

Land and Water Boards of the Mackenzie Valley



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

Subsection 6(1) and Schedule III of the [Mackenzie Valley Federal Areas 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:	X
	Wek'èezhìi Land and Water Board:		Gwich'in Land and Water Board:	

To complete this form, please refer to the LWB [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 LWB 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 non-federal area and/or a Land Use Permit.	Water Licence:		
	Land Use Permit:		X

1. NAME AND CONTACT INFORMATION – APPLICANT

Project Name:	Great Bear Lake Sites Remediation Project		
Applicant's Name:	Dawn Keim		
Position:	Acting Senior Manager		
Company Name:	Crown-Indigenous Relations Northern Affairs Canada – Contaminants and Remediation Division		
Mailing Address:	4923 52nd Street		
Community:	Yellowknife	Telephone:	(867) 444-0065
Prov/Terr:	NWT	Email:	
Postal Code:	X1A 2R3	Other: (Fax)	(867) 669-2439

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

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

Use an “X” to indicate this information is the same as Item 1 above:			X
Name:			
Position:			
Company Name:			
Mailing Address:			
Community:		Telephone:	
Prov/Terr:		Email:	
Postal Code:		Other:	

3. LOCATION OF PROJECT

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

Traditional Place Name:

The location includes abandoned historic industrial properties of Silver Bear Mines (made up of Terra [Nak’a ts’e deh], Northrim, Norex, Graham Vein and Smallwood mine sites), El Bonanza and Bonanza Mine, Contact Lake Mine (Kw’e K’a tue), the Sawmill Bay site and three small portal sites (Contact Lake Portal, Mystery Island Portal and Bear Portal) in the southeast area of Sahtú (Great Bear Lake).

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 LWB [Geospatial Data Submission Standards](#) for providing geographic information.

Minimum latitude:	65° 34' 56.54" N	Maximum latitude:	65° 59' 37.36 N
Minimum longitude:	117° 48' 0.63" W	Maximum longitude:	118° 7' 11.23"W

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

86E, 86F

GIS Data: Use an “X” to indicate if GIS data is attached.

Attached:	X	Not Available:	
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Land Types: Use an “X” to indicate the type(s) of land on which the activities are proposed:

Free Hold/ Private:	X	Commissioner’s/ Territorial Lands:	X	Federal Land:	X	Municipal Land:	
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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 Great Bear Lake Remediation Project (the Project) is to reduce the hazards and environmental impacts associated with these contaminated sites and to restore the original state as much as practical. These activities will result in an overall positive impact on the environment.

The Project includes:

Pre-Remediation Supporting Activities

1. Construction, operation, maintenance, and decommissioning of a camps, including Sewage Disposal Facilities
2. Construction, maintenance and operation of site access routes, including: existing site roads and portages; existing airstrips; winter roads, as well as installation of culverts and temporary docks
3. Construction, maintenance and operation of staging areas and fuel storage facilities
4. Barge operation
5. Water withdrawal for camp use, industrial use, winter road construction, cleaning, concrete mixing, and dust suppression
6. Use of equipment and machines
7. Borrow/granular material extraction/use (no crushing)
8. Installation, operation and removal of environmental protection measures to support Pre-remediation activities
9. Historic camp building demolition, including asbestos and lead paint abatement

Remediation Activities

1. Physical works associated with the management of waste rock, impacted water, and buildings and infrastructure containing hazardous materials
2. Consolidation and disposal of waste petroleum hydrocarbon products (assumed empty drums fall under category of "debris")
3. Dock Removal
4. Closing mine openings
5. Covering of gamma soils at Contact Lake
6. Construction of a surface water diversions away from waste
7. Decommissioning of some access roads

The GBL Sites have been the subject of numerous assessments and studies to characterize the nature of environmental contamination and hazards. CIRNAC-CARD's efforts to date have included Environmental Site Assessments, Hazardous Material Surveys, Risk Assessments and focused geochemical studies, among others. Efforts culminated in the production of Remedial Action Plans (RAPs) for each of the Project sites (Appendix O). The RAPs summarized site conditions, interpreted results of sampling/assessment, evaluated remedial options and presented the selected remedial approach. The RAP for each site serves as the primary guidance document for the proposed scope of remedial activities and site management, which are summarized below. Certain remedial activities, including tailings management, excavation and treatment of contaminated soil, non-hazardous waste disposal and waste

rock management at Silver Bear Mines, are not within the scope of the applications because the remedial approach has not yet been confirmed.

The proposed remedial actions have been selected based on guidance from technical experts and with input from community members to identify preferences and environmental considerations. Project activities presented within this Water Licence application have been co-developed by the Great Bear Lake Remediation Project Co-Management Team, which includes members of the Délı̨ne Got'ı̨ne Government and CIRNAC. Documentation of community engagement activities may be found within the Engagement Log provided in Appendix E.

The following sections present a summary of the pre-remedial and remedial activities planned for the Project, as well as documenting the remedial activities conducted to date.

SITE ACCESS

None of the Great Bear Lake (GBL) sites are road accessible and the access approach will be confirmed by the Contractor selected by the Licensee to complete the pre-remediation/remediation works and activities. Proposed transportation routes are illustrated in Figure 1 and Figure 2 of Appendix C. Water use for winter road access will be obtained from, and returned to Great Bear Lake. Appendix I lists the proposed mitigation measures for winter road and barge activities for the remediation Project. The SLWB will be notified of the Contractor's preferred access approach, through submission of a Mobilization and Demobilization Plan.

Maintenance, upkeep, and in select areas, upgrades will be required of site access roads. This will facilitate transport of the equipment and debris/building materials between the main sites and barge landing areas. The onsite access roads will be upgraded during the summer season between July and September every year. Maintenance would consist of road grading, installation of culverts and temporary docks, where necessary. Where earthworks are in proximity to waterbodies, Department of Fisheries and Oceans (DFO) Canada will continue to be consulted. The intention is to use the existing road alignments as much as possible; however, should these have deteriorated beyond use or do not allow access to areas requiring remediation, additional small alignments may be required. New winter road alignments connecting each site may also be required.

CLOSURE OF MINE OPENINGS

A large number of underground mine openings are found at the Silver Bear Mines, with a lesser number at Contact Lake Mine and El Bonanza/Bonanza Mine (no mining activities occurred at Sawmill Bay). The three portal sites (Contact Lake Portal, Bear Portal and Mystery Island Portal) each contain a single portal opening.

Some of the vertical openings (shafts, raises and open stopes) are uncovered and present hazards for people and wildlife. Horizontal openings (adits and portals) present risks if deliberately entered, from both poor air quality and unstable conditions. There was limited surface mining at the GBL Sites. A shallow "open pit" is found at Terra Mine and a mined trench/pit at Northrim Mine.

Active management of the risks from the mine openings was selected for all sites during community consultations. This is consistent with legislation, as the Northwest Territories Mine Health and Safety

Regulations specify that all underground openings to surface must be sealed before a mine is permanently closed and provide basic design criteria for the capping of shafts and raises. Each opening will be sealed in a manner that meets the regulations and achieves the requirements for strength and durability, worker safety, while remaining cost-effective. The closure methodology selected for the mine openings was generally consistent across the GBL Sites, and summarized as follows:

- Shafts/Vent Raises: Install engineered concrete caps
- Portals and Adits: Install backfill with local waste rock;
- Open Stopes: Backfill with local waste rock where accessible; and,
- Open Pit: Backfill open pit/mined trench at Graham Vein with local waste rock and backfill adit/stope at base of Terra “open pit”.

A listing of the GBL Sites mine openings and selected closure approach is provided in Table 1 below.

Table 1 Selected Remedial Approach for Mine Openings

Site	Mine Opening	Remedial Approach
Silver Bear Mines	17 Vertical Openings (shafts and vent raises)	Install engineered concrete caps
	12 Horizontal Openings (portals and adits)	Install backfill of opening with local waste rock
	4 Open Stopes	Backfill with local waste rock
	3 Open Pits/Mined Trenches	Backfill open pit/mined trench at Graham Vein with local waste rock and backfill adit/stope at base of Terra “open pit”.
Contact Lake Mine	1 Horizontal Opening (Adit)	Install backfill of opening with local waste rock
	2 Vertical Openings (One Shaft and One Raise)	Install engineered concrete caps
	1 Open Stope	<i>Closure not in scope of current application</i>
El Bonanza/Bonanza Mine	1 Horizontal Opening (Adit)	Install backfill of opening with local waste rock
	4 Vertical Openings (Shafts)	Install engineered concrete caps at accessible openings and cap #1 Shaft in a safe manner.
Portal Sites	3 Horizontal openings (1 portal at each of Contact Lake Portal, Bear Portal and Mystery Island Portal)	Install a combination of waste rock backfill, steel cap or foam plug, as access and available materials allow

At nearly all locations the general approach discussed above will be employed; however, there are select mine openings at which a revised approach is required due to access limitations, worker safety, ground conditions or the absence of hazards. This includes the “open pit” at Terra Mine (in fact a side cut from a natural cliff face requiring closure of adit and stopes), the open stope at Contact Lake Mine (revised approach has yet to be finalized) and the El Bonanza No. 1 Shaft (access constraints may require fencing or a foam seal).

Closure of the openings will require the contractor to provide Engineered Backfill and Engineered Cap Design Drawings to CIRNAC-CARD. This may include evaluation of alternative cap technologies if determined appropriate and successful in meeting the remedial objectives of closure. Following review of submissions by the Departmental Representative, the engineered drawings and designs will be submitted to the Government of the Northwest Territories Mines Inspector for review and approval.

Geotechnical inspections will be implemented on a routine frequency after closure to confirm the ongoing structural integrity of the closures and identify any corrective measures required. The scope of these activities will be outlined in the Geotechnical Inspection Plan.

CONTACT LAKE WASTE ROCK MANAGEMENT

Waste rock quantities at the Contact Lake Mine are limited (approximately 30,000 cubic metres [m³]) in keeping with the nature and scale of past operations (exploration, minimal mining). Remedial issues are minor and related to small areas where the rock exhibits slightly elevated gamma radiation levels and runoff water with elevated metal content.

Remedial approaches for the management of waste rock were designed based on the geochemical and radiological risks presented from the materials and the impacts on downstream receptors. For the waste rock deposit at Contact Lake, areas with elevated radiation levels will be covered by soil in 10 m by 10 m grid areas where the average exceeds 250 microrentgen/hour ($\mu\text{R/h}$) in order to reduce the grid average below 250 $\mu\text{R/h}$. Additionally, surface grading will be improved at, and in the vicinity of, the toe of the waste rock pile to minimize off-site runoff contact with the mine waste rock and eliminate standing water at the toe of the waste rock pile.

Water quality monitoring will be conducted downstream of the waste rock deposits during construction and post-construction to confirm the effectiveness of remedial measures. Geotechnical inspections will be implemented on a routine frequency after remediation to confirm the ongoing structural integrity of the remedial works. The scope of these activities will be outlined in the Water Quality Monitoring Plan and Geotechnical Inspection Plan respectively.

Management of waste rock at the remaining Project sites are not part of the scope of the current application.

DEMOLITION OF BUILDINGS, EQUIPMENT AND INFRASTRUCTURE

At Contact Lake Mine, El Bonanza/Bonanza Mine and Sawmill Bay, structures generally consist of camp facilities (cabins, kitchens, outhouses, etc.); headframes, mine dry buildings, powder shacks and core shacks (at mining properties only); and support structures such as powerhouses, maintenance shops and offices. Most buildings are timber framed structures constructed on site. Many of the structures at Contact Lake Mine, El Bonanza/Bonanza and Sawmill Bay have either collapsed or partially collapsed in the decades since abandonment. However, some standing buildings remain.

The Silver Bear Mines contains a substantial number of buildings and infrastructure which are newer than those at the other sites. The majority of buildings are found at Terra Mine and are steel framed/clad structures with concrete foundations and floors. These include the mine ventilation and compressor plants, the freshwater pumphouse, the crusher building, and the largest complex on site,

which includes the assay lab, processing plant, power house, main warehouse, changing rooms, and offices. Most of the smaller shops and storage sheds are timber framed and timber sided, with steel roofs. The camp buildings include timber structures built on site and ATCO trailer complexes. The buildings at Silver Bear are typically in better condition than other sites, though have been unmaintained for decades and are deteriorating.

Structures present physical hazards in their current state and as they deteriorate further in the future. Hazardous building materials have also been documented and sampled, including lead amended paints, polychlorinated biphenyl (PCB) amended paint, wood treated with pesticides Dichlorodiphenyltrichloroethane or DDT) and asbestos containing materials (ACMs) such as insulation, floor tiles and pipe wrap.

The primary concern in considering remedial action for buildings and equipment is the safety of people who may visit the sites and wildlife which may opportunistically use structures. The following remedial approach was selected:

- Demolish buildings/infrastructure after removal of hazardous materials and dispose of non-hazardous debris in an approved manner (Déljñę may wish to retain select structures where these present value to use).

During pre-remediation, non-hazardous building materials will be consolidated for future management. Upon receipt of a Northwest Territories Burn Permit, untreated and unpainted wood will be burnt in consolidated piles or in-situ for select timber-frame structures. During remediation, all hazardous building materials will be removed from structures, consolidated and transported to a licensed off-site hazardous waste management facility (see Hazardous Waste section below). Burn ash will also be sampled and, where failing to meet disposal criteria, will be transported to a licensed off-site hazardous waste management facility.

During the 2010 GBL Sites Phase I Remediation Project the majority of buildings at the Contact Lake Mine and El Bonanza/Bonanza Mine were demolished. The Contact Lake Mine headframe, hoist house shed, quonset and outhouse remain, in addition to the headframe at both El Bonanza and Bonanza, the Building #2A shop and dilapidated cabin at Bear Portal. Hazardous building materials were shipped to a licensed off-site management facility, with the exception of ACMs which were double bagged and remain at the sites, while non-hazardous debris was consolidated on-site. Unpainted untreated wood was burned under permit and the ash sampled for management. No building or infrastructure demolition was conducted at Sawmill Bay or Silver Bear Mines.

Remaining buildings and infrastructure will be demolished and materials managed per the selected remedial option.

NON-HAZARDOUS WASTE MANAGEMENT

The GBL Sites contain a significant amount of non-hazardous waste, the greatest volume of which is found at Terra Mine. These materials are in consolidated waste disposal areas, scattered around site or will be generated during building/infrastructure demolition. At the Silver Bear Mines, the volume of non-hazardous material that would be generated from demolition of the buildings and collection of equipment and debris from the storage yards was estimated just over 16,000 m³, plus an additional

6,750 m³ from former waste disposal sites (i.e., surface dumps) and 2,000 m³ of scattered refuse. Primary materials are steel, wood, and concrete, with lesser quantities of plastics, rubber, glass, insulating materials and paper products. Smaller volumes of material are found at the Contact Lake Mine, El Bonanza/Bonanza Mine and Sawmill Bay site.

The following remedial option was selected for all sites for the scope included in the current application:

- Consolidate non-hazardous waste for future management.

Materials with lead-amended paint applications that are below leachable criteria will also be consolidated for future management. This may include vehicles, equipment, drums and dismantled tanks (once residual fuels/hazardous materials removed and articles cleaned).

In 2010 the following activities were conducted during the GBL Sites Phase I Remediation Program:

- Contact Lake Mine: Scattered surface debris and debris <0.5 m depth at waste disposal sites was consolidated in stockpiles. After building demolition, non-hazardous building debris was added to these stockpiles.
- El Bonanza/Bonanza Mine: Scattered surface debris and all debris at waste disposal sites was consolidated in stockpiles. After building demolition, non-hazardous building debris was added to these stockpiles.
- Sawmill Bay: Scattered surface debris and debris <0.5 m depth at waste disposal sites was consolidated in stockpiles. No building demolition occurred. Approximately 10,800 empty drums were crushed and stockpiled.
- Silver Bear: No activities conducted.

The Project will include consolidation of existing material and debris from building demolition and surface debris piles at each site. Also included will be very minor volumes (<3 m³) of debris from Bear Portal, Contact Lake Portal and Mystery Island (within the general Project area).

HAZARDOUS WASTE MANAGEMENT

At the Silver Bear Mines there is a considerable inventory of potentially hazardous waste materials that include batteries, lead paint, old lime and residual mill reagents, with lesser volumes identified at the Contact Lake Mine, El Bonanza Mine and Sawmill Bay. Hazardous building materials include DDT impacted wood, lead and PCB amended paints, ACMs (select insulation, tiles, pipe wrap, window sealant, drywall tape, etc.) and transformers. Vehicles, equipment, tanks, drums and various mine infrastructure may also have lead-amended paint exceeding leachable lead criteria non-hazardous waste and require off-site management as a hazardous material. The following remedial options were selected:

- Designated Substances / Hazardous Materials / ACMs – Remove and dispose of in an off-site designated licensed facility for hazardous materials

All hazardous materials will be shipped off-site in accordance with the Transportation of Dangerous Goods Regulations (TDGR) to a licensed disposal facility.

The Project will include the consolidation and off-site management of hazardous materials at the Contact Lake Mine (remaining buildings only), El Bonanza/Bonanza Mine (remaining buildings only), Sawmill (all buildings) and Silver Bear (debris and buildings).

Blasting caps have been found at the abandoned mine sites. CIRNAC-CARD retained a former mines inspector to conduct a survey of the sites, to locate any remaining blasting caps, which were subsequently removed/destroyed. However, the possibility exists that additional blasting caps are still present on the sites. During debris clean-up, personnel will be made aware of this hazard and appropriate steps to be taken, should a blasting cap be found, as described in the Waste Management Plan (Appendix G).

Heavy metal and radiological contamination from uranium ore was identified at discrete areas of Sawmill Bay. Responsibility for any residual radioactive soils on the Sawmill Bay site now rests with Atomic Energy Canada Limited (AECL), though was formerly with Natural Resources Canada (NRCAN). A program was conducted in 1997 to remove licensable radioactive materials from the site; however, ongoing assessment and/or remedial activities may be required (e.g. soil, barge). In February, 2013 a radiological risk assessment was completed based on existing radiological data for the site. The report concluded that for seasonal casual use (e.g. hunting, outfitters camp), the site does not pose a human health risk based on international/national protection criteria, nor does it pose an ecological risk. In summary, it is CIRNAC-CARD's understanding that the current uranium and radiation levels fall within the industrial land use guideline of CCME. AECL will maintain responsibility for managing materials and for communication with communities and the SLWB.

DRUMS, TANKS AND RESIDUAL FUELS MANAGEMENT

More than 10,000 drums and numerous above-ground storage tanks were identified at the GBL Sites, many of which contained residual fuel, other products (e.g. glycols) or fuel/product mixed with water. Based on these considerations, the following remedial option was selected:

- Drums and Fuel Storage Tanks – Dispose of contents (in accordance with relevant guidelines) and consolidate drums/ tanks with other non-hazardous waste for future management.

The community agreed to have the barrels collected, cleaned and crushed during the GBL Sites Phase I Remediation Project. In 2010, a total of 8,235 empty drums were consolidated and crushed at the Sawmill Bay site, including 34 from Contact Lake Mine and 76 El Bonanza/Bonanza Mine. Crushed drums were placed with the non-hazardous debris stockpiles. The remaining 2,590 drums contained some residual liquid product. In 2011, drums with liquid were consolidated based on disposal requirements set in the Abandoned Military Site Remediation Protocol, laboratory results and visual observations. The emptied drums were washed within the drum processing area (a lined box). The process water was treated with an oil-water separator which resulted in two liquid streams: treated water and process waste. The process waste was consolidated, while the treated water was either held in temporary holding bladders and sampled for discharge or recycled back into the washing system. The treated water was discharged in accordance with the requirements set in the Water Licence. A total of 202 drums containing product and process waste were removed from site in 2014, followed by removal of an additional 950 drums in 2016. It is believed that all drums with residual product have been removed from the GBL Sites, though some residual sludge remains in the tanks.

During the Project, any residual fuel and fuel/product mixtures will be managed per Phase I protocols and shipped off-site for disposal in a licensed facility. Empty drums (once washed if containing product)

will be consolidated with other non-hazardous waste for future management, as will dismantled tanks with lead paint applications below leachable criteria. If exceeding criteria, materials will be managed per hazardous materials and shipped to a licensed off-site hazardous waste management facility.

DEMOLITION OF DOCKS

Three docks are found at the Silver Bear Mines on the Camsell River; one at Terra, one at Northrim and one at Norex. A dilapidated dock and sand crib is also associated with the Contact Lake Mine and is found along the shore of the East Arm of Great Bear Lake. The docks are in disrepair and some contain contaminated soils/wood. The following remediation options was selected:

- Dock and crib structures – remove these structures and consolidate debris for future management

The plan is to remove the docks with minimal disturbance to the surrounding sediments and stabilize the shorelines. The docks will be excavated to the original shoreline and stabilized with rock fill (where necessary). The excavation would be inundated with water from the river and rigorous methods would be necessary to prevent releases of sediment to the river. This activity would include the use of silt curtains, the application of Best Management Practices (e.g. Sediment and Erosion Control Plan), as well as consultation with DFO and monitoring.

Water quality monitoring will be conducted during and following dock removal. Geotechnical inspections will also be implemented on a routine frequency to confirm the structural integrity of the shoreline. The scope of these activities will be outlined in the Water Quality Monitoring Plan and Geotechnical Inspection Plan respectively.

AIRSTRIP MAINTENANCE

Historic airstrips are found at Silver Bear Mine (Terra and Smallwood), El Bonanza/Bonanza (at shore of Great Bear Lake) and Sawmill Bay. While unmaintained, the airstrip at Terra Mine and Sawmill Bay are still used to access the sites. The airstrips at Smallwood and El Bonanza/Bonanza are overgrown and no longer in use.

The remedial plan is to leave the Smallwood and El Bonanza/Bonanza airstrips as is to continue natural revegetation. For the Terra Airstrip and Sawmill Bay airstrip, maintenance and improvement activities will be completed as required to promote safe operations during remediation activities. Once the airstrips are no longer required to service reclamation activities, Transport Canada and the Community of Délı̨nę will be consulted to identify requirements.

ROAD AND CULVERT RECLAMATION

GBL Site roads are constructed from local borrow materials and waste rock to varying degrees, though all are considered to pose little environmental risk. Culverts are found at discrete locations, many of which would only carry ephemeral water during freshet or major precipitation events.

The remedial approach for the roads is to remove the culverts and to allow the roads to naturally revegetate. DFO has been consulted and will continue to be consulted to so that culverts removed at closure would be done using Best Management Practices and fisheries approval where required. Considerations will include proper stream channel design, fish passage (if required with DFO input), and long-term stability of the stream bed and banks at each location.

CAMP FACILITY CONSTRUCTION

Completion of the Project will require operation of a field camp. Upon selection, the Contractor will be required to submit a Camp Methodology and Layout Plan (either as a standalone document or part of the comprehensive Work Plan), to be provided to the SLWB. In the interim, CIRNAC-CARD has estimated a camp size of approximately 20-50, in operation for seven months per year for three years. The remote camps will generate approximately 100 L of wastewater per person per day. Waste management protocols for sewage and greywater are detailed in the Waste Management Plan (Appendix G).

The Contractor will ultimately be responsible for the design and implementation of camp facilities, pending CIRNAC-CARD review. The camp will be located in relatively close proximity to the Project activities. Given the scope of work at Terra Mine is substantially larger than the other Project sites and there is considerable existing camp infrastructure, it is assumed the Contractor will use this location for the new primary camp (projected capacity of 20-50 personnel). Due to the need to demolish the former mine/camp buildings, the Contractor may elect instead to establish a new camp. The most probable location would be on the main Terra Mine site, adjacent to the large pit area. The location must not interfere with remediation activities and facilities must be removed at the completion of work activities. Satellite camps at the other sites may operate concurrently or in sequence. The temporary satellite camps may also act as a base for the remediation Project when the existing central camp at Terra Mine is being demolished. Satellite camps are predicted to be 10-15 persons or less and would be composed of temporary structures.

Camps will be placed on areas cleared during historical operations. As much as possible, camp facilities will be located greater than 100 m from a waterbody. However, at some sites the most suitable cleared area is less than this distance (e.g. El Bonanza/Bonanza).

5. TYPE OF UNDERTAKING

Refer to Schedule II of the [Mackenzie Valley Federal Areas 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): Remediation and decommissioning activities

6. WATER LICENSING CRITERIA

Refer to Schedules IV to VIII of the [Mackenzie Valley Federal Areas Waters Regulations](#). Use an "X" to indicate which criteria apply:

	Type B	Type A
To obtain water	X	

	Type B	Type A
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		

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.

Purpose of Water Use	Name and Type of Water Source	Location	Geographic Coordinates		Proposed Water Use Volume/Rate, including units
			Latitude	Longitude	
Work activities, operation of satellite camps at Sawmill Bay, Contact Lake, El Bonanza/ Bonanza Mines	Great Bear Lake	Great Bear Lake	65°55'04.8"N	120°49'09.5"W	<ul style="list-style-type: none"> • Dust Suppression: <50 m³/day; • Below volumes constitute the combined treated wastewater discharge of up to 50 m³/day: <ul style="list-style-type: none"> • Camp Use: <15 m³/day; • Cleaning: <5 m³/day; • Concrete Mixing: <20 m³/day; and • Other Industrial Use: <10 m³/day
Work activities at Silver Bear Mines and main camp at Terra Mine	Camsell River	Camsell River	65°35'29.0"N	118°00'04.0"W	
Work activities and operation of satellite camp at Contact Lake Mine	Contact Lake	Contact Lake	65°58'42.2"N	117°46'45.5"W	
Work activities and operation of satellite camp at El Bonanza Mine	Silver Lake	Silver Lake	66°00'10.9"N	118°04'18.6"W	
	Mile Lake	Mile Lake	66°00'18.5"N	118°04'14.6"W	
Work activities and operation of satellite camp at Bonanza Mine	Whale Lake	Whale Lake	66°00'30.0"N	118°05'05.0"W	
Work activities at Smallwood Mine	Smallwood Mine	Smallwood Mine	65°34'49.2"N	117°56'36.8"W	
Winter road construction	Great Bear Lake	Great Bear Lake	65°55'04.8"N	120°49'09.5"W	< 300 m ³ /day
	Camsell River	Camsell River	65°35'29.0"N	118°00'04.0"W	
	Unnamed Lake 1	Unnamed Lake 1	65°38'04.9"N	118°13'55.7"W	
	Unnamed Lake 2	Unnamed Lake 2	65°38'42.9"N	118°13'33.6"W	

Note: The estimated volumes above are daily maximums and actual use is expected to be lower. At no point will

water use exceed the 299 m³ per day, except in the unlikely event of emergency fire response. Winter road construction will use water from Great Bear Lake, the Camsell River and if needed two unnamed lakes, which will be returned to source. The workers would be on-site for approximately 7 months each year (210 days), requiring total water use of approximately 21,000 m³ /year.

All water use will be tracked, including the following minimum information: identification of water source, GPS location of water withdrawal, volume of water withdrawn per trip in cubic meters, cumulative uptake per source, time of uptake, date of uptake and contractor/employee identification. Water intake hoses will be equipped with screens to prevent the entrainment or impingement of fish (per DFO Interim code of practice: end-of-pipe fish protection screens for small water intakes in freshwater (2020)).

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. For more information about determining winter water source capacity, refer to the LWB/GNWT [Method for Determining Winter Water Source Capacity for Small-Scale Projects](#).

Water Source	Capacity of Water Source, including units	Other Users of the Water Source	Comparison of Total Proposed Water Use to Available Capacity
Great Bear Lake	Approx. 3.1 billion m ³	Local Peoples, commercial lodges and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<0.1% of total available water use capacity (i.e. negligible)
Camsell River	Approx. 840,000 m ³ /day	Local Peoples and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<0.1% of total available water use capacity (i.e. negligible)
Contact Lake	Approx. 790,000 m ³	Local Peoples and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<6% of total available water use capacity (i.e. negligible)
Silver Lake	Approx. 3,400 m ³	Local Peoples and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<100% of total available water use capacity
Mile Lake	Approx. 103,000 m ³	Local Peoples and mineral rights holders (though none currently	<50% of total available water use capacity

Water Source	Capacity of Water Source, including units	Other Users of the Water Source	Comparison of Total Proposed Water Use to Available Capacity
		known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	
Whale Lake	Approx. 11,000 m ³	Local Peoples and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<100% of total available water use capacity
Smallwood Lake	Approx. 26,000 m ³	Local Peoples and mineral rights holders (though none currently known to be operating). <i>See Engagement Plan and Log in Appendix E.</i>	<100% of total available water use capacity
Unnamed Lake 1	Approx. 145,000 m ³	Local Peoples	<30% of total available water use capacity
Unnamed Lake 2	Approx. 45,000 m ³	Local Peoples	<100% of total available water use capacity
Note: "Capacity of Water Source" is based on calculation found in the reference document provided above and it is the "total available water use capacity" that has been provided (Total Surface Area (m ²) * 0.10m = Total Available Water Use Capacity (m ³)).			

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 LWB [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. 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 LWB [Waste and Wastewater Management Policy](#) and [Standard Process for Setting EQC](#) [https://mvlwb.com/sites/default/files/images/Guidelines/Guidelines for Effluent Mixing Zones - Final Draft - June 2017 EDIT9.pdf](https://mvlwb.com/sites/default/files/images/Guidelines/Guidelines%20for%20Effluent%20Mixing%20Zones%20-%20Final%20Draft%20-%20June%202017%20EDIT9.pdf). Refer to the LWB/GNWT [Guidelines for Effluent Mixing Zones](#)

when mixing zones are being considered. Refer to the LWB/GNWT [Guidelines for Aquatic Effects Monitoring Programs](#) for more information regarding the development of AEMP programs.

A Waste Management Plan is included as Appendix G.

The waste materials which require management during the Project are within two general streams:

- Legacy Site Waste: These materials were generated during original operation of the now abandoned sites and in keeping with remedial objectives, will be managed to improve site conditions.
- Project Generated Waste: The Project will generate discrete waste during camp operation and remedial activities.

The sections below discuss the general waste management approach for both Legacy Site Waste and Project Generated Waste.

Legacy Site Waste

Additional detail on the management approach for legacy site waste is provided in Section 4 of this application. The RAPs for each of the Project sites have been designed in part to manage the legacy waste and may be consulted for options analysis and technical considerations. The following types of legacy site waste will be generated:

- Unpainted/untreated wood
- Non-hazardous waste
- Hazardous materials
- Waste rock

Unpainted/Untreated Wood

No new deposition will occur and efforts will focus on management/reduction of unpainted and untreated wood found as surface debris and within buildings. The Contractor will be required to obtain a Government of the Northwest Territories (GNWT) Burn Permit before commencing work and comply with the GNWT guidance document Municipal Wastes Suitable for Open Burning (1993). The Contractor will also be required to outline any associated management measures, including fire prevention. All residual ash will be sampled and managed per hazardous or non-hazardous materials, as indicated in Section 4.

During the 2010 GBL Sites Phase I Remediation Program, approximately 1,450 m³ of unpainted/untreated wood was burned in piles or in-situ (for select timber frame structures). The Project will complete these activities, addressing all remaining unpainted/untreated wood at the Project sites (approximately 3,000-5,000 m³).

Non-Hazardous Waste

Non-hazardous waste includes metals, glass and other non-hazardous debris from waste disposal areas, scattered refuse, building/infrastructure demolition and vehicles/equipment (once stripped of fuel/product and hazardous materials). Non-hazardous waste will be consolidated at the sites for future management

Hazardous Materials

Includes hazardous materials from waste disposal areas, scattered refuse, chemical use/storage, building infrastructure demolition and vehicles/equipment. All hazardous waste will be packaged and shipped per the *Transportation of Dangerous Goods Act* to a licensed hazardous waste management facility. These approaches will be provided in the Contractor's updated Waste Management Plan, to be provided for SLWB review and approval.

Waste Rock

The selected approaches detailed in the RAPs include covers and improved drainage to reduce water infiltration to minimize acid rock drainage concerns. The success of these remedial measures will be measured by conducting ongoing geotechnical inspections and monitoring downstream environments.

Project Generated Waste

Additional detail of the Project Generated Waste stream is provided in the attached Waste Management Plan (**Appendix G**). Upon contract award and selection of a remedial approach, the Contractor will be required to submit an updated and refined Waste Management Plan, including methodologies and specific equipment requirements. All waste will be segregated and managed per the categories discussed below and incorporate means to reduce waste (e.g. source reduction, reuse, recycling and treatment). The following general approaches will be used for waste management:

- *Incineration*: Applicable materials will be incinerated to minimize the volume of Project generated waste requiring disposal. For camp wastes, the Contractor will be required to provide a dual chamber, forced air, fuel fired incinerator to site which meet applicable requirements outlined in the Waste Management Plan.
- *Waste Storage or Transfer to an Approved Facility*: All hazardous waste as well as any material which cannot be incinerated or recycled will be packaged and shipped to licensed facilities for disposal. Examples include any scrap material generated, vehicle components (e.g. anti-freeze and tires), aerosol cans, batteries, contaminated materials from spill response and waste oil. Storage and shipment of these materials to licensed facilities will be in accordance with the *Transportation of Dangerous Goods Act*. All Project generated non-hazardous waste, including incinerated ash material below applicable criteria, recyclables and other surficial debris, will be consolidated on-site for future management during pre-remediation activities.

The Project will generate two discrete wastewater streams to be tested, treated (if necessary) and discharged:

- *Camp Wastewater*: Greywater (ablution, general use), kitchen sumps/traps and blackwater (sewage).
- *Process Wastewater*: Water used for washing and decontamination, such as washing drums, tanks, equipment, soil and non-hazardous waste.

Based on water consumption detailed in Section 7, it is expected that total wastewater discharge from both streams will not exceed 50 m³/day. Treatment systems will be provided for wastewater as necessary to meet discharge criteria provided in the Water Licence. Testing will be conducted prior to discharge and at regular frequencies during discharge.

Tested effluent will be released onto the ground at a location reviewed and accepted by the Inspector that is a minimum of 30 m from natural drainage courses and 100 m from fish bearing waters. As much as possible, discharge locations will be a minimum of 100 m from all waterbodies; however, given that camp facilities must be erected within the pre-existing footprint of the historic operations, a minimum setback of 30 m may be required in select locations. Similarly, work activities at shoreline infrastructure

(e.g. removal of docks) must be completed within these setback distances. Discharge locations will be selected to minimize erosion (bedrock outcrops or sumps if necessary).

In keeping with other small CIRNAC-CARD remediation camps, the Contractor may select between alternate approaches to management of sewage waste at the satellite camps, including Incinolet toilets, Pacto-type toilets, discharge to sumps or incineration. The proposed methodology will be provided within the Contractor’s updated Waste Management Plan.

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.

Name:	See Engagement Plan and Log in Appendix E
Community:	See Engagement Plan and Log in Appendix E
Province/Territory:	See Engagement Plan and Log in Appendix E
Describe Engagement Completed:	See Engagement Plan and Log in Appendix E

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.

Previous Preliminary Screening

Preliminary Screening was conducted for the GBL Remediation Project during the submission of the initial Water Licence application submitted in 2009 ([CIRNAC-CARD - S09L8-001 | Mackenzie Valley Land and Water Board \(mvlwb.com\)](#)). A preliminary screening report was produced by the SLWB and may be found here: [S09L8-001 - Preliminary Screening - Jul 13 10.pdf \(mvlwb.ca\)](#). Since this initial screening, water licence renewals were requested in 2015 and 2017, both of which were deemed to be exempt from Preliminary Screening under the MVRMA Exemption List Regulations, Schedule 1, Part 1, Section 2, due to the following points:

- a) has not been modified, and
- b) has fulfilled the requirements of the environmental assessment process established by the MVRMA.

These previous determinations may be found here:

2015 https://registry.mvlwb.ca/Documents/S15L8-001/S15L8-001%20-%20Prelim%20Screening%20Exemption%20-%20Jul%2024_15.pdf

2017 https://registry.mvlwb.ca/Documents/S17L8-002/S17L8-002%20-%20INAC-CARD%20-%20Staff%20Report%201%20-%20Jul%209_17.pdf

Since the submission of the 2017 Water Licence application, Dél̄ı̄n̄ę Got'ı̄n̄ę Government (DGG) and CIRNAC have entered into a Governance Agreement for the co-management of the GBL Remediation Project. As part of the cooperative nature of the Governance Agreement, DGG and CIRNAC have evaluated the plans for the site to confirm acceptance of the remedial measures presented within previous application packages. Select remedial activities are being re-evaluated by the Co-Management Team to confirm alignment with the principles of the Governance Agreement and have not been included in the current application package. Consequently the current Water Licence Application package is a reduction from the scope included in previous applications. All scope included in this application remains unchanged from

previous applications and was part of the previous preliminary screening documented above (and subsequently exempted in later licence applications).

Additional application(s) will be provided to the SLWB once the remaining remedial scope has been finalized by the Co-Management Team.

Overview of Potential Impacts and Mitigations

The Project has been designed to provide a positive effect to land and water systems. Any impacts during the remediation program are anticipated to be small relative to the overall benefit. In addition to anticipated effects, there is always a potential for unplanned events or incidents. The probability of unplanned events and the potential impacts they may incur will be reduced through planning and the application of environmental management plans.

The Contractor will be responsible for several submittals relating to environmental protection. The following plans will be requested of the Contractor or provided by CIRNAC-CARD and submitted to the SLWB for approval:

- *Mobilization and Demobilization Plan*: To be provided 60 days prior to site mobilization. Outlines Contractor's general access approach and confirmation of permit/licence requirements. This also includes the submission of a Camp Methodology and Layout Plan.
- *Waste Management Plan*: Interim plan provided in **Appendix G**. Updated plan to be provided by the Contractor to meet licence/permit requirements and tailored to the approach for completing remediation activities.
- *Spill Contingency Plan*: Interim plan provided in **Appendix F**. Updated plan to be provided by the Contractor to meet licence/permit requirements and tailored to the pre-remediation and remediation activities.
- *Wildlife Management and Monitoring Plan*: Plan provided in **Appendix H**, outlining preventive and response measures to be employed to minimize impacts to wildlife at the Project sites.
- *Erosion and Sedimentation Plan*: To be provided by the Contractor 90 days prior to initiating remediation activities and defined in the scope. Overall objective will be to prevent and manage erosion and specifically address the protection of water bodies, water courses and aquatic species.
- *Water Quality Monitoring Plan*: Updated plan providing summarizing monitoring results, expanded construction/post-construction monitoring requirements, stations, frequency, methodology and QA/QC.
- *Long-Term Monitoring Plan*: Updated plan providing stations, frequency, methodology, QA/QC and adaptive management framework to be provided six months prior to completion of Construction/Post-Construction monitoring as detailed in the Water Quality Monitoring Plan.

In addition, CIRNAC-CARD and PSPC will monitor the work being completed by the Contractor(s) during each phase of the Project.

Water

The GBL Remediation Program contains limited in-water work and with the application of mitigation measures, no significant effects to surface water receivers or groundwater are anticipated. There are negligible anticipated effects from water use given volumes as water use for road construction will be returned to source, and other water uses as detailed in previous sections are small and water intake hoses will be equipped with screens to prevent the entrainment or impingement of fish (per DFO Interim code of practice: end-of-pipe fish protection screens for small water intakes in freshwater (2020)). Overall, the

remedial measures have been designed to improve water quality, restore original flow pathways and are not expected to affect water quantity. However, mitigation measures will be required to minimize potential effects during the following:

- **Dock Removal and Shoreline Work:** Dock removal is required at Contact Lake Mine and Silver Bear Mines. These bank modifications are intended to restore natural conditions. Similarly, other shoreline work is required to improve environmental conditions, including regrading waste rock, placement of covers and removal of debris. However, these activities have the potential to result in the suspension of sediments to the water column or release of contaminants during excavations. The Erosion and Sedimentation Plan will include the Contractor's management measures when conducting shoreline and in-water work (e.g. silt curtains, booms). Water monitoring will take place in and around the silt curtains and best management practices, recommended by DFO, will be followed.
- **Culverts:** Culverts will be removed at the completion of the Project. Many of these culverts will carry no water in the summer/fall months and may be removed with little effects to water systems. Other culverts (e.g. between Mile Lake and Silver Lake at El Bonanza) will require management to prevent migration of suspended sediments or impacts to downstream receiving environments and receptors. Consultation with DFO has been ongoing to ensure best practices are employed and the Erosion and Sedimentation Plan will outline the management measures for this work
- **Barging:** The Contractor will likely elect to use barges in various phases of the remedial program. While a common approach at northern contaminated sites, all transport presents a potential for spill of operational fuel or material being transported. To mitigate these risks, all personnel supervising or operating equipment via marine routes will be properly certified, experienced, and follow the regulations specific to the industry. The Contractor will be required to provide a Mobilization and Demobilization Plan, including details of the barging operation and additional spill contingency measures provided by the operator. An additional list of proposed mitigations pertaining to the use barges can be found in Appendix I.
- **Discharges:** Camp facilities will require discharge of camp wastewater and process wastewater. These treated effluents will be discharged to land systems. Effects will be mitigated using the approaches detailed in the Waste Management Plan (Appendix G). Effluent will be tested before and during discharge to ensure compliance with criteria. Discharge locations will be selected to prevent erosion, sedimentation or overland flow to aquatic systems.
- **Site Roads:** Should the Contractor elect to use winter roads for site access, management measures must be implemented to prevent effects to water systems. Federal/territorial legislation as well as permit and licence conditions will be adhered to. Such conditions include but are not limited to, minimum snow cover for winter roads, maximum vehicle weights, use of only water or snow in ice bridge construction, speed limits to reduce wave height to shore, dogleg of approaches to portages, v-notch or remove snow fills snow fills and prohibition of cutting a stream bank. An additional list of proposed mitigations pertaining to the use of winter roads can be found in Appendix I.

With the exception of Sawmill Bay, the GBL Sites are dominated by exposed bedrock and topographically controlled groundwater regimes. The flat topography and sandy soils at Sawmill Bay present a different groundwater regime. Given the remedial activities are designed to remove contaminant sources and thereby reduce loadings, there is limited risk to groundwater systems. Adherence to the Waste Management Plan (Appendix G) and Spill Contingency Plan (Appendix F) will reduce potential effects to groundwater systems.

Land

Given the Project sites are former industrial properties and remedial efforts are focused within these disturbed areas, there will be negligible incremental impacts to the land. However, there is the potential to impact land systems during select activities which must be managed appropriately. These potential effects and mitigation measures are as follows:

- Spills: May be released from fuel storage/transfer facilities, camp or vehicles/equipment. Risks may be mitigated using the management and response approaches detailed within the Spill Contingency Plan (Appendix F).
- Borrow Source Excavation: Borrow source excavation will result in disturbance of the land in these discrete areas, vegetation clearing and potential risks to permafrost. Measures which will be employed to minimize these effects include, scheduling considerations (e.g. avoiding spring thaw to reduce equipment impacts); minimizing borrow requirements (i.e. waste rock where possible); segregation of surficial organic soils for use in restoring and grading borrow areas to prevent pooling water and subsequent permafrost degradation; backfilling/grading of excavations; promoting drainage; use of protective materials (e.g. mats) in soft ground conditions and applying measures outlined in the Erosion and Sedimentation Plan (e.g. silt fencing where necessary).
- Discharges: Camp facilities will require discharge of camp wastewater and process wastewater. These treated effluents will be discharged to land systems. Effects will be mitigated using the approaches detailed in the Waste Management Plan (Appendix G). Effluent will be tested before and during discharge to ensure compliance with criteria. Discharge locations will be selected to prevent erosion, sedimentation or overland flow to aquatic systems.
- Roads/Earthworks: Earthworks and vehicle operation in some areas of the sites will have the potential to result in the atmospheric suspension of fine particulate matter (i.e. dust). Dust suppression will be employed by spraying water from approved sources. There may be new road upgrades to the existing access routes within the sites. The Contractor will be required to submit a Mobilization and Demobilization Plan detailing these activities and measures to mitigate potential impacts.

Flora and Fauna

Management of effects to local biota will be conducted throughout the Project. This includes the following:

- Flora: Given the scope of remedial work is within previously cleared areas, there are not expected to be significant impacts to local flora. A small amount of clearing may be required of overgrown roadways, when accessing remote areas of the site and during borrow source extraction. The Contractor will be required to minimize stripping of topsoil and vegetation; protect vegetation as much as possible; and seek approval from CIRNAC-CARD before clearing. No self-propelled machinery will be used for clearing and any vegetation will be cut no more than 20 cm above ground surface. Any brush/debris will be segregated from standing timber.
- Fauna: Potential risks to wildlife include disruption during site activities, habituation from camp activities and interaction with workers or vehicles/equipment. The risks from these activities may in most cases be mitigated with active management as explained within the attached Wildlife Management and Monitoring Plan (Appendix H).

Socio-Economic

The socio-economic effects accruing from the remediation program will be positive. To enhance regional socio-economic benefits, the Contractor will be required to submit a socio-economic plan that will include the Contractor's commitments to provide Indigenous employment, sub-contracting and training. In addition to Indigenous benefits, the Project is anticipated to continue providing significant contracting and employment opportunities for northerners.

Archaeological and Heritage

A desktop Archaeological Overview Assessment was completed at the GBL Sites in 2019, which was followed by a field based Archaeological Impact Assessment in 2021 (excluding the small portal sites and Bonanza, which are to be integrated in future monitoring programs).

As a result of the AIA one historic and seven prehistoric archaeological sites were recorded, including a grave site of high cultural importance. The AIA recommends continued avoidance by at least 30 m and in some cases 150m of the sites that were recorded. There are no proposed Project activities that involve ground disturbance within the recommended buffers. Should avoidance not be feasible (i.e. cleanup work is required within the buffer), then additional archaeological research developed in consultation with the Territorial Archaeologists and the DGG will be required prior to work activities. For any of the archaeology sites identified during the AIA that are within the permitted buffer areas, approval from the Sahtu Land and Water Board will be required to operate any vehicle or equipment.

As a result of this AIA, unless work is planned in the avoidance buffers for the recorded archeological sites, no further archaeological studies were recommended by the Project Archaeologist in conjunction with the Great Bear Lake Remediation Project

Worker orientation will include specific training in archaeological preservation. Workers will be instructed to stop work immediately if an archaeological site is identified/suspected and notify the Supervisor and Departmental Representative. A buffer area will be established to prevent disruption and coordinates/photos collected. With the exception of notifying Project/territorial archaeologists, this information will be kept confidential. Workers will be informed that archaeological sites are protected by law and disruption or removal of artifacts is prohibited.

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 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. Use landscape orientation if preferred.

It is anticipated that this application will continue to be exempt from Preliminary Screening as documented in Section 10 of this application; therefore the following table has not been completed per instructions above.

<p>Potential Impacts Use an "X" to indicate which apply</p>	<p>X</p>	<p>Potential Project Impacts and Proposed Mitigations Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.</p>
<p>ABIOTIC COMPONENTS</p>		

Potential Impacts <i>Use an "X" to indicate which apply</i>	X	Potential Project Impacts and Proposed Mitigations <i>Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.</i>
Land		
Soil contamination		
Soil compaction		
Destabilization/erosion		
Change in soil structure		
Inability to support vegetation		
Other (Atmospheric suspension of fine particulate matter)		
Water		
Groundwater		
Water table alteration		
Infiltration changes		
Changes in water quality		
Temperature changes		
Other		
Permafrost		
Loss or change in extent		
Changes in seasonal fluctuations		
Change in persistence		
Other		
Surface Water		
Water flow or level changes (permanent, temporary, seasonal)		
Drainage pattern changes		
Temperature changes		
Changes in water quality		
Wetland impairment		
Changes to aquatic habitat (see Biotic section below)		
Other		
Air		
Changes in air quality		
Harm to living things		
Increased greenhouse gases		
Other		
BIOTIC COMPONENTS		
Vegetation		
Direct loss of vegetation		
Loss of Species at Risk or may-be-at-risk plants		
Change in species composition		

Potential Impacts <i>Use an "X" to indicate which apply</i>	X	Potential Project Impacts and Proposed Mitigations <i>Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.</i>
Introduction of non-native (invasive) species		
Effects on plant health (dust, metals, toxins)		
Increased risk of fire		
Compaction of vegetation		
Other		
Terrestrial Wildlife Habitat		
Direct loss or removal of habitat, dens, or nests		
Loss or removal of keystone species and/or Species at Risk habitat		
Fragmentation of wildlife corridor		
Direct injury or mortality		
Disturbances to key lifecycle stages: breeding, feeding, nesting, staging		
Effects on population abundance		
Change in species diversity		
Effects on wildlife health (toxins, metals, etc.)		
Changes to migratory movement patterns		
Changes to predator-prey relationships		
Human-wildlife conflicts		
Other		
Aquatic Habitat		
Breeding disturbances		
Change in species diversity		
Effects on health (toxins, metals, sediment, etc.)		
Changes to migratory movement patterns		
Changes to predator-prey relationships		
Effects on population abundance		
Other		
CULTURAL COMPONENTS		
Wildlife Harvesting		
Loss or reduction in game species populations		
Effects on traditional land use, subsistence, and harvesting rights		
Other		
Cultural Integrity and Heritage Resources		
Change to or loss of cultural integrity		
Change to or loss of traditional lifestyle		
Change to or loss of heritage resource		
Other		
Social and Economic Well-being		

Potential Impacts <i>Use an "X" to indicate which apply</i>	X	Potential Project Impacts and Proposed Mitigations <i>Describe the potential impact(s) and the proposed measure(s) to reduce each of these impacts.</i>
Increased human health hazard and risk		
Economic opportunities or losses (employment, training)		
Change in ecological, cultural, social, or economic values identified for protection in approved Land Use Plans		
Impairment of the recreational or traditional uses of the land or water		
Impairment of the aesthetic quality of the land or water		
Changes to the use of the area by other non-Indigenous people (e.g., trappers, outfitters, residents, hunters, forest harvesters, other authorized projects)		
Other		

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](#).

See Appendix F for the updated Spill Contingency Plan.

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:	X – The Contractor/sub-contractor will be determined as an outcome of the tender process.		
Responsibilities:			
Company Name:			
Mailing Address:			
Community:		Telephone:	
Prov/Terr:		Email:	
Postal Code:		Other:	

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.

Please refer to Appendix J for a full inventory of the studies undertaken to date at the GBL Sites.

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:	2024	Completion Date:	2027
Annual Contractor mobilization and waste backhaul will occur between February and March of each year, and pre-remediation/remediation activities will occur between May and September. It is assumed that shutdown will occur annually over the winter (approximately five months).			
The start date/year is subject to regulatory approvals and contract award.			
Term of Licence Requested:	3 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 LWB [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.

Land Use Plans: Contact the applicable Land Use Planning Board or the Tłı̨ch̨ Government for assistance in interpreting the requirements of the relevant Land Use Plan(s). Include a Land Use Plan Conformity Table, or if applicable, written confirmation of conformity from the Tłı̨ch̨ Government, in your Application Package, demonstrating how the project meets the requirements of the Land Use Plan, if applicable.

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

Facilities: Include the supporting information required under subsection 6(2) of the [Mackenzie Valley Federal Areas 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 the 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. Refer to the LWB/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 sections

1.3 and 2.1 of the LWB/GNWT/CIRNAC [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 72.03(5)(d) of the [Mackenzie Valley Resource Management Act](#). Please note this information will be required by the Board prior to issuance.

Engagement: Please see Appendix E – Engagement Plan and Log.

Eligibility: The Project Sites and access portages are located on Federal Lands, Territorial Lands, and Sahtu Settlement Lands. The Project sites are listed under Schedule 4, Part 5, as well as Schedule 7, Part D of the *Northwest Territories Lands and Resources Devolution Agreement* as “waste sites” requiring remediation by Aboriginal Affairs and Northern Development Canada (now CIRNAC). Sections 6.62 to 6.68 of the *Northwest Territories Lands and Resources Devolution Agreement* provide Canada/CIRNAC the right to access Territorial and Settlement lands and water for the purpose of conducting the remediation of the Project sites. Notification of the proposed Project has been provided to DGG through extensive involvement in the Co-Management Team for the Project. The Territorial Government has been provided with notification of the work activities on Territorial lands, which is limited to small portages for potential winter road use.

Land Use Plans: Please see Appendix A – Land Use Plan Conformity Table.

Traditional Knowledge (TK): As part of early Project planning, Traditional Knowledge Studies were completed for the areas that will be addressed as part of the remedial activities of this Project, including the site footprints, road access corridors and other traditional land use areas (i.e., historic winter roads, traditional hunting and trapping routes, ceremonial burial sites, sacred sites, etc.). These studies were coordinated through the Community Liaison Coordinator for the Sahtu organizations and through the Tłı̨chǫ Government. These reports are outlined within Section 8 (Engagement Reports) of the engagement plan (Appendix E). Traditional Knowledge studies are continuing and information will be used to refine the remaining remedial designs and strategies.

Facilities: Under subsection 6(2) of the [Mackenzie Valley Federal Areas Waters Regulations](#) the Project considered the categories below as directed:

- Camp:
 - i) Camp Plan: A plan showing the location of the camp will be provided by the successful contractor chosen to complete the work activities. The Camp Plan will be submitted prior to the commencement of operations.
 - ii) Camp Capacity: The Contractor’s Camp Plan will include the maximum capacity of the camp. The Camp Plan will be submitted prior to the commencement of operations.
 - iii) Water or Sewage System: The attached Waste Management Plan (Appendix G) details the minimum requirements for water and sewage management. This plan will be refined by the successful contractor chosen to complete the work activities and an updated Waste Management Plan will be provided a minimum of 60 days before the commencement of remediation activities with cross-sections and elevations of the chosen management approaches.
- Water for Industrial Use:

- Please see Section 4 for a description of the undertaking, though it is noted that chemical use is expected to be limited to vehicle and camp cleaning fluids (i.e. no chemical processes are required within the scope of work)
- Please see Appendix G for the Waste Management Plan, including management of wastewater.
- Deposit of Waste:
 - Please see Appendix G for the Waste Management Plan. These plans will be refined by the successful contractor chosen to complete the work activities and an updated Waste Management Plan will be provided a minimum of 60 days before the commencement of remediation activities.
- Handling/Storage of Petroleum Products and Hazardous Materials:
 - The successful contractor chosen to complete the work activities will be required to submit a Fuel Management Plan prior to the initiation of work activities, including proposed storage locations.
 - Please see Appendix F for the Spill Contingency Plan for the maximum volumes, minimum handling requirements, and contingency plan for containment and cleanup in the event of a spill. This plan will be refined by the successful contractor chosen to complete the work activities and an updated Plan will be provided a minimum of 60 days before the commencement of remediation activities
 - Please see Appendix G for the Waste Management Plan description for hazardous waste management. This plan will be refined by the successful contractor chosen to complete the work activities and an updated Plan will be provided a minimum of 60 days before the commencement of remediation activities.
- Abandonment and Temporary Closure:
 - The successful contractor will include winterization of all camp activities and work activities in progress within the Camp Plan and Work Plans.

Closure and Reclamation: The aim of the Great Bear Lake Remediation Project is to complete the remediation and closure of the abandoned sites. The Project Overview provided in Section 4 summarizes the work to be conducted within the licence period. However, the scope of work within this application does not include final remediation of any of the sites, which will require a subsequent water licence submission or amendment. Upon finalization by the Co-Management Team of the final remedial plans for all aspects of the sites and selection of a remedial contractor, a Closure and Reclamation Plan will be prepared by the Project team for the work activities conducted during the remediation Project (e.g. site roads, airstrips, camp/facility decommissioning).

Closure Cost Estimate: As the Project has developed, cost estimates have been conducted meeting Federal requirements for future contracting processes (confidential per Federal procurement policies). Updates will be required as plans are finalized for final remediation of the sites. Funding for the remediation Project has been secured through the Government of Canada Northern Abandoned Mines Reclamation Program (NAMRP).

Financial Capacity: As legal custodians of the contaminated sites, CIRNAC has secured funding through the Government of Canada Northern Abandoned Mines Reclamation Program (NAMRP) through to March 2035.

For more detailed information, please see the following appendices to this Application:

- Appendix A: Land Use Permit Conformity
- Appendix B: Great Bear Lake Site Maps
- Appendix C: Proposed Transportation Routes
- Appendix D: Detailed Design Drawings
- Appendix E: Engagement Plan and Log
- Appendix F: Spill Contingency Plan
- Appendix G: Waste Management Plan
- Appendix H: Wildlife Management and Monitoring Plan
- Appendix I: Proposed Mitigation Measures for Winter Road and Barge Activities
- Appendix J: List of Studies and Reports
- Appendix K: 2017 Water License Application
- Appendix L: 2017 Land Use Permit Application
- Appendix M: Pre-Remediation Monitoring Plan
- Appendix N: QAQC Control Plan
- Appendix O: Remedial Action Plans

15. FEES

Refer to the Guide for assistance with determining applicable fees.

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

If fees are submitted separately, indicate how and when they will be delivered to the Board's office.

The Government of Canada is exempt from paying these fees.

Mackenzie Valley Resource Management Act

Section 7. This Act is binding on Her Majesty in right of Canada or a province, except that Her Majesty in right of Canada is not required to pay any fee prescribed by regulations made under paragraph 90.3(1)(k) or subparagraph 90.3(2)(a)(i).

16. SIGNATURE

Dawn Keim	Acting Senior Manager – CIRNAC-CARD
Applicant's Name (print) or Company Name	Position (print)
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).