May 31, 2023

AlecSandra Macdonald
Regulatory Specialist
Gwich'in Land and Water Board
Alex Moses-Greenland Building
105 Veterans Way
P.O. Box 2018
Inuvik, NT X0E 0T0

RE: Submission of Type B Water Licence Application for the Inuvik Mike Zubko Airport

Dear Ms. Macdonald:

The Government of Northwest Territories (GNWT) – Department of Infrastructure (INF) is providing this letter to support an application for a Type B water use licence (the water licence) to the Gwich'in Land and Water Board (GLWB) under the *Mackenzie Valley Resource Management Act* (SC 1998, c. 25) and the *Northwest Territories Waters Act* (SNWT 2014, c. 18) and regulations. This letter and the application have been prepared in accordance with the Land and Water Boards of the Mackenzie Valley Guide to the Water Licencing Process.[1]

The water licence is required to complete surface drainage upgrades at the Inuvik Mike Zubko Airport (Inuvik Airport), located approximately 12 km east of the Town of Inuvik, NT, and for maintenance of the drainage ditches and regular operation of the airport after construction is complete. After corresponding with the GLWB and GNWT–Department of Environment and Climate Change,[2] GNWT–INF understands that "deposit of waste" is the only trigger for this project under Schedule H of the *Waters Regulations* (NWT Reg. 019-2014) for miscellaneous undertakings. This is the first submission of a water licence application for the Inuvik Airport.

This water licence application focuses on the drainage upgrade components of the upcoming construction activities for the infrastructure upgrades and runway extension. GNWT–INF will be using material from the main and north quarries

[1] Mackenzie Valley Land and Water Board, Gwich'in Land and Water Board, Sahtu Land and Water Board, and Wek'èezhìi Land and Water Board . 2021. Guide to the Water Licensing Process. https://glwb.com/sites/default/files/2021-08/LWB%20Guide%20to%20the%20Water%20Licensing%20Process%20-%20FINAL%20-%20Aug%2030_21.pdf.
[2] Macdonald, A. Regulatory specialist, Gwich'in Land and Water Board (GLWB). January 13, 2023 (conference call) with representatives from Associated, GLWB, GNWT–ECC, GNWT–INF, Mackenzie Valley Land and Water Board, and Wek'èezhìi Land and Water Board.

located adjacent to the airport for construction. A water licence and land use permit for activities completed at the quarries is not required;[3] therefore, details about the quarry are not included in this application.

The construction of the infrastructure upgrades is anticipated to begin on June 12, 2023, and be completed by December 30, 2027. The construction of the drainage upgrades for the new proposed ditches (Figure 3-2 in Attachment A and identified as Work Areas 8, 11A, and 11B on Drawing 2886-00-G-002 in Attachment B) is anticipated to begin on August 1, 2023, or after the water licence is issued, and be completed by October 31, 2024. Construction of the drainage ditches adjacent to the runway will likely be completed at the same time as the other infrastructure upgrades.

This application is time-sensitive.

The following documents are included to support the Type B water licence application:

- Water licence application form
- Figures 3-1, 3-2, 3-3, and 3.4 (Attachment A)
- Design drawings (Attachment B)
- Drainage Design draft report (Attachment C)
- Environmental Monitoring Plan (Attachment D)
- Erosion and Sediment Control Plan (Attachment E)
- Spill Contingency Plan (Attachment F)
- Hazardous Material Response Plan (Attachment G)
- Engagement Plan and Record (Attachment H)
- Preliminary Environmental Screening Report (Attachment I)
- Phase II and Phase III Environmental Site Assessment, 2007 (Attachment J)
- Inuvik Airport Quarry Pit Expansion Archaeological Impact Assessment (Attachment K)
- Prince of Wales Northern Heritage Centre review (Attachment L)

[3] Macdonald, A. Regulatory specialist, Gwich'in Land and Water Board (GLWB). April 17, 2023 (email) with Caitlin McKenzie and Jennifer Brown from Associated.

Should you have questions or require additional information, please contact me at (867) 777-2467 or by email at Jason_MacNeil@gov.nt.ca.

Sincerely,

Jason MacNeil
Regional Airport Manager, Inuvik Mike Zubko Airport
Department of Infrastructure
Government of Northwest Territories

Land and Water Boards of the Mackenzie Valley

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE IN NON-FEDERAL AREAS

Subsection 5(1) and Schedule C of the Waters Regulations

Use an "X" to indicate which Board the Application is being made to:	Mackenzie Valley Land and Water Board:		Sahtu Land and Water Board:	
	Wek'èezhìi Land and Water Board:		Gwich'in Land and Water Board:	X

To complete this form, please refer to the MVLWB *Guide to the Water Licensing Process* (Guide) and fill in the grey fields; attach additional pages, as necessary. Indicate N/A in the grey fields for Items or parts of Items that are not applicable. An application package checklist is provided in the Guide. Review the following MVLWB guidance for formatting your Application Package:

- *Document Submission Standards*
- *Standard Outline for Management Plans*

If applicable, provide the existing or current Water Licence number:	N/A		
Use an "X" to indicate if this Application is accompanied by another Application for a Water Licence in a federal area and/or a Land Use Permit.		Water Licence:	**X**
		Land Use Permit:	

1. NAME AND CONTACT INFORMATION – APPLICANT

Applicant's Name:	Jason MacNeil		
Position:	Regional Airport Manager, Inuvik Mike Zubko Airport		
Company Name:	Government of Northwest Territories – Department of Infrastructure		
Mailing Address:	Bag Service 1 P.O. Box 3024		
Community:	Inuvik	Telephone:	(867) 777-2467
Prov/Terr:	NT	Email:	Jason_MacNeil@gov.nt.ca
Postal Code:	X0E 0T0	Other:	

2. NAME AND CONTACT INFORMATION – APPLICANT'S HEAD OFFICE

Include a Certificate of Corporate Registration from the Government of the Northwest Territories to your Application Package.

Use an "X" to indicate this information is the same as Item 1 above:	**X**

3. LOCATION OF PROJECT

Use the grey fields below to provide or reference the following information:

Traditional Place Name:	Inuuvik

Maps and Geographic Information System (GIS) Data: Include a map in your Application Package, identifying local geographic features, watercourses and water sources, project structures, and location(s) of any proposed waste deposits. Provide geographic coordinates (latitude and longitude) of project features, and the maximum and minimum project boundary in degrees, minutes, seconds, or decimal degrees. Include GIS data in your Application Package, if applicable. Refer to the MVLWB *Geospatial Data Submission Standards* for providing geographic information.

Minimum latitude:	68.313413°	Maximum latitude:	68.297677°
Minimum longitude:	–133.539347°	Maximum longitude:	–133.422451°

The project location is shown in Figure 3-1 (Attachment A). The proposed approximate project footprint and approximate project area[1] with the design project features are provided in Figure 3-2 (Attachment A). The existing and proposed drainage conditions with the current outfall locations and the proposed design outfall locations are provided in Figures 3-3 and 3-4 (Attachment A), respectively.

Table 3-1 Geographic Coordinates of Project Features

Project Feature	Latitude	Longitude
OF_02	68.297661°	–133.527747°
OF_03	68.296394°	–133.488948°
OF_04	68.304840°	–133.428771°

NTS Map Sheet No.: Provide the map sheet number:	107B07

Land Types: Use an "X" to indicate the type(s) of land on which the activities are proposed:

Free Hold/ Private:		Commissioner's/ Territorial Lands:	**X**	Federal Land:		Municipal Land:	

[1] The **approximate project footprint** is the proposed area where direct, physical disturbance to the land will occur as a result of construction (e.g., vegetation clearing, excavating, and installing erosion and sediment control measures). The **approximate project area** is the area that may be disturbed during construction or operation either indirectly as a result of construction (e.g., noise, vibration), or by other means such as equipment access in the quarry and collecting surface water and sediment samples at the proposed sampling locations.

4. DESCRIPTION OF PROJECT

Describe the proposed activities in the grey field provided below and contact Board staff to determine whether additional information will be required. For proposed amendments to authorized activities, specify: the nature of the amendment, the condition(s) to be amended, and the rationale for the amendment.

The purpose of the proposed upgrades is to increase the resilience of the Inuvik Mike Zubko Airport (Inuvik Airport) to climate change and to protect and maintain essential airport infrastructure. Additionally, the water licence will regulate the normal surface water management, including maintenance of the drainage ditches at the Inuvik Airport, after construction of the drainage upgrades is complete. This is the first water licence for the Inuvik Airport.

Project Background

The Inuvik Airport is located approximately 12 km east of the Town of Inuvik, NT, in the Beaufort Delta Region (Figure 3-1 of Attachment A). The Inuvik Airport is a critical piece of infrastructure that has been providing transportation services for passengers, cargo, and mail service to the northern communities since 1969. The Government of Northwest Territories (GNWT) – Department of Infrastructure (INF) began civil infrastructure upgrades at the Inuvik Airport in 2021, with the purpose of addressing safety and operational concerns identified and funded by the Department of National Defence.

The existing drainage system does not function in its current condition. Runoff does not drain properly and forms areas of standing water, which causes the land around the runway and taxiways to sink, degrades permafrost, attracts wildlife (e.g., birds), and causes erosion and sediment concerns. Currently, runoff from airport surfaces and the undisturbed land north of the airport is discharged along existing natural drainage paths that enters both Chii Zhìt Van (Dolomite Lake) and East Lake at the following outfall locations:

- Through a natural drainage path west of the main quarry that drains to Chii Zhìt Van (OF_01);
- Through a natural drainage path on the east side of the Public Quarry Road that drains to Chii Zhìt Van (OF_02);
- Through a natural drainage path south of the airport that drains around Runway 24 and then south to Chii Zhìt Van (OF_03); and
- Directly into East Lake (OF_04).

The existing drainage conditions and outfall locations are shown in Figure 3-3 (Attachment A).

Project Description

The drainage upgrades will involve constructing new drainage ditches and culverts within the airport property which includes the runway, taxiways, and the natural areas to the east and west of the airport within Commissioner's land under reserve by the Inuvik Airport within property boundaries held by GNWT–Department of Lands.

The purpose of the drainage design is to prevent surface water from ponding around the runway and minimize further permafrost degradation in order to stabilize the runway, embankments, and vertical infrastructure (i.e., buildings). The proposed drainage paths and outfall locations are shown in Figure 3-4 and described as follows:

- Stormwater that used to flow over the Public Quarry Road to OF_01 will be diverted southeast to design condition OF_02, thereby reducing surface flow through the active quarry area and increasing surface flow and runoff volume to OF_02.

- The ditch on the east side of the Public Quarry Road will be realigned to drain approximately 175 m east of the Public Quarry Road to avoid blasting an existing rock formation to create the larger drainage channel if the existing OF_02 location was retained.
- Stormwater that flows along the southeast section of the runway will flow in a newly constructed ditch along the south side of the runway and be reconnected to the existing natural drainage path that flows to Chii Zhìt Van (OF_03). The existing natural drainage path that flows from the southeast side of the runway to Chii Zhìt Van (OF_03) will not be altered. There will be less flow and volume of runoff that enters Chii Zhìt Van from this location because the stormwater from the east of Taxiway E will be diverted to East Lake (OF_04).
- Stormwater that used to flow from the existing Taxiway E ditch line will be diverted to East Lake by the newly constructed drainage channel to OF_04, thereby increasing the flow and volume to East Lake.

OF_02 Outfall will capture the stormwater discharge from the westward ditch. The westward ditch consists of the following approximate dimensions:

- 1.5 m wide;
- 1,200 m long from the west side of Taxiway A to the Public Quarry Road;
- 260 m long along the east side of the Public Quarry Road into the 1,200 m westward ditch; and
- 750 m long from the Public Quarry Road south to the outfall at Chii Zhìt Van (OF_02).

The gabion basket check dam at OF_02 will be approximately 5 m above the ordinary high-water mark of Chii Zhìt Van.

OF_03 Outfall will capture the stormwater discharge from the south westward ditch from the east end of the runway. The ditch consists of the following approximate dimensions:

- 1.5 m wide; and
- 480 m long from the east end of the runway west to the existing natural drainage path that flows to Chii Zhìt Van (OF_03).

The drainage design does not require that any upgrades be made to the existing natural drainage path and no gabion basket check dam will be installed at OF_03.

OF_04 Outfall will capture the stormwater discharge from the eastward ditch. The eastward ditch consists of the following approximate dimensions:

- 1.0 m wide; and
- 1,200 m long from Taxiway E to the outfall at East Lake (OF_04).

The gabion basket check dam at OF_04 will be approximately 18 m above the ordinary high-water mark of East Lake.

Only the drainage upgrades for the runoff from the Inuvik Airport are discussed in this application. Drainage from the quarries will change, but it is considered separate from the application for the Inuvik Airport; therefore, the details are not included in this application.

The proposed drainage ditch alignments and the outfall locations are shown in Figures 3-2 and 3-4 (Attachment A).

The proposed drainage design drawings are provided in Attachment B. Note that the drawings for the drainage upgrades are integrated with the drawings for the other civil infrastructure upgrades, such as the runway extension.

Construction Details

Construction of the drainage ditches will include the following activities:

- Clearing and grubbing of vegetation and soil (approximately 110 hectares [ha]);
- Using blast rock material from the quarries as embankment fill and screened rock in the drainage ditches;
- Excavating ground and grading ditches (side slopes at 4:1 slope);
- Installing gabion basket check dams (blast rock encased in wire mesh) in ditches where water velocity will be greater than 2 metres per second (m/s);
- Installing non-woven geotextile and screened rock in ditches where water velocity will be greater than 1 m/s;
- Hydroseeding ditches with a native grass seed mix;
- Installing culverts with screen rock aprons; and
- Installing gabion baskets and gabion mat splash pad at the two new outfall locations, above the ordinary high water mark of both lakes.

The following erosion and sediment control measures will be incorporated into the design:

- Gabion basket check dams, which are rocks typically encased in wire mesh, will be installed at intervals where water velocity will be greater than 2 m/s.
- Ditches will be armoured with screened rock over non-woven geotextile in sections where water velocity will be greater than 1 m/s.
- A screened rock apron will be installed around the culverts.
- Gabion baskets will be installed at the end of the two new outfall locations (OF_02 and OF_4), approximately 5 m above the ordinary high-water mark of Dolomite Lake and 18 m above the ordinary high-water mark of East Lake.
- Ditches will be hydroseeded with a native grass mix where screened rock is not required.

Drawings showing details of the proposed drainage design, including the gabion basket check dams, are provided in Attachment B.

Activities associated with construction (e.g., vegetation clearing and excavating the ground) have the potential to cause an increase in total suspended solids entering the lakes during snowmelt and runoff events. The contractor completing the work will need to comply with the contract environmental specifications, which will include developing a construction environmental management plan (CEMP). The contractor will be responsible for including and incorporating the management plans included in this application into their plans, such as the spill contingency plan, erosion and sediment control plan, and monitoring plan.

Examples of environmental considerations that will be included in the CEMP are:

- Stopping work during periods of heavy precipitation runoff;
- Monitoring and ongoing testing of surface water quality for turbidity during construction;
- Installing, maintaining, and repairing temporary erosion and sediment control measures (e.g., silt fences);
- Marking clearing limits to avoid damaging vegetation adjacent to the work area; and
- Securing an environmental monitor to be on site for work within 30 m of Chii Zhìt Van.

Additionally, the contractor will be required to follow any requirements provided in the Letter of Advice anticipated to be issued by Fisheries and Oceans Canada (DFO). The conditions of the water licence will be adhered to.

Airport Operations
The new drainage ditches will convey water runoff from airport surfaces and the undisturbed land north of the airport west and south to Chii Zhìt Van and east to East Lake. Operations at the airport primarily involve maintaining airport surfaces and aircrafts, including snow clearing, seasonal deicing activities using an ethylene glycol–containing deicer, and refuelling and maintenance of aircraft, which involve petroleum-based products such as fuel, coolant, and lubricants.

After construction of the drainage ditches is complete, regular monitoring and maintenance of the drainage ditches is anticipated to ensure that they are functioning properly. Maintenance activities may include removing snow, vegetation, debris, and sediment build-up from culverts and ditches, regrading ditches, and repairing ditches with rock, riprap, and hydroseeding a native grass mix.

5. TYPE OF UNDERTAKING

Refer to Schedule B of the Waters Regulations. Use an "X" to indicate which one type of undertaking applies:

1	Industrial		
2	Mining and milling		
3	Municipal		
4	Power		
5	Agriculture		
6	Conservation		
7	Recreation		
8	Miscellaneous	**X**	(describe): Inuvik Mike Zubko Airport

6. WATER LICENSING CRITERIA

Refer to Schedules D to H of the Waters Regulations. Use an "X" to indicate which criteria apply:

	Type B	Type A
To obtain water		
To cross a watercourse		
To modify the bed or bank of a watercourse		
Flood control		
To divert water		

To alter the flow of, or store, water			
To deposit waste	X		
Other			(describe):

7. PROPOSED QUANTITY OF WATER INVOLVED

Describe the purpose of each proposed water use, name, and type (e.g., lake, river) of the water source, the location, and the quantity of water that would be used in the grey fields below. Add more rows as needed.

The purpose of the new drainage design is to redirect airport surface runoff away from the runway infrastructure and reduce surface runoff from the nearby quarry by redirecting the runoff into engineer controlled outfalls at Chii Zhìt Van (Dolomite Lake) and East Lake. The completion of the drainage improvements should serve the airports long-term resilience to climate change and extreme weather and protect and maintain essential infrastructure.

The location of the existing drainage pathways and outfalls are shown in Figure 3-3 and the proposed new drainage ditches and outfalls in Figure 3-4.

Associated completed hydraulic modelling of the airport and surrounding area that considered the new drainage alignments, potential implications related to climate change, and GNWT–INF's long-term development plans that increases the pavement area and resulting surface runoff. Based on a 25-year return period rainfall event, the modelling results shows that the resulting peak flow rates and runoff volumes are expected to increase from existing conditions, as summarized in Table 7-1.

More details on the hydrological and hydraulic modelling and stormwater drainage design are provided in the draft Inuvik Airport Drainage Design report in Attachment C.

Table 7-1 Proposed Water Quantity Use: Change in Modelled Peak Flow Rate and Runoff Volume (25-Year Return Period) from Existing to Proposed Design Conditions

Purpose of Water Use	Name and Type of Water Source	Location	Geographic Coordinates		Change in Modelled Peak Flow Rate from Existing to Proposed Design Conditions	Change in Modelled Runoff Volume
			Latitude	Longitude		
Alteration of surface runoff peak flow and volume from the airport to Chii Zhìt Van	Unnamed natural drainage path to Chii Zhìt Van (OF_01)	Chii Zhìt Van	68.300067°	−133.544198°	From 2.8 m^3/s to 1.7 m^3/s **Total change: −1.1 m^3/s**	From 55,100 m^3 to 11,100 m^3 **Total change: −44,000 m^3**
Alteration of surface runoff peak flow and volume from the airport to Chii Zhìt Van	Unnamed stormwater drainage path to Chii Zhìt Van (OF_02)	Chii Zhìt Van	Existing OF_02: 68.297676° Design OF_02: 68.297661°	Existing OF_02: −133.532809° Design OF_02: −133.527747°	From 2.9 m^3/s to 8.1 m^3/s **Total change: +5.2 m^3/s**	From 23,700 m^3 to 94,900 m^3 **Total change: +71,200 m^3**
Diversion of surface runoff that currently flows to Chii Zhìt Van east to East Lake	Unnamed stormwater drainage path east of Taxiway E will be diverted to East Lake (OF_04)	Chii Zhìt Van	68.305270°	−133.459753°	From 3.3 m^3/s to 0 m^3/s into Chii Zhìt Van **Total change: −3.3 m^3/s**	From 42,900 m^3 to 0 m^3 **Total change: −42,900 m^3**
Alteration of surface runoff peak flow and volume from the	Unnamed stormwater drainage path to East Lake (OF_04)	East Lake	68.304840°	−133.428771°	From 0.3 m^3/s to 3.7 m^3/s **Total change: +3.4 m^3/s**	From 4,800 m^3 to 51,600 m^3 **Total change: +46,800 m^3**

airport to East Lake						

Note: The modelling did not include the change in runoff flow and volume to OF_03 because the drainage design is not being modified in this area. (–) indicates a decrease in peak flow rate or runoff volume and (+) indicates an increase in peak flow rate or runoff volume. The change in modelled peak flow and runoff volume does not include considerations for climate change.

For each water source identified in the table above, provide a comparison of total proposed water use to the available capacity. Add more rows as needed.

Water will not be used (i.e., withdrawn) from the eastward and westward drainage ditches, Chii Zhìt Van, or East Lake during construction or operation. Dewatering of the standing water in the existing drainage ditches within the airport may be required to complete construction but water will not be withdrawn from watercourses for construction use. Calculating the capacity of water for the water sources does not apply to this water licence application and will depend on precipitation and snowmelt. A more in-depth comparison of the change in runoff peak flow rates and runoff volumes to Chii Zhìt Van and East Lake, and to each outfall, is provided in Table 7-2.

Table 7-2 Change in Peak Flow Rate and Runoff Volume from Existing Drainage Conditions to Proposed Design Conditions (25-Year Return Period)

Outfall	Existing Conditions Peak Flow Rate (m^3/s)	Design Conditions Peak Flow Rate (m^3/s)	Change in Peak Flow Rate (m^3/s)	Existing Conditions Runoff Volume (m^3)	Future Conditions Runoff Volume (m^3)	Change in Runoff Volume (m^3)
OF_01	2.8	1.7	–1.1	55,100	11,100	–44,000
OF_02	2.9	8.1	+5.2	23,700	94,900	71,200
OF_03	3.3	0 (flows to OF_04)	–3.3	42,900	0	–42,900
OF_04	0.3	3.7	+3.4	4,800	51,600	46,800
Overall peak flow and runoff volume to Chii Zhìt Van	**9.0**	**9.8**	**+0.8**	**121,700**	**106,000**	**–15,700**
Overall peak flow and runoff	**0.3**	**3.7**	**+3.4**	**4,800**	**51,600**	**+46,800**

volume to East Lake						

Note: The modelling did not include the change in runoff flow and volume to OF_03 because the drainage design is not being modified in this area. (–) indicates a decrease in peak flow rate and runoff volume and (+) indicates an increase in peak flow rate and runoff volume. The change in modelled peak flow does not include considerations for climate change.

See the draft Inuvik Airport Design report for more details on the modelled change in peak flow and runoff volume (Attachment C).

8. PROPOSED WASTE MANAGEMENT METHODS

Use the grey field below to provide or reference the following information:

Waste Management Plan: Include a Waste Management Plan in your Application Package, if applicable, or for small-scale activities, describe proposed waste management activities in the grey field provided below. A template for the Plan is available in the MVLWB *Guidelines for Developing a Waste Management Plan*.

If waste is proposed to be disposed of off-site within the NWT, written confirmation (e.g., an email, letter, etc.) from the facility/facilities indicating they will accept the waste is required. Include it/these in your Application Package. Please note this information will be required by the Board prior to commencement of activities.

Municipalities: Complete the relevant Operations and Maintenance Plans using the available Templates and include them in your Application Package. Please refer to Sections 4-8 of Environment and Climate Change Canada's *Solid Waste Management for Northern and Remote Communities: Planning and Technical Guidance Document*.

EQC and AEMP: For activities that involve the deposit of waste into water, provide proposed effluent quality criteria (EQC) in accordance with the MVLWB *Water and Effluent Quality Management Policy* and MVLWB/GNWT *Guidelines for Effluent Mixing Zones*. Please refer to the MVLWB/GNWT *Guidelines for Effluent Mixing Zones* when mixing zones are being considered. Please refer to the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs* for more information regarding the development of AEMP programs.

WASTE MANAGEMENT

The contractor will be required to develop and follow a CEMP, which will be reviewed by a GNWT representative before construction begins. The CEMP will include methods for waste management. Waste will be disposed of off site at a licensed facility. As per the tender contract documents, the contractor is required to separate waste materials, such as recycling from general waste. Excess aggregate material will be stored at a local facility for reuse, as directed and approved by a GNWT representative (possibly in the north or main quarries).

Potential wastes associated with the **construction phase** include the following:

- Solid waste generated through construction (e.g., general refuse and excess aggregate material);
- Total suspended solids in surface water (see the environmental monitoring plan, Attachment D, and erosion and sediment control plan, Attachment E); and
- Hazardous waste generated through construction, such as used oil rags (see the spill contingency plan, Attachment F).

Potential wastes associated with the **operation phase** include the following:

- General solid, liquid, and hazardous waste generated from airport operations and maintenance (Hazardous Material Response Plan, Attachment G);
- Total suspended solids in surface water during runoff conditions (environmental monitoring plan, Attachment D, and erosion and sediment control plan, Attachment E); and
- Deicing chemicals (see below).

Aircraft deicing is occasionally performed at the airport. When deicing activities are completed at the airport, they are performed at the west apron using an ethylene glycol–containing deicing liquid. There is currently no method to recapture the deicing fluid and runoff flows west of the airport, approximately 1.8 km to Chii Zhìt Van. Proposed monitoring requirements for glycol are included in the environmental monitoring plan, in Attachment D.

EFFLUENT QUALITY CRITERIA

Baseline Conditions – Chii Zhìt Van (Dolomite Lake) and East Lake

Chii Zhìt Van is approximately 5 km in length and 580 ha in size, with a depth of approximately 10 m.[2] It receives intermittent surface water from wetland ponds and lakes located in the airport area. Ice typically covers the lake surface from November to June. The fish species in Chii Zhìt Van that are important traditionally and economically are:

- lake whitefish (*Coregonus clupeaformis*);
- broad whitefish (*Coregonus nasus)*;
- lake trout (*Salvelinus namaycush);* and
- northern pike (*Esox lucinus)*.

Wildlife that are known to use the area of Chii Zhìt Van, as reported by local community members who are familiar with it, are waterfowl such as ducks, geese, and swans; birds of prey, such as ospreys, eagles, and falcons; and mammals, such as moose, caribou, foxes, and wolves.[3] The area is used traditionally for activities such as hunting, trapping, and berry picking, and recreationally for activities such as boating, swimming, and cross-country skiing. Community members own cabins on Chii Zhìt Van.

East Lake is an unofficially named pothole lake located east of the Inuvik Airport. It is approximately 1.8 km long and 0.5 ha in size. The depth of East Lake is unknown and based on imagery, it appears to be shallow. There are no known reported occurrences of fish in East Lake and it is not known to be used for traditional or recreational purposes.

Water Quality Data

There is no existing runoff data from the airport and no known recent or relevant water quality data on the receiving environments of Chii Zhìt Van or East Lake. Due to the lack of data, effluent quality criteria, effluent mixing, and receiving water quality criteria are not being proposed in this application.

The environmental monitoring plan (Attachment D) details the proposed monitoring methods for construction and operation of the airport to Chii Zhìt Van and East Lake. The proponent proposes to compare water quality results to the Canadian Council of Ministers of the Environment Canadian Water

[2] Racca, R.G., D.E. Hannay, JASCO Research Ltd., R.B. Murray, W.B. Griffiths, LGL Limited, M. Muller, and IEG Inuvialuit Environmental and Geotechnical Inc. 2004. Testing Fish Deterrents for Use Under-ice in the Mackenzie Delta Area. Environmental Studies Research Funds Report No. 145. Calgary. 118p.

[3] Government of Northwest Territories. 2018. Dolomite Lake "What We Heard." Summary of Findings from the Public Engagements Held February 7 and 8. https://www.ecc.gov.nt.ca/sites/ecc/files/resources/dolomite_lake_-_public_engagement_inuvik_-_what_we_heard_-_en.pdf.

Quality Guidelines for the Protection of Aquatic Life[45]. Water quality results for glycol are proposed to be compared to Environment and Climate Change Canada's glycol guidelines for federal airports.[6]

9. EXISTING WATER USERS AFFECTED BY THIS PROJECT

Describe pre-Application engagement efforts with any existing water users and associated possible claims for water compensation or compensation agreements. Include the names and locations of existing water users (e.g., persons or organizations) in the grey fields below. An additional table should be added for each water user.

See the engagement plan and engagement record (Attachment H) for pre-application engagement efforts.

Based on a desktop search completed in March 2023, no active water licences were issued for Chii Zhìt Van, East Lake, or other water bodies in the vicinity of the Inuvik Airport. Chii Zhìt Van and the surrounding area are used traditionally by Gwich'in participants, and the area is considered good hunting territory for caribou and moose by Inuvik residents.[7] Chii Zhìt Van is also used recreationally, including for fishing year-round. No permanent residences exist within the area of the proposed drainage upgrades. Residents that own the cabins on the lakeshore are not anticipated to be impacted in the long term. However, they may be temporarily impacted during construction activities (e.g., noise and increased vehicle traffic).

10. POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROJECT AND PROPOSED MITIGATIONS

If the proposed project, or parts of the proposed project, may be exempt from preliminary screening, describe the rationale for the exemption in the grey field below. Include the date of the most recent screening, and/or the environmental assessment or impact review number.

Dillon Consulting Ltd. completed a preliminary environmental screening report for the proposed Inuvik Airport Runway Extension in 2009 (Attachment I). Potential environmental impacts associated with construction activities for the drainage upgrades and with normal operation at the Inuvik Airport are presented in the table below.

The approximate land area to be cleared and grubbed for the drainage ditches is 110 ha. Riparian vegetation will be cleared for the drainage ditches up to approximately 5 m from the ordinary high-water mark of Chii Zhìt Van and up to approximately 18 m from the ordinary high water mark of East Lake. Besides the riparian areas, there are no known sensitive land areas to be disturbed.

Unless the project could be exempt from preliminary screening, using the Impact-Mitigation Table below, or the more detailed Table in Appendix F of the Guide, identify all potential impacts and possible mitigations that are relevant to the proposed project, and indicate whether any of the mitigation measures

[4] Canadian Council of Ministers of the Environment (CCME). 1999a. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Total Particulate Matter. Updated 2002. https://ccme.ca/en/res/total-particulate-matter-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf.

[5] Canadian Council of Ministers of the Environment (CCME). 2023. Summary Table. https://ccme.ca/en/summary-table.

[6] Environment and Climate Change Canada (ECCC). 2017. Order in Council: Glycol Guidelines. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/guidelines-objectives-codes-practice/order-council-glycol.html.

[7] Snowshoe, S. Director, Department of Cultural Heritage, Gwich'in Tribal Council. May 3, 2020. Personal communication (written) with Courtney Barr of Associated.

have been developed as a result of input from affected parties. Applicants for type A water licences must use the detailed Table in the Guide; other applicants may choose either the Table below or the Table in the Guide. Possible potential impacts are listed below; however, these lists are not exhaustive and may not apply to all projects. All information provided should reflect the size, scale, and nature of the proposed project. Cumulative impacts and climate change must be considered. Attach additional pages if needed.

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
ABIOTIC COMPONENTS		
Land		
Soil contamination	**X**	**<u>Waste and petroleum hydrocarbon storage</u>** **Potential impact:** Temporary on-site storage of waste (domestic garbage, waste petroleum products, hazardous waste) during construction and from normal airport operations could result in contamination of soil from improper storage or handling of the wastes. **Proposed mitigation:** Contractor to include a waste management plan (including hazardous waste) in their CEMP, to be approved by a GNWT representative, and follow the spill contingency plan in Attachment F. The Inuvik Airport follows waste management procedures for storing and disposing of materials such as used oil. Waste and hazardous waste are disposed of off site, at a licensed facility. **<u>Fuel transfer</u>** **Potential impact:** Transfer, storage, and use of petroleum products, or chemicals may result in a release to the environment. Use of motorized and heavy equipment may result in equipment malfunction and spills to the environment. **Proposed mitigation:** Contractor to follow the spill contingency plan included in Attachment F and update it with company- and project-specific information. The spill contingency plan will include mitigation measures for fuel storage and refuelling, including setback distances from waterbodies and drainage ditches, and the requirement for the contractor to inspect their equipment to ensure it is in good working order and free of leaks. The Inuvik Airport follows its Hazardous Material Response Plan, included in Attachment G. **<u>Work in potential contaminated area</u>** **Potential impact:** Construction of ditches through an existing contaminated area could result in

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		improper handling and mixing of impacted soil. **Proposed mitigation:** Associated reviewed the historical Phase II and Phase III Environmental Site Assessment (ESA) performed at the Inuvik Airport (Attachment J). No construction work is anticipated to occur in the known contaminated areas (i.e., contaminated soils treatment facility or the previous fire training area). If any soil has to be moved from a known contaminated site, it will be stockpiled in a contained area and testing before disposal or reuse.
Soil compaction	**X**	**Potential impact:** Repeated equipment use in undisturbed areas during construction may result in soil compaction, which could affect vegetation growth and water infiltration. **Proposed mitigation:** Contractor to clearly mark access routes, work area boundaries, and clearing limits to minimize damage to undisturbed areas outside the project footprint. Contractor to use identified laydown or disturbed areas to store equipment and supplies. Compacted areas outside the project footprint should be restored (e.g., decompacted and seeded with a native seed mix).
Destabilization/erosion	**X**	**Potential impact:** Vegetation clearing, grubbing, and soil excavation activities may result in exposed soil, which is prone to erosion from water runoff. **Proposed mitigation (construction):** Contractor to follow erosion and sediment control plan (Attachment E) and to include company-specific information in their CEMP. **Proposed mitigation (design):** Erosion and sediment control measures are incorporated in the proposed design of the drainage ditches (e.g., gabion basket check dams). Areas that will not have screened rock will be seeded with a native seed mix. See Section 4 of this application form, the design drawings (Attachment B), and erosion and sediment control plan (Attachment E) for details.
Change in soil structure	**X**	**Potential impact:** Soil excavation, grading, and design of ditches will change soil structure. **Proposed mitigation:** Minimize disturbance area to that required for designing the ditches.
Inability to support vegetation	**X**	**Potential impact:** Sections of the drainage ditch where non-woven geotextile fabric and screened

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		rock are installed will no longer support vegetation. There may be an inability to support vegetation due to compaction (see above). **Proposed mitigation:** None. This is a necessary component of the drainage ditch design to mitigate for erosion and sediment concerns. See soil compaction impact for mitigations.
Other	N/A	N/A
Water		
Groundwater		
Water table alteration	N/A	N/A
Infiltration changes	**X**	**Clearing of vegetation** **Potential impact:** Clearing and grubbing of vegetation may change the rate and location of surface water infiltration to groundwater. **Proposed mitigation:** Contractor to limit clearing and disturbance to that necessary to complete project activities. **Drainage upgrades and diversion of drainage paths** **Potential impact:** Changing the path along which some of the runoff flows will change the location where infiltration occurs. For example, most of the runoff that used to flow from the southeast corner of the airport will no longer flow through the natural drainage path to Chii Zhìt Van. Upgrading the airport drainage will eliminate or reduce the amount of standing water at the airport. **Proposed mitigation:** None. This change is necessary to perform the upgrades to the airport drainage to protect airport infrastructure.
Changes in water quality	X	**Use of petroleum hydrocarbons** **Potential impact:** Transfer, storage, and use of petroleum products during construction of the drainage ditches and operation of the airport may affect groundwater quality above permafrost, depending on the location and size of spill. **Proposed mitigation:** Contractor to follow spill contingency plan (Attachment F). Airport to follow Hazardous Material Response Plan (Attachment G).

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
Temperature changes	N/A	N/A
Other	N/A	N/A
Permafrost		
Loss or change in extent	**N/A**	N/A
Changes in seasonal fluctuations	**N/A**	N/A
Change in persistence	**X**	**Potential impact:** Upgrading the drainage ditches at the airport will reduce the amount of standing water, which lessens the impact to permafrost thaw. This is a positive potential impact. However, excavating new drainage ditches near permafrost may impact the permafrost, depending on depth. **Proposed mitigation:** Permafrost excavation will be limited to areas required for new construction only and conducted during the winter months to minimize thermal disturbance. Ditch networks are designed to ensure water flow is maintained to eliminate standing water and are sufficiently offset from airport infrastructure to protect against further permafrost degradation under or adjacent to the runway or taxiways as thermal equilibrium is reached.
Other	N/A	N/A
Surface Water		
Water flow or level changes (permanent, temporary, seasonal)	**X**	**Potential impact:** Increased peak water flow and runoff volumes in new proposed ditches and decreased peak water flow and runoff volumes in existing drainage paths. The drainage paths are not fish bearing. Runoff will ultimately flow to the same lakes that it does in existing conditions. **Proposed mitigation:** The drainage design has accounted for an increase in peak flow and runoff volume due to improvements planned at the Inuvik Airport. See the draft Inuvik Airport drainage design report in Attachment C.
Drainage pattern changes	**X**	**Potential impact:** The proposed drainage design will change the location that runoff flows from the airport to Chii Zhìt Van and East Lake. This will change the peak flow rate and volume of runoff water that discharges to both lakes at each outfall location. **Proposed mitigation:** The drainage upgrades were designed with the least amount of drainage pattern changes to maintain positive drainage from the airport.

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
Temperature changes	**X**	**Potential impact:** Surface water temperature may be impacted by potential increased sediment loads during freshet and precipitation events that produce runoff. **Proposed mitigation:** See the erosion and sediment control plan for mitigation measures (Attachment E) and the monitoring plan for mitigations related to construction turbidity monitoring (Attachment D).
Changes in water quality	**X**	**Construction activities** **Potential impact:** Vegetation clearing, excavation of new drainage ditches, and spills from equipment or fuel transfer and storage may impact the quality of runoff water that enters both lakes. Potential parameters of concern are total suspended solids, turbidity, petroleum hydrocarbons, and metals. **Proposed mitigation:** Contractor to follow the monitoring plan, erosion and sediment control plan, and spill contingency plan (Attachments D, E, and F). The monitoring plan includes monitoring for turbidity during construction. The contractor will follow the other plans and mitigations in their CEMP, which will be approved by a GNWT representative before work begins. **Runoff from airport operations** **Potential impact:** Runoff from airport surfaces that enters both lakes may contain the parameters of concern described above and also glycol from deicing chemicals. Note that the use of deicing chemicals at the airport is not new and occurs only occasionally. **Proposed mitigation:** • Spill contingency plan (Attachment F) • Inuvik Airport's Hazardous Material Response Plan (Attachment G) • Erosion control measures installed in drainage ditches (Section 4 of this application form) • Environmental monitoring plan (Attachment D)
Wetland impairment	N/A	N/A
Changes to aquatic habitat (see Biotic section below)	X	**Potential impact:** Clearing of riparian vegetation and work adjacent to a waterbody (at 5 m from the high-water mark).

Potential Impacts *Use an "X" to indicate which apply*	X	Potential Project Impacts and Proposed Mitigations *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		Proposed mitigation: Submit a DFO Request for Review and follow requirements provided in the Letter of Advice from DFO. Contractor to follow environmental protocols for work adjacent to waterbodies in the environmental protocols of the contract specifications and the monitoring plan, erosion and sediment control plan, and spill contingency plan (Attachments D, E, and F). This includes having an environmental monitor on site when working within 30 m of Chii Zhìt Van or East Lake.
Other	N/A	N/A
Air		
Changes in air quality	**X**	**Potential impact:** Temporary increase in particulate matter during construction from equipment use, traffic, and exposed soil. **Proposed mitigation:** The contractor is required to control dust by watering the roads and work areas, as required.
Harm to living things	N/A	N/A
Increased greenhouse gases	**X**	**Potential impact:** Temporary increase in greenhouse gases during construction activities from equipment and vehicle use. **Proposed mitigation:** Measures to reduce idling will be included in the contractor's CEMP, such as prohibiting vehicle idling.
Other	N/A	N/A
BIOTIC COMPONENTS		
Vegetation		
Direct loss of vegetation	**X**	**Potential impact:** Removal of approximately 110 ha of vegetation for the drainage ditches, including trees and shrubs. **Proposed mitigation:** Restrict vegetation removal to that necessary for construction by clearly marking clearing limits.
Loss of Species at Risk or may-be-at-risk plants	N/A	**Potential impact:** Removal of vegetation and construction activities could damage species at risk or may-be-at-risk plants. **Proposed mitigation:** A desktop review indicated that the plants currently listed as species at risk under the federal *Species at Risk Act* (SC 2002, c. 29) (SARA) and the *Species at Risk (NWT) Act*

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		(SNWT 2009, c. 16) (SAR NWT) are not located in the Inuvik area.
Change in species composition	X	**Potential impact:** Undisturbed vegetation consisting of trees and shrubs will be cleared to construct the drainage ditches, and areas that will not have screened rock will be replaced with a native grass seed mix that is low maintenance and does not attract wildlife. **Proposed mitigation:** Limit area cleared to that necessary for construction. Use grass seed mix that consists of native species.
Introduction of non-native (invasive) species	**X**	**Potential impact:** Machinery, tools, and even clothing have the potential to spread invasive species. Additionally, by disturbing the ground, seeds of invasive species have the potential to germinate if they are brought closer to the soil's surface and can take advantage of bare ground. **Proposed mitigation:** Equipment cleaning to be done in Inuvik before arriving at the worksite. Regularly inspect machinery and remove debris and vegetation to prevent the spread of potential invasive species. During airport operations, monitor the area for growth of invasive species and remove them using a pre-determined effective method (e.g., hand pulling, trimming).
Effects on plant health (dust, metals, toxins)	**X**	**Potential impact:** Construction activities and increased equipment and vehicle use in the area may deposit dust on adjacent vegetation. **Proposed mitigation:** Implement dust-control methods (e.g., watering of roads, reduced speed limits), as required.
Increased risk of fire	**X**	**Potential impact:** The use of machinery on unpaved or undeveloped ground has the potential to ignite vegetation. There is also potential for equipment to create sparks against rocks or other hard surfaces. Burning of vegetation piles has the potential to increase the risk of fire to the surrounding area. **Proposed mitigation:** Ensure equipment exhausts are clear of debris and all machinery is equipped

Potential Impacts *Use an "X" to indicate which apply*	X	Potential Project Impacts and Proposed Mitigations *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		with fire extinguishers. No equipment idling or parking on dry grass or vegetation. Obtain a burn permit from the Town of Inuvik if vegetation piles will be burned.
Compaction of vegetation	X	**Potential impact:** Equipment used during construction has the potential to compact vegetation outside the project area. **Proposed mitigation:** Clearly limit the project work area boundaries and minimize equipment use on undisturbed areas. Mark equipment access routes to avoid compacting vegetation.
Other	N/A	N/A
Terrestrial Wildlife Habitat		
Direct loss or removal of habitat, dens, or nests	X	**Potential impact:** Impact to breeding or nesting migratory birds and their nests if vegetation clearing is done during the breeding bird window, or to wildlife dens from vegetation removal. Additionally, migratory birds may nest in equipment, vehicles, brush stockpiles, or aggregate stockpiles that are sloped to a certain degree. **Proposed mitigation:** The majority of clearing and grubbing around the airport was completed outside the breeding bird window, with the exception of the proposed westward, eastward, and southwestward ditches. The contractor's CEMP is to outline procedures to address potential impacts to wildlife. These will include: • Clearing outside the bird breeding window, where possible; • Completion of migratory bird awareness training by site staff; • Completion of pre-clearing or pre-disturbance bird nest sweeps by a qualified environmental professional (QEP) before clearing, grubbing, or burning of brush piles within the breeding bird window. Pre-clearing sweeps for wildlife dens will also be completed. If active nests or breeding birds are found, a no-disturbance

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		buffer will be implemented until the young have fledged the nest (to be determined by the QEP and discussed with GNWT–INF Environmental Affairs); • Developing a response protocol for the discovery of a breeding or nesting migratory bird, or active wildlife den; • Inspecting heavy equipment and buildings daily before use for potential nests of bank swallow (*Riparia riparia)* and barn swallow *Hirundo rustica*); • Sloping stockpiles to less than 70% to deter birds from nesting in them; and • Before blasting activities at the quarry, conducting wildlife sweeps for large mammals within 500 m of the blast site.
Loss or removal of keystone species and/or Species at Risk habitat		**Potential impact:** Peregrine falcon (*Falco peregrinus)* have been observed on Chii Zhìt Van.[8] Peregrine falcon are listed as "sensitive" under the NWT General Status Rank of "May be at Risk" species. There is potential for peregrine falcon nests to be located in the vicinity of construction work near Chii Zhìt Van because they nest on sheltered ledges or crevices in cliffs near water. The QEP will be aware of the potential for peregrine falcon nests during the pre-clearing bird nest surveys and will implement appropriate no-disturbance setback distances, where required. Bank swallow and barn swallow have the potential to occur in the project area; however, the project area is not considered an area containing critical habitat for either species.[9][10] Other species listed under SARA, the Committee on the Status of Endangered Wildlife in Canada, or SAR NWT [e.g., wolverine (*Gulo gulo*), grizzly bear (*Ursus arctos)*, polar bear (*Ursus maritimus),*

[8] Snowshoe, S. 2020. Personal letter communication titled Inuvik Airport Geotechnical Drilling Program 2020 to Barr, C. of Associated.

[9] NWT Species at Risk. n.d. Bank Swallow. https://www.nwtspeciesatrisk.ca/species/bank-swallow.

[10] NWT Species at Risk. n.d. Barn Swallow. https://www.nwtspeciesatrisk.ca/species/barn-swallow.

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		rusty blackbird (*Euphagus carolinus*], eskimo curlew (*Numenius borealis), short*-eared owl (*Asio flammeus*), horned grebe (*Podiceps auritus*), and red-necked phalarope (*Phalaropus lobatus)*] have the potential to occur in the project area; however, the project area is not considered an area containing critical habitat for these species, and a significant impact or loss to habitat is not anticipated. Woodland caribou (boreal population) (*Rangifer tarandus)* are listed as a threatened under SARA and SAR NWT. The boreal population prefers to live in areas with no human disturbance and is unlikely to frequent the Inuvik Airport area. The project area overlaps with an NWT Important Wildlife Area for moose. Construction activities may temporarily deter moose from the area. **Proposed mitigation:** See mitigations listed under the direct loss or removal of habitat, dens, or nests impact.
Fragmentation of wildlife corridor	**X**	**Potential impact:** Clearing of vegetation contributes to fragmentation for wildlife; however, most of the clearing is located within commissioner's land held under reserve by the Inuvik Airport and within property boundaries held by GNWT – Department of Lands. **Proposed mitigation:** Reduce clearing to that necessary for construction.
Direct injury or mortality	**X**	**Potential impact:** Human–wildlife conflicts from increased presence of people in the area. Injury or mortality from increased vehicle traffic in the area. Reducing the amount of standing water around the airport will reduce the presence of wildlife (e.g., birds), which will decrease the potential for aircraft bird strikes. This is a positive potential impact.

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		Proposed mitigation: Contractor to include procedures that address the potential for human–wildlife conflicts in their CEMP. This will include: • Crew members will have wildlife awareness training and be equipped with deterrents such as air horns and bear spray; • Airport vehicle traffic will need to adhere to low speed limits; • Crew members will participate in a wildlife observation reporting program; and • Garbage and scented items will be properly stored.
Disturbances to key lifecycle stages: breeding, feeding, nesting, staging	X	**Potential impact:** There is potential for there to be a greater disturbance to mammals and fish from construction during their key lifecycle stages. **Proposed mitigation:** The contractor's CEMP must include mitigations for impacts to wildlife from construction activities. A least-risk timing window is provided in the contractor specifications and identifies a caution window for caribou and moose (which have the potential to be in the project area, although unlikely) during their calving and post-calving cycles, for grizzly bears during their sensitive foraging life cycles, and for lake whitefish and lake trout. Extra caution will be taken by the QEP conducting wildlife sweeps before higher disturbance construction activities.
Effects on population abundance	N/A	N/A
Change in species diversity	N/A	N/A
Effects on wildlife health (toxins, metals, etc.)		**Potential impact:** Surface water quality may be impacted by construction and operation activities. **Proposed mitigation:** Contractor to follow the monitoring plan, erosion and sediment control plan, spill contingency plan, and general waste management methods listed in Section 8 of this application form and those to be included in the contractor's CEMP and approved by a GNWT representative.

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
Changes to migratory movement patterns	N/A	N/A
Changes to predator-prey relationships	N/A	N/A
Human-wildlife conflicts	**X**	**Potential impact:** See direct injury or mortality impact. **Proposed mitigation:** See direct injury or mortality impact.
Other	N/A	N/A
Aquatic Habitat		
Breeding disturbances	N/A	N/A
Change in species diversity	N/A	N/A
Effects on health (toxins, metals, sediment, etc.)	**X**	**Potential impact**: Fish and aquatic species may be impacted by an increase in sediment loading in surface water during construction. **Proposed mitigation:** Contractor to follow the monitoring plan, erosion and sediment control plan, spill contingency plan, and general waste management methods listed in Section 8 of this application form, those to be included in the contractor's CEMP and approved by a GNWT representative, and requirements listed in the Letter of Advice to be issued by DFO. Results will be compared to the Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the Protection of Aquatic Life.
Changes to migratory movement patterns	N/A	N/A
Changes to predator-prey relationships	N/A	N/A
Effects on population abundance	N/A	N/A
Change in species diversity	N/A	N/A
Other	N/A	N/A
CULTURAL COMPONENTS		
Wildlife Harvesting		
Loss or reduction in game species populations	N/A	N/A
Effects on traditional land use, subsistence, and harvesting rights	**X**	**Potential impact:** There may be a temporary impact on traditional land use in the Chii Zhìt Van area during construction activities from the increase of equipment use and noise during construction. No long-term impact has been identified. **Proposed mitigation:** Reduce disturbance to the

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		area necessary for construction. Restrict equipment access to identified access routes.
Other	N/A	N/A
Cultural Integrity and Heritage Resources		
Change to or loss of cultural integrity	N/A	N/A
Change to or loss of traditional lifestyle	**X**	**Potential impact:** There may be a temporary impact on traditional lifestyle in the Chii Zhìt Van area during construction activities from the increase of equipment use and noise during construction. No long-term impact has been identified. **Proposed mitigation:** Reduce disturbance to the area necessary for construction. Restrict equipment access to identified access routes.
Change to or loss of heritage resource	**X**	**Potential impact:** Disturbance of heritage resources from clearing and ground disturbance activities in currently undisturbed areas. **Proposed mitigation:** The project work area boundaries and a shapefile of the project footprint was emailed to the Prince of Wales Northern Heritage Centre (PWNHC). The PWNHC reviewed the footprint and had no concerns. An archaeological impact assessment was completed in 2020 for the potential quarry expansion (Attachment K). The PWNHC reviewed the assessment and summarized the management recommendations to be followed (Attachment L). The contractor's CEMP is to include procedures for uncovering potential archaeological sites under the *Archaeological Sites Act* (SNWT 2014, c. 9) and *Archaeological Sites Regulations* (R-024-2015).
Other		No impact identified.
Social and Economic Well-being		
Increased human health hazard and risk	**X**	**Potential impact:** Risk to the public and worker health during construction. **Proposed mitigation:** Contractor to restrict public access to the work area. The contractor and

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
		workers will comply with the NWT *Occupational Health and Safety Regulations* (R-039-2015).
Economic opportunities or losses (employment, training)	X	**Potential impact:** The project presents economic opportunities for local contractors. **Proposed mitigation:** The tender will be weighted to favour local contracting companies per the terms of the GNWT's Business Incentive Program.
Change in ecological, cultural, social, or economic values identified for protection in approved Land Use Plans	X	**Potential impact:** The drainage upgrades will protect infrastructure that contributes to the economic values of the Gwich'in area. The improvements to the drainage system and incorporation of erosion and sediment control measures in the ditch design will likely reduce sedimentation concerns once ditches are stabilized and vegetation is established. Potential impacts to water resources during construction from sedimentation will be mitigated. **Proposed mitigation:** See mitigations for impacts to water quality, identified above.
Impairment of the recreational or traditional uses of the land or water	X	**Potential impact:** There will be an increase in traffic on the Public Quarry Road during certain stages of construction and an increase in noise during construction. There may be temporary restrictions to the access point to Chii Zhìt Van from the Public Quarry Road during blasting. Other restrictions to access to Chii Zhìt Van are not anticipated at this time. There will be a temporary increase in disturbance from construction, such as noise, vegetation clearing, and equipment use, on the north shore of Chii Zhìt Van during active construction that may impair the use of the area for recreational or traditional uses of the land. **Proposed mitigation:** Access to Chii Zhìt Van along the Public Quarry Road will be maintained, except for during active blasting at the quarry. Chii Zhìt Van is a relatively large lake, and significant impact is not anticipated.
Impairment of the aesthetic quality of the land or	X	**Potential impact:** Native vegetation will be

Potential Impacts *Use an "X" to indicate which apply*	**X**	**Potential Project Impacts and Proposed Mitigations** *Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.*
water		cleared and replaced with screened rock and with a native grass seed mix along ditch alignments. Two previously natural outfall locations will be replaced with gabion basket check dams for erosion and sediment control. **Proposed mitigation:** Only one drainage ditch and outfall to Chii Zhìt Van is proposed.
Changes to the use of the area by other non-Indigenous people (e.g., trappers, outfitters, residents, hunters, forest harvesters, other authorized projects)	X	**Potential impact:** There will be a temporary increase in disturbance from construction, such as noise, vegetation clearing, and equipment use, on the north shore of Chii Zhìt Van during active construction that may deter the use of the area by non-Indigenous people. **Proposed mitigation:** Chii Zhìt Van is a relatively large lake, and significant impact is not anticipated.
Other	N/A	N/A

Spill Contingency Plan: Include a Spill Contingency Plan in your Application Package, if applicable, or for small-scale activities, provide relevant details in the grey field provided below. An example of this Plan can be found in the INAC *Guidelines for Spill Contingency Planning*.

The contractor will be required to follow the spill contingency plan in Attachment F and update their CEMP with company-specific information, which will be reviewed by a GNWT representative before work commences.

The Inuvik Airport follows the Hazardous Material Response Plan provided in Attachment G.

11. NAME AND CONTACT INFORMATION – CONTRACTORS AND SUB-CONTRACTORS

Include relevant names, responsibilities, and contact information in the grey fields below. An additional table should be added for each contractor and sub-contractor.

Name:			
Responsibilities:			
Company Name:			
Mailing Address:			
Community:		Telephone:	
Prov/Terr:		Email:	
Postal Code:		Other:	

X	Use an "X" to indicate that contractor and/or subcontractor information is not available at this time.

12. STUDIES UNDERTAKEN TO DATE

In the grey field below list any relevant studies that support the proposed activities and include them in your Application Package.

Preliminary Environmental Screening Report, 2009

In preparation for construction at the Inuvik Airport, a Preliminary Environmental Screening Report[11] was completed in 2009 for due diligence purposes. Even though a formal *Canadian Environmental Assessment Act, 2012* (SC 2012, c.19, s. 52) environmental assessment was not required, the report followed the environmental assessment framework outlined in the Act. The report includes information on baseline environment and socioeconomic components and the potential effects from the Inuvik Airport construction on those components.

A summary of the contents of the report is as follows:

- There are known contaminated sites at the airport at the existing maintenance garage, the fire training area, localizer/distance measuring equipment building, main quarry garbage dump, and the RCMP hangar. (See below for a discussion of the sites in the area of the drainage upgrades.)
- Vegetation is dominated by stunted black spruce (*Picea mariana*) and tamarack (*Larix laricina*), with a shrubby understorey of dwarf birch (*Betula pumila*) and willow (*Salix* spp.), and an understorey dominated by cottongrass (*Eriophorum* sp.), lichens, and peat moss (*Sphagnum* sp.).
- Chii Zhìt Van is the nearest fish-bearing waterbody, approximately 2.5 km southwest of the Inuvik Airport.
- Sandhill cranes and other songbirds were observed in the Inuvik Airport area.
- Four species listed under the SARA have potential to occur in the Inuvik Airport area: woodland caribou, peregrine falcon, Eskimo curlew (*Numenius borealis*), and rusty blackbird (*Euphagus carolinus*).
- No known archaeological sites were documented or expected to occur within 150 m of the airport expansion.
- After mitigation measures were implemented for potential environmental effects, the "residual effects" from construction were reported to be "not likely significant" or "no likely effect."

See Attachment I.

Inuvik Airport Quarry Pit Expansion Archaeological Impact Assessment, 2021

An archaeological impact assessment[12] was completed in 2021 for the proposed expansion of the main and north quarries and the potential construction of the west quarry pit. One archaeological site consisting of the remains of a historic log cabin was identified, with recommendations to avoid the area by a 30 m buffer.

See Attachment K.

Phase II and Phase III Environmental Site Assessment, 2007

[11] Dillon Consulting Limited. 2009. Preliminary Environmental Screening – Proposed Inuvik Airport Runway Extension. Final Report.

[12] Golder Associates Ltd. 2021. Inuvik Airport Quarry Pit Expansion Archaeological Impact Assessment. Permit No. 2020-006.

A Phase II and Phase III ESA[13] was completed at the Inuvik Airport in 2007to assess 10 areas of potential environmental concern (APECs). Further delineation or investigation was recommended for five APECs. The APECs located at the former firefighting training area and the landfill south of the land treatment units are located in the area of the drainage upgrades.

See Attachment J.

13. PROPOSED PROJECT SCHEDULE AND TERM

Indicate the proposed project start and completion dates, and the time of year the project activities are planned to occur. Describe any anticipated temporary closure(s) or seasonal shutdowns. Indicate the term requested.

Start Date:	August 1, 2023	Completion Date:	October 30, 2024
The construction of the infrastructure upgrades is anticipated to begin on June 12, 2023, and be completed by December 30, 2027. The construction of the drainage upgrades for the new proposed ditches (Figure 3-2, in Attachment A and identified as Work Areas 8, 11A, and 11B on Drawing 2886-00-G-002, in Attachment B) is anticipated to begin on August 1, 2023, or after the water licence is issued, and be completed by October 30, 2024. Construction of the drainage ditches adjacent to the runway will likely be completed at the same time as the other infrastructure upgrades. Site conditions (e.g., wet boggy areas) may require the work to be postponed to a time when the ground is frozen toac-commodate equipment access. The Inuvik Airport is anticipated to operate at this location in perpetuity. Runoff occurs during freshet and rainfall events each year, typically between April and September. After construction of the drainage ditches is complete, regular monitoring and maintenance of the drainage ditches is anticipated, which is why the 25 year licence term is being requested.			
Term of Licence Requested:	25 years		

14. ADDITIONAL SUPPORTING INFORMATION

Use the grey field below to provide or reference the following information:

Engagement: Conduct engagement, prepare an Engagement Record and Engagement Plan in accordance with the MVLWB *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, and include them in your Application Package. Templates are provided in the Guidelines. Please also refer to *Information for Proponents on MVLWB's Engagement Requirements*.

Eligibility: Contact Indigenous, federal, and territorial governments, and other parties to ensure all appropriate authorizations have been obtained or are in the process of being obtained. Obtain permission from the landowner(s), if necessary (e.g., obtain and reference licences of occupation, leases, access authorizations, etc.) and attach it/them to the Application.

[13] Franz Environmental Inc. 2007. Draft Phase II and Phase III Environmental Site Assessment Inuvik (Mike Zubko) Airport Inuvik, Northwest Territories.

Land Use Plans: Contact the applicable Land Use Planning Board or the Tłı̨chǫ Government to discuss conformity with the relevant Land Use Plan(s). Include a Land Use Plan Conformity Table in your Application Package, demonstrating how the project meets the requirements of the Land Use Plan, if applicable.

Traditional (Environmental) Knowledge (TEK/TK): Provision of TEK/TK is mandatory for Applications to the Sahtu Land and Water Board. Other applicants are strongly encouraged to include TEK/TK.

Facilities: Include the supporting information required under subsection 5(2) of the Waters Regulations if the project includes the following: dam(s); storage reservoir(s); watercourse crossing(s); camp(s) or lodge(s); use of water for industrial use or mining and milling; deposit of waste; or handling or storage of petroleum products or hazardous materials.

Closure and Reclamation: Include a Closure and Reclamation Plan in your Application Package, or for small-scale activities, describe the proposed closure and reclamation activities in the grey field provided below. Describe any temporary closure(s) and seasonal shutdowns. Please also refer to the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories* and Environment and Climate Change Canada's *Solid Waste Management for Northern and Remote Communities: Planning and Technical Guidance Document*.

Closure Cost Estimate: Prepare a Closure Cost Estimate and include it in your Application Package. Applicants are encouraged to contact Board staff, prior to applying, to determine which closure-cost-estimate template is most suited to the project activities being applied for. Guidance is provided in section 2.2 of the MVLWB/AANDC/GNWT *Guidelines for Closure and Reclamation Cost Estimates for Mines*. If your Application is submitted concurrently with a Land Use Permit Application, the estimate should include a breakdown of water- and land-related activities and liabilities.

Financial Capacity: Provide information relating to your financial capacity, as outlined in paragraph 26(5)(d) of the *Waters Act*. Please note this information will be required by the Board prior to issuance.

Engagement
The engagement plan and record are provided in Attachment H.

Nành' Geenjit Gwitr'it T'igwaa'in (Working for the Land), the Gwich'in Land Use Plan
The Inuvik Airport and Chii Zhit Van are located in the community boundaries and the general use zones of the land zoning system (i.e., not in a Conservation Zone, Heritage Conservation Zone, or Special Management Zone). The project is in the Mackenzie Development Area – Inuvik Zone, as per the *Mackenzie Development Area Regulations* (RRNWT 1990, C.A.-14).

Closure and Reclamation Plan, Closure Cost Estimate, Financial Capacity, and Fees
Areas disturbed during construction will be restored (e.g., reseeded with a native grass mix) as necessary. A closure and reclamation plan, closure cost estimate, proof of financial capacity, and fees are not required because it is assumed that the Inuvik Airport will be there in perpetuity. This was confirmed with AlecSandra Macdonald with the Gwich'in Land and Water Board.[14]

15. FEES

Refer to the Guide for assistance with determining applicable fees.

Type of Fee	Amount ($)
Application fee (if applicable):	$0
Water use fee deposit:	$
Total Fees:	$

16. SIGNATURE

Jason MacNeil	Regional Airport Manager
Applicant's Name (print) or Company Name	Position (print)

	May 31, 2023
Signature	Date

Review the application package checklist provided in the Guide, and submit completed applications to the Regulatory Manager or Executive Director identified on the "Contact Us" pages of the respective Land and Water Board (www.mvlwb.com, www.wlwb.ca, www.slwb.com, www.glwb.com).

[14] Macdonald, A. Regulatory specialist, Gwich'in Land and Water Board. January 20, 2023. Personal communication (email) with Caitlin McKenzie of Associated.