



Edie Lake Quarry Geotechnical Assessment

Project Description Report

Government of the Northwest Territories – Department of Infrastructure
January 2021

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Abbreviations

AIA	Archaeological Impact Assessment
CR	Conformity Requirement
DFO	Fisheries and Oceans Canada
ENR	Department of Environment and Natural Resources
GNWT	Government of the Northwest Territories
INF	Department of Infrastructure
IGO	Indigenous Governmental Organization
km	kilometre
LUP	Land Use Permit
m	metre
mm	millimetre
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLUR	Mackenzie Valley Land Use Regulations
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	<i>Mackenzie Valley Resource Management Act</i>
NT	Northwest Territories
PCAR	Prohibition Creek Access Road
PDR	Project Description Report
PEMP	Permafrost and Erosion Management Plan
SCP	Spill Contingency Plan
SDMCLCA	Sahtu Dene and Metis Comprehensive Land Claim Agreement
SLUP	Sahtu Land Use Plan
SLUPB	Sahtu Land Use Planning Board
VC	Valued Component
WMP	Waste Management Plan

1 Introduction

1.1 Name and Contact Information

1.1.1 Applicant Head Office Address

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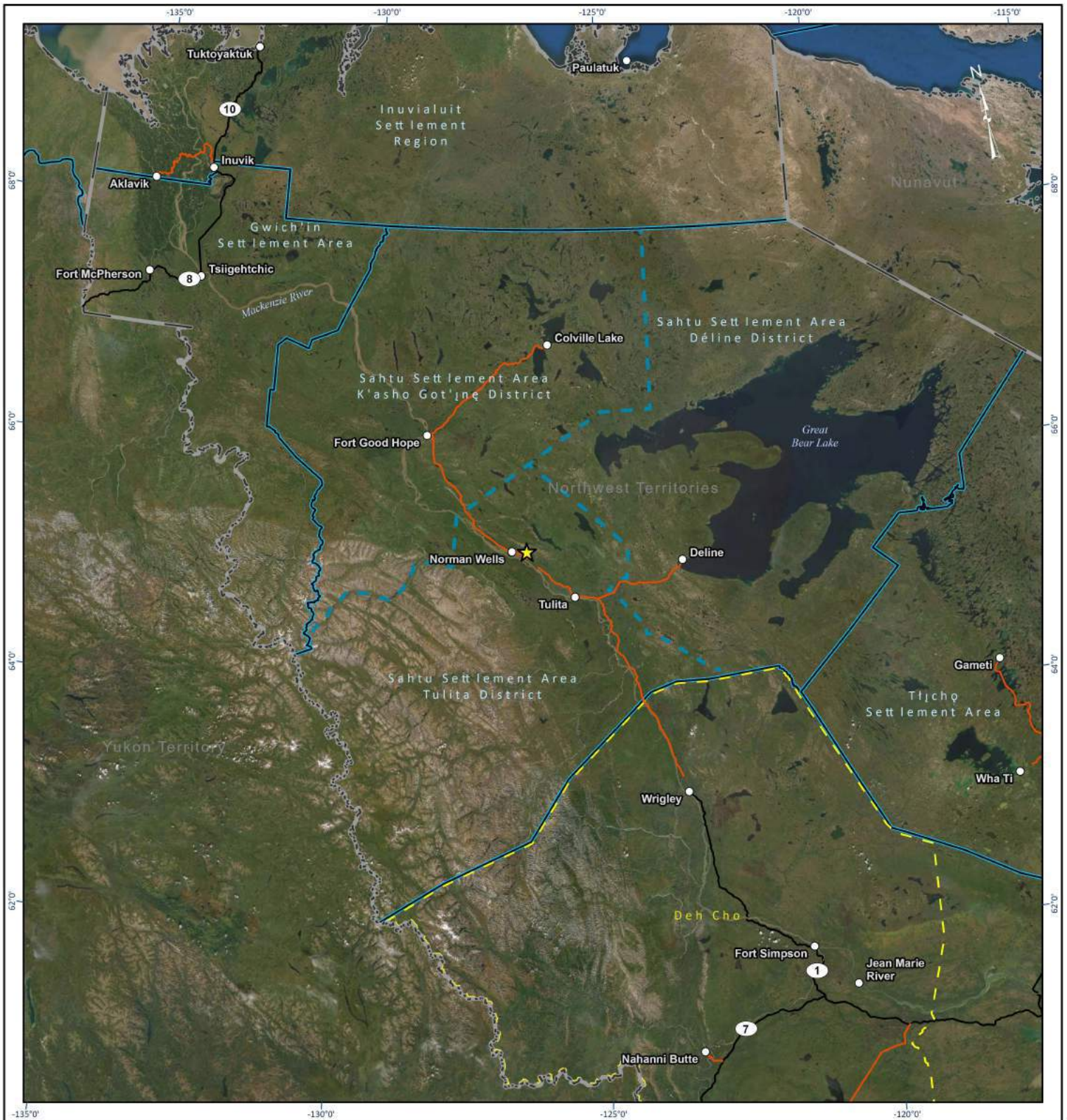
1.1.3 Other Personnel

HRN Contracting Ltd. in Norman Wells, Northwest Territories (NT) will supply equipment and general labourers to support Project work. Additionally, INF intends to obtain a wildlife monitor from Norman Wells Renewable Resource Council to support the work.

The maximum number of personnel which will be working on the Project at any given time is expected to be approximately five people for seven days.

2 Location of Activities

The Project will be completed in the Sahtu region of the NT. The Project area includes the existing Eddie lake quarry and surrounding area, as shown in Figure 2-1 below. The associated NTS Map Sheet Number is 96 E/7 (Department of Energy, Mines and Resources 1984). Coordinates for the Project area are outlined in Table 2-1.



- LEGEND**
- ★ Edie Lake Quarry Project Location
 - District Boundary
 - Region
 - Community
 - Settlement Area Boundary
 - Territorial Boundary
 - All-Season Road
 - Winter Road



NOTES
 Sources: Project Data: Government of Northwest Territories. Base Data: CanVec, Government of Canada; Government of Northwest Territories; NWT Centre of Geomatics
 Image Earthstar Geographics
 Spatial Reference: NAD 1983 Northwest Territories Lambert

Figure 2-1 - Project Location

GIS	CES	2020-11-10	Doc ID: 144902910-0009 REVA
QA/QC	CS	2020-11-10	Government of the Northwest Territories



Table 2-1 Project Area Coordinates

Description	Latitude	Longitude
Quarry Boundaries		
Corner 1	65°17'8"N	126°32'18"W
Corner 2	65°16'57"N	126°31'25"W
Corner 3	65°16'43"N	126°31'42"W
Corner 4	65°16'51"N	126°32'23"W
Corner 5	65°16'58"N	126°32'29"W
Proposed Boreholes		
EL20-P01	65°16'52"N	126°31'44"W
EL20-P02	65°16'55"N	126°31'52"W
EL20-P03	65°17'00"N	126°31'52"W
EL20-P04	65°16'58"N	126°31'39"W
EL20-P05	65°16'57"N	126°31'31"W
EL20-P06	65°17'00"N	126°32'5"W
Recon	65°16'52"N	126°31'56"W

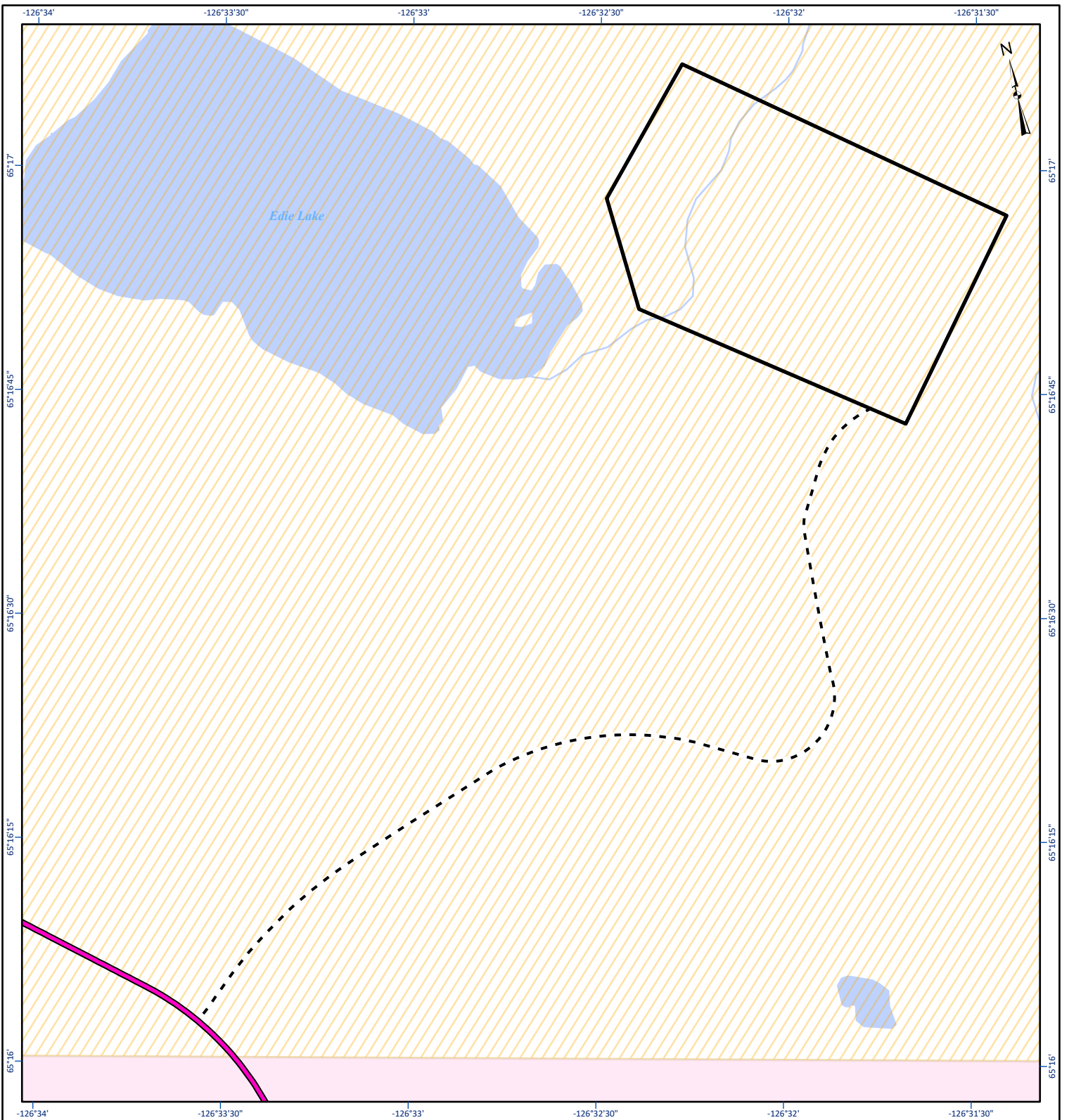
3 Eligibility

INF’s eligibility for a permit is described in Section 18 part (b) of the Mackenzie Valley Land Use Regulations (MVLUR) which states “... has the right to occupy the land and either contracts to have the land-use operation carried out or is the person who is to carry out the operation.”

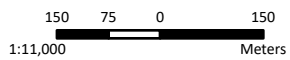
4 Rights and/or Contracts to Support Eligibility

4.1 Land Tenure / Access

The Project will be completed at the Edie Lake Quarry and entirely on territorial land (Figure 4-1).



LEGEND	
	Canyon Creek All Season Access Road
	Haul Road
	Edie Lake Quarry
	Sahtu Settlement Land
	Territorial
	Watercourse
	Waterbody



NOTES
 Sources: Project Data: Government of Northwest Territories. Base Data: CanVec, Government of Canada; Government of Northwest Territories; NWT Centre of Geomatics
 Image Source: Government of Northwest Territories; NWT Centre of Geomatics
 Spatial Reference: NAD 1983 Northwest Territories Lambert

Figure 4-1 - Current Land Ownership

GIS	CES	2020-11-10	Doc ID: 144902910-0010 REVA
QA/QC	CS	2020-11-10	Government of the Northwest Territories



4.2 Land Use Permit

INF will require a Type “A” Land Use Permit (LUP) from the Sahtu Land and Water Board (SLWB) to complete the Project as per Items 4(a)(ii,iv,v), (b) (i) of the MVLUR. This document has been developed to provide the information requested in the LUP application.

4.3 Water Licence

Water withdrawal for the Project will be less than 100 m³ per day. Based on this information, a water licence will not be required for this Project. . Water will be sourced from the Town of Norman Wells municipal water source and transported to site via water truck operated by HRN Contracting Ltd.

5 Project Description

INF is planning to construct a 13 kilometre (km) all-season access road between Canyon Creek and Prohibition Creek located southeast of Norman Wells, NT called the Prohibition Creek Access Road (PCAR). Prior to advancing this work, a geotechnical assessment program is required to be completed at the Edie Lake Quarry (the Project) to confirm the suitability of the material proposed to be used during the PCAR construction program. Upon completion, the findings of the assessment will inform and support the design of an expanded quarry at Edie Lake.

This PDR has been developed to support the regulatory applications required to conduct the Project in the winter/spring of 2021.

5.1 Location and Number of Boreholes

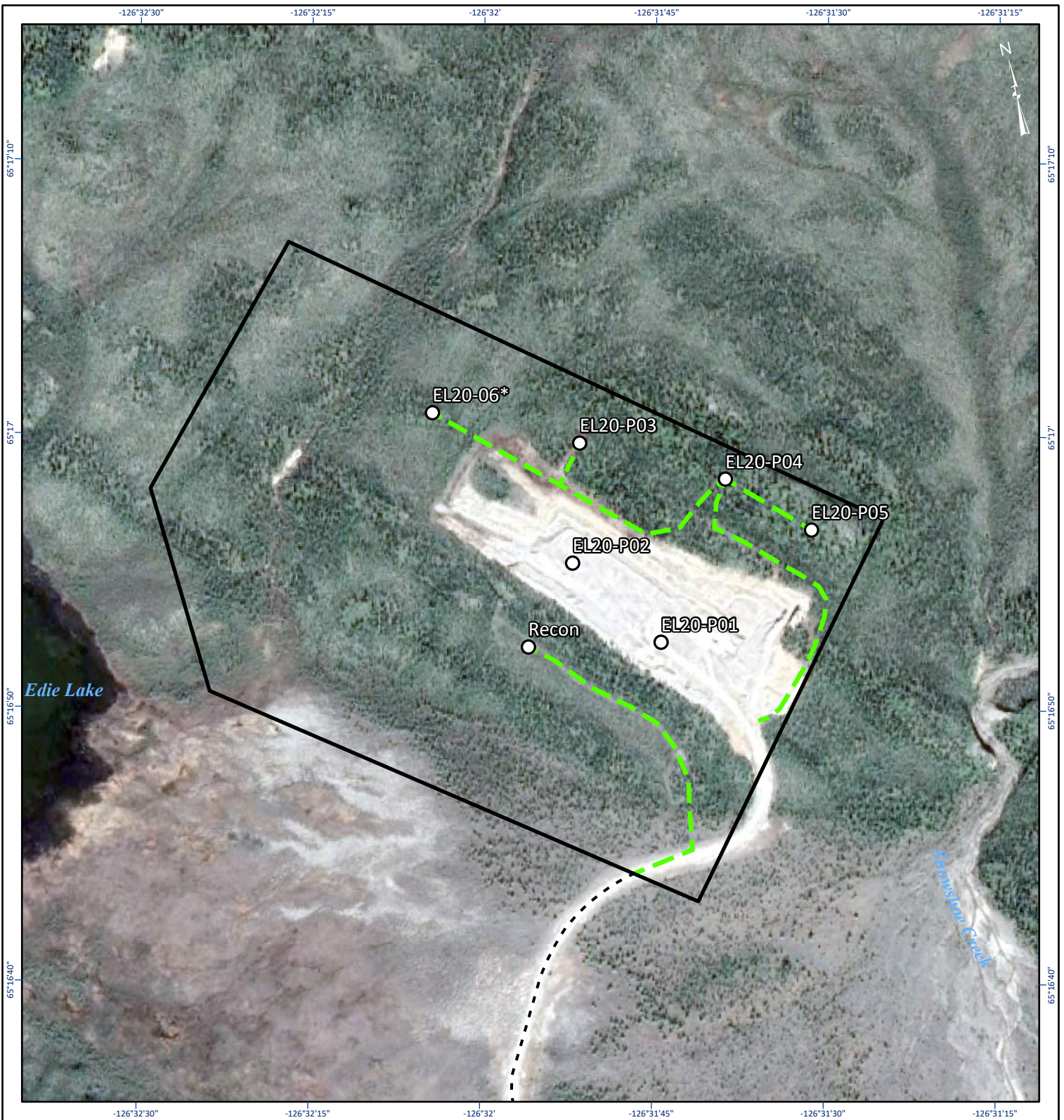
The Project will be completed using a pad-mounted core drill. Each drilling location will be accessed overland via the Edie Lake Quarry haul road and temporary access trails which have already been cleared for the program. The proposed drilling locations and cleared access trails are illustrated in Figure 5-1.

In preparation for the work, an access route was developed utilizing previously cleared areas as much as possible. These clearing activities were completed under the existing LUP [S15L8-004](#) for the Canyon Creek Access Road (CCAR) and Edie Lake Quarry. In total an additional 200 metres (m) of clearing was required to complete the route. Vegetation along the access route to the drill sites was cleared by HRN Contracting Ltd. in early October 2020. Salvageable timber was stockpiled at the worksite. Cleared vegetation was placed on the sides of the access route, and the subsurface was not disturbed during the clearing activities. The total area cleared is approximately 800 m² (4 m wide route by 200 m length).

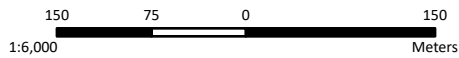
INF estimates that up to seven boreholes will be advanced to a maximum depth of 40 m during the field program; however, the final number of boreholes drilled will be determined in the field based on professional judgement and/or field conditions. Upon arrival at the drilling location, the drill will be positioned on wooden temporary drill pads that will be constructed on site.

Water will be used during the drilling program for drilling purposes. Water will be sourced from the Town of Norman Wells municipal water source and transported to site via water truck operated by HRN Contracting Ltd. Given the quantity of water required for each borehole and the number of boreholes, less than 100 m³ of water will be required during the geotechnical assessment program (~2 m³ per drilling day). Spent water not lost downhole will be discharged to a containment sump for settlement purposes.

Upon drilling, stratigraphy encountered will be logged and drilling core will be collected and stored for future reference. Upon completion of each borehole, the Contractor will backfill the borehole immediately with bentonite or an equivalent plug.



- LEGEND**
- Borehole (Proposed)
 - Access Trails to Boreholes
 - - - Haul Road
 - Edie Lake Quarry



NOTES
 Sources: Project Data: Government of Northwest Territories; Base Data: CanVec, Government of Canada; Government of Northwest Territories; NWT Centre of Geomatics
 Image Source: Government of Northwest Territories; NWT Centre of Geomatics
 Spatial Reference: NAD 1983 Northwest Territories Lambert

Figure 5-1 - Proposed Borehole Location

GIS	CES	2020-11-10	Doc ID: 144902910-0011 REVA
QA/QC	CS	2020-11-10	Government of the Northwest Territories



6 Camp

Due to the proximity of the Project work sites to Norman Wells, a camp will not be required to facilitate the Project.

7 Road and Access

The drilling sites are at an existing quarry which is already accessible through a nearby access road and haul road. For drilling locations outside the existing quarry, access trails have previously been cleared to reach these sites.

8 Waste Management Methods

Waste management for the Project will be managed in accordance with the Guidelines for Developing a Waste Management Plan (MVLWB 2011) and the Guideline for the General Management of Hazardous Waste in the Northwest Territories (GNWT 2017). A Waste Management Plan (WMP) for the Project is provided in Appendix A.

Waste generated during the Project is anticipated to be a limited amount of domestic garbage and sewage (generated by portable washroom facility placed at the work sites). All waste will be disposed of at the Town of Norman Wells disposal facilities. INF has secured an agreement with local waste management facilities for the disposal of any solid waste generated by the Project. Approval for Project waste disposal from the Town of Norman Wells is included in Appendix B.

The Contractor for the Project will be responsible for submitting a final WMP to the SLWB prior to the commencement of the Project, which will adhere to the aforementioned guidelines and be approved by INF.

9 Equipment

Equipment to be used during the project is outlined in Table 9-1 below.

Table 9-1 Equipment List and Specifications

Equipment	Size	Weight (kg)	Number	Purpose
Geotechnical Drill Rig	Various	Up to 40,000	1	For drilling boreholes at selected sites
Excavator	Cat 270	Not Applicable	1	Preparing quarry site for drill access (ramps, clearing etc.)
Dozer	D6	Not Applicable	1	Preparing quarry site for drill access (ramps, clearing etc.)

Equipment	Size	Weight (kg)	Number	Purpose
Service Pickup	½ tonne to 5 tonne capacity	5,000	2 to 4	Provide personnel transport, fuel transport in tidy tanks
Water Truck	Various	Not Applicable	1 to 2	For supplying water to the drilling unit.
Portable Diesel and Gas Generators	Not Applicable	Not Applicable	2 to 6	To provide electrical power at drill sites
Light Plants	Not Applicable	Not Applicable	2 to 4	For lighting purposes at the drill sites

10 Fuel

10.1 Fuel Delivery, Storage, and Use

Diesel is anticipated to be the primary fuel used during the Project, sourced from HRN Contracting Ltd. in Norman Wells, NT. Fuel tanks will be mounted in the back of the pickup trucks for refuelling mobile equipment and vehicles. No stationary fuel storage tanks will be stored at the work site.

The fuel tanks used during the Project will meet regulatory requirements. INF will provide the SLWB with an updated list of fuels, tanks, and storage volumes prior to the start of work.

10.2 Fuel Transfer

Fuel will be transferred using pumps and hoses attached to fuel tanks mounted on pick-up trucks and all releases will be handled in accordance with the approved Spill Contingency Plan (SCP) for the Project. All fuel transfers will be performed by experienced personnel and will adhere to the regulatory requirements specified in the LUP (for instance, fuel transfers will occur at a minimum safe set-back distance from any watercourses). Spill containment trays will be used under equipment at the work site.

11 Spill Contingency Plan

A SCP for the Project is provided in Appendix C.

12 Proposed Time Schedule

The Project is proposed to occur in the winter/spring of 2021 upon approval from the SLWB. Final dates will be determined upon receipt of the regulatory authorizations.

Due to the limited number of boreholes to be advanced at the Project sites, INF estimates that the Project will be completed within one week. To accommodate potential delays or setbacks in project execution, INF is requesting an LUP with a five year term.

13 Summary of Potential Environmental Impacts

Potential environmental impacts and proposed mitigation measures have been summarized relative to the appropriate Valued Components (VCs) in the section below.

13.1 Land

Although not anticipated, vegetation and/or surficial materials within the Project area may be disturbed. This disturbance may result in changes in the active layer depth and melting of ground ice which would result in surface water ponding, erosion, settlement, etc. To mitigate the impacts associated with the Project, INF will employ the measures outlined in the Permafrost and Erosion Management Plan (PEMP) in Appendix D. Once completed, each of the boreholes will be backfilled with the drill cuttings and/or bentonite.

Contamination of the soil is a risk associated with potential hydrocarbon spills. To mitigate this impact, Project staff will follow all measures outlined in the SCP.

13.2 Water

13.2.1 Groundwater

Groundwater is not anticipated to be encountered during the Project.

13.2.2 Permafrost

The Project is located within the zone of discontinuous permafrost (NRCAN 1993). Although not anticipated, vegetation and/or surficial materials within the Project area may be disturbed. This disturbance may result in changes in the active layer depth and melting of ground ice which would result in surface water ponding, erosion, settlement, etc.

To mitigate the impacts associated with the Project, INF will employ the measures outlined in the PEMP in Appendix D. Once completed, each of the boreholes will be backfilled with the drill cuttings and/or bentonite.

13.2.3 Surface Water

Water required for the Project will be sourced from the Town of Norman Wells and transported to the Project work sites. Water will not be withdrawn from waterbodies for the purposes of the drilling activities.

Due to the very small quantity of water and the use of setbacks for waste deposited into sumps, it is not anticipated that water quality of the surrounding waterbodies will be impacted. Mitigation methods that will be implemented to prevent impacts to surface water quality include:

- Sumps for the disposal of wastewater will be located at least 100 m from any waterbody.
- Drilling activities will be completed greater than 30 m from the ordinary high-water mark of any waterbody.
- Any spills will be cleaned up and reported in accordance with the SCP.
- Fuel transfer will occur at least 100 m from any waterbody.

The Project is not anticipated to have an impact on surface water hydrology. There will be no damming of flow or installation of water control structures.

13.3 Air

13.3.1 Air Quality

Emissions from gasoline and/or diesel combustion engines used during the Project will be generated. However, given the small number of vehicles and equipment used, localized non-persistent effects on air quality are anticipated. Impacts to air quality will be localized and temporary given the short duration of the Project (approximately one week). Given the short timelines required to complete the borehole drilling, vehicles and/or equipment will not be at any specific location for long periods of time (greater than one day).

Mitigation methods to reduce impacts associated with air quality include:

- Vehicles and equipment will be maintained in proper operating condition.
- Unnecessary idling will be discouraged.
- Garbage will be disposed of in Norman Wells. No waste incineration will be completed at the work sites during the Project.

13.3.2 Climate Change

The effects of climate change are observable and already impact the VCs within the Project area. These observations include warming temperatures, greater precipitation, and extreme/unpredictable weather events. Based on the limited timeline, it is not anticipated that this Project will have a consequential impact on climate change.

Mitigation methods that have been integrated into the Project plan to reduce impacts resulting in climate change include:

- Vehicles and equipment will be maintained in proper operating condition.
- Unnecessary idling will be discouraged.

13.4 Vegetation

No additional clearing is expected to be required as part of this Project. However, some direct and indirect impacts to vegetation may occur.

- Direct: accidental spills may damage vegetation.
- Indirect: Plant communities in the Project area may be affected by the introduction of non-native or invasive plant species during the drilling program. Dirty equipment transported to site from other areas may introduce invasive species to the Project area.

Mitigation methods to reduce impacts to vegetation include:

- Vehicles and equipment used will be decontaminated to prevent the spread of invasive plant species.
- Any spills will be cleaned up and reported in accordance with the SCP.

13.5 Wildlife

The areas adjacent to the proposed drilling sites support wildlife including some species with special conservation status. Wildlife and wildlife habitat may be impacted during the Project. Potential direct and indirect impacts on wildlife from this Project include:

- Temporary habitat loss from sensory disturbance (e.g. noise and visual disturbances)
- Wildlife mortality (direct and indirect)

13.5.1 Temporary Habitat Loss

Sensory disturbance from Project activities (e.g. noise and visual disturbances) have the potential to displace wildlife from their preferred habitats temporarily, resulting in potential effects to feeding, nesting and movement. For example, caribou are known to be sensitive to sensory disturbance (noise from machines, human presence and vehicles [Dyer et al. 2001]). Moose may be somewhat more tolerant of disturbance than caribou. Many factors affect the size of a zone of influence of a disturbance, such as topography, the presence of security cover, and environmental conditions such as wind and snow cover.

Migratory birds may be present within the Project area during the period of the work. In addition, raptor nests may be present and may be in use starting in March. Bears and other furbearers may den in the area over the winter and spring. Migratory bird, raptor nest, and den surveys will be conducted prior to starting the Project.

Mitigation measures to reduce impacts to wildlife include:

- Minimize Project footprint to the extent possible.
- A den and nest survey will be completed prior to the start of Project work.

- Wildlife monitors will be present during the Project to monitor the location of overwintering caribou. Project activities will be ceased if caribou are identified within 500 m (GNWT 2015), and will not recommence until caribou are no longer within 500 m of the drilling location.
- Drilling activities will not be completed within 800 m of bear, wolverine or wolf dens. If during the drilling activities, dens are identified, work will cease at that location.
- If raptor nests are identified during the Project, horizontal setbacks will be maintained in accordance with the Sahtu Land Use Plan (1 km between early March to early August; 500 m between early August to late February) (SLUPB 2013). If nests are identified within the setback limit, INF will discuss additional mitigations with GNWT Environment and Natural Resources (ENR).
- Vehicles and equipment will be maintained in proper operating condition, including the use of mufflers.
- Observations of wildlife by Project personnel will be reported to ENR.
- Traffic volumes and speeds will be kept low.

13.5.2 Wildlife Mortality

During the Project, there will be a limited amount of vehicles and equipment present at the work sites. During travel, vehicles will travel at the posted highway speeds. It is not expected that vehicle-wildlife collisions will be an issue for this Project.

Mitigation measures to reduce impacts to wildlife include:

- Equipment/vehicle movements and speeds will be kept low, which should minimize risk of collisions.
- Any wildlife injury or mortality will be immediately reported to INF which will then inform ENR. The cause will be investigated with potential new mitigation developed and applied.
- Maintenance measures to reduce attraction of wildlife will be employed.
- If required, additional mitigation will be developed to minimize effects on wildlife.
- Wildlife will have the right-of-way during the Project.
- Project related employees and contractors will be prohibited from feeding, harassing, or approaching wildlife.
- Hunting will not be allowed during the Project.
- All sightings of caribou will be reported to wildlife monitors. The locations of the caribou will be recorded and provided to ENR upon completion of the Project.
- The Project will comply with the NWT *Wildlife Act*.

13.5.3 Noise

Noise generated during the Project will be associated with the operation of equipment and vehicles at the Project work sites. Increases in the type and levels of the noise may disturb wildlife.

Project related noise will be localized and temporary given the short duration of the Project (approximately one week).

Given the short timelines required to complete the borehole drilling, drilling equipment will not be at any specific location for long periods of time (greater than one day). Noise generated will be localized to the vicinity of the work sites.

Mitigation methods to reduce impacts associated with noise include:

- Vehicles and equipment will be maintained in proper operating condition to reduce noise.
- Unnecessary idling will be discouraged.

13.6 Fish and Fish Habitat

The Project is not anticipated to have an adverse impact on fish or fish habitat. Interactions with the aquatic environment are not anticipated during this Project as boreholes will be completed greater than 30 m from the ordinary high-water mark of any waterbody during the winter months.

Mitigation methods that will be implemented to prevent impacts associated with fish and fish habitat include:

- Sumps for the disposal of wastewater will be located at least 100 m from any waterbody.
- Drilling activities will be completed greater than 30 m from the ordinary high-water mark of any waterbody.
- Maintain working areas clean and free of potential harmful substances.
- Fuel transfer will occur at least 100 m from any waterbody. Comply with fuel storage and handling guidelines and best practices including personnel training, fuel storage setbacks, secondary containment, etc. Any spills will be cleaned up and reported in accordance with the SCP.

13.7 Wildlife Harvesting

Based on its location, the Project is not anticipated to disrupt hunting or trapping activities.

13.8 Archaeology Resources

Archaeological features are not anticipated to be encountered during the Project. An Archaeological Impact Assessment (AIA) covering the entire Project area was conducted by Stantec Consulting in 2018. Sections of this AIA associated with Edie Lake Quarry are provided in Appendix E. This AIA

did not reveal any archaeological sites in the area. If, during the Project, archaeological sites are identified, INF and its Contractor will contact the SLWB and the Prince of Wales Northern Heritage Centre while also adhering to any other conditions outlined in the LUP.

13.9 Socio-Economic Effects

This Project will be temporary and short-term, occurring over about one week period. A field crew of approximately five people is anticipated, although this number could change depending upon the rate of progress and any changes in Project deadlines. The Project work has included general labourers and equipment provided by HRN in Norman Wells, and there will be opportunities for local individuals to be involved in the Project as wildlife monitors.

Some employment and business opportunities will be generated by this Project; however, the Project is small in size and short in duration. As such, there are unlikely to be any significant or long-term impacts on employment and business in local communities.

14 Closure and Reclamation

Restoration activities for the Project will be confined to the backfilling of boreholes with drill cuttings and/or bentonite clay or a similar material. At the end of the Project, all Project vehicles and equipment (including fuel and waste) will be removed from the Project area.

15 Additional Supporting Information

15.1 Engagement

An engagement record and engagement plan for the Project is provided in Appendix F.

15.2 Land Use Planning

The SLUPB is one of three regional, co-management boards of public government that were established by the Sahtu Dene and Metis Comprehensive Land Claim Agreement (SDMCLCA) and, as with the SLWB, was given effect under the *MVRMA*. Working with the SLWB and the Mackenzie Valley Environmental Impact Review Board (MVEIRB), this board provides for an integrated and coordinated system of land and water management in the Sahtu.

As of August 8, 2013 licences, permits or other authorizations relating to the use of land or waters or the deposit of waste, are required to follow the SLUP. The proposed Project is located in a General Use Zone under the SLUP (SLUPB 2013). All activities other than bulk water removal are allowed in general use zones (GUZs), and projects in these zones must comply with the general Conformity Requirements (CRs) of the SLUP.

The determination of whether or not a project under development conforms to the land use plan is made by the SLUPB. The Proponent is developing the road to conform to the plan. The CRs have been addressed as follows:

- CR #1 – Land Use Zoning: The Project is located in a GUZ and does not involve Bulk Water Removal.
- CR #2 – Community Engagement and Traditional Knowledge: Meetings have been held with the public and IGOs to discuss issues related to the PCAR-related geotechnical activities and Edie Lake Quarry development. An engagement record is provided in Appendix F.
- CR #3 – Community Benefits: The Project will support the eventual construction and maintenance of the PCAR, which will provide community benefits in the form of greater economic opportunities.
- CR #4 – Archaeological Sites and Burial Sites: It is not anticipated that archaeological sites will be encountered during the Project. AIAs conducted within the Project area did not indicate the presence of any archaeological sites. If, during the Project, archaeological sites or burial sites are identified, these areas will be avoided.
- CR #5 – Watershed Management: Very minor amounts of water will be required for the Project. Water required will be sourced from Norman Wells and transported to the Project work sites. A Water Licence is not required.
- CR #6 – Drinking Water: The Project will have little to no reasonable potential to contaminate surface or groundwater within community catchments.
- CR#7 – Fish and Wildlife: Background information on fish and wildlife occurring in the project area is provided in Section 13.
- CR #8 – Species Introductions: Introduction of non-native species is not anticipated.
- CR #9 – Sensitive Species and Features: The Project work sites are not within or near areas of concern identified in this CR.
- CR #10 – Permafrost: Impacts to permafrost and ice rich soils associated with this Project are not anticipated. To minimize the risk of any potential impacts to the permafrost layer, the mitigations described in Section 13.10 will be applied.
- CR #11 – Project Specific Monitoring: INF intends to obtain a wildlife monitor from Norman Wells Renewable Resource Council to support the work.
- CR #12 – Financial Security: The proponent for the Project is INF. Under the MVRMA, the territorial government is exempt from the collection of security.
- CR #13 – Closure and Reclamation: Closure and reclamation activities associated within the Project will be limited to backfilling boreholes following drilling.
- CR #14 – Protection of Special Values: As noted above, any identified archaeological sites will be avoided, impacts to water quality will be mitigated through design, and impacts to wildlife habitat will be minimized through design and construction practices.

15.3 Traditional Knowledge

Information on traditional knowledge (TK) near the Edie Lake Quarry is included in the TK report for the CCAR, which is provided in Appendix G.

15.4 Studies Undertaken to Date

Material sampling at Edie Lake Quarry was completed by Wood Environment and Infrastructure Solutions in May 2019. This program assessed the general quality of quarry material and recommended that additional assessment be completed to further characterize the site.

15.5 Letters of Support

Letters of support for the Project are included in Appendix H.

16 References

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