RD. WASHOUT REHABILITATION CORAL HARBOUR, NU

SITE LOCATION AND DRAINAGE PLAN

PROJECT NO.	OFFICE	DES	CKD	REV	DRAWING
V13203282	VANC	MAN	DNM	0	Figure 1
DATE	SHEET No.	DWN	APP	STATUS	
February 3, 2016	of	JDM	DNM	-	



SITE PLAN
SCALE: 1:2000

LEGEND

NOTES

SCALE 1:4000
40 0 40 100 160m

NUM	DATE	DWN	CKD	APR	DESCRIPTION

REVISIONS

PROFESSIONAL SEAL

CLIENT

Nunavut

TETRA TECH EBA | BUCKLAND & TAYLOR | COWI

AIRPORT RD. WASHOUT REHABILITATION
CORAL HARBOUR, NU

PROPOSED SITE PLAN

PROJECT NO.	OFFICE	DES	CKD	REV	DRAWING
V13203282	VANC	MAN	DNM	0	Figure 2
DATE	SHEET No.	DWN	APP	STATUS	
February 3, 2016	of	JDM	DNM	-	

Q:\Vancouver\Drafting\Engineering\V13\V13203282\V13203282 - Coral Harbour Airport Rd Detailed Design_R0.dwg [FIGURE 2] February 03, 2016 - 1:07:50 pm (BY: MANG, JUSTIN)

APPENDIX A
TETRA TECH'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of Tetra Tech EBA’s client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA’s Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. The Client warrants that Tetra Tech EBA’s instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by Tetra Tech EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

SUPPLEMENTAL INFORMATION REPORT – COAL HARBOUR AIRPORT COMMUNITY ROAD WASHOUT REHABILITATION PROJECT, NU

Provided in a separate PDF.

APPENDIX C

TETRA TECH EBA DETAILED DESIGN DRAWING PACKAGE (2016)

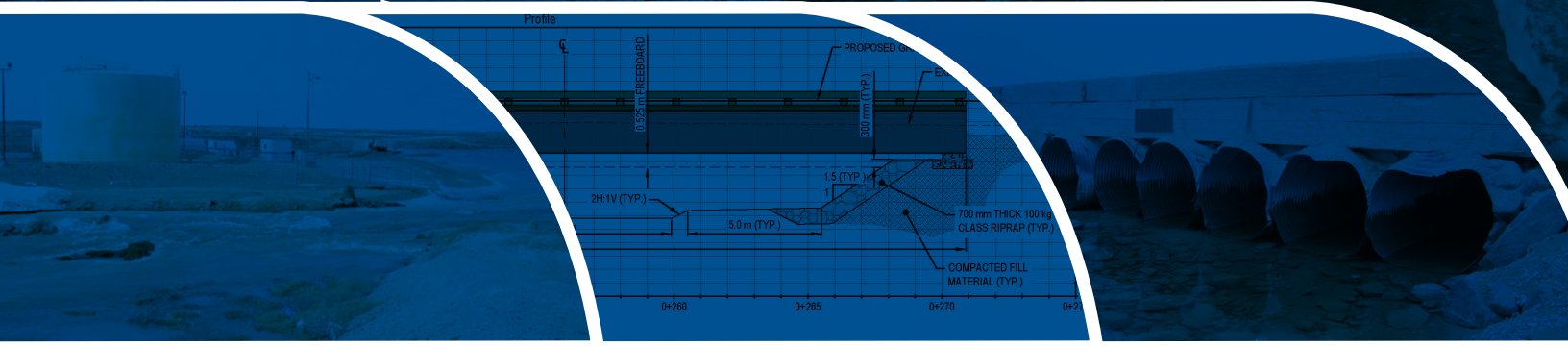
Provided in a separate PDF.

APPENDIX D
SPILL CONTINGENCY AND EMERGENCY RESPONSE PLAN

Provided in a separate PDF.

ᑲᑎᒪᔨᑦ ᓄᓇᕗᑦ ᐱᑭᒃᑲᓕᕆᓂᖅ
Building *Nunavut* Together
*Nunavu*liuqatigiingniq
Bâtir le *Nunavut* ensemble

Tetra Tech EBA
Suite 1000 - 10th Floor,
885 Dunsmuir Street
VANCOUVER, BC V6C 1N5
p. 604.685.0275



TETRA TECH EBA