

Great Bear Lake Sites Remediation Project Waste Management Plan July 2024

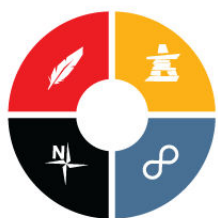


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1 Introduction

Indigenous and Northern Affairs Canada (CIRNAC) – Contaminants and Remediation Division (CARD) has developed the Great Bear Lake Sites (GBL Sites) Remediation Project (the Project) – Waste Management Plan (Plan). This document is in accordance with the Mackenzie Valley Land and Water Board (MVLWB) *Guidelines for Developing a Waste Management Plan* (2011).

Although conceptual in nature, the Plan is being submitted in support of the Type “A” Land Use Permit and Type “B” Water Licence applications for the Project. **A more comprehensive plan tailored to the remedial approach will be submitted by the successful Primary Remediation Contractor (the Contractor) as part of their submittal process and in advance of mobilization to site.**

This current interim Plan is considered the minimum standard that future submittals will be measured against.

1.1 Key Information

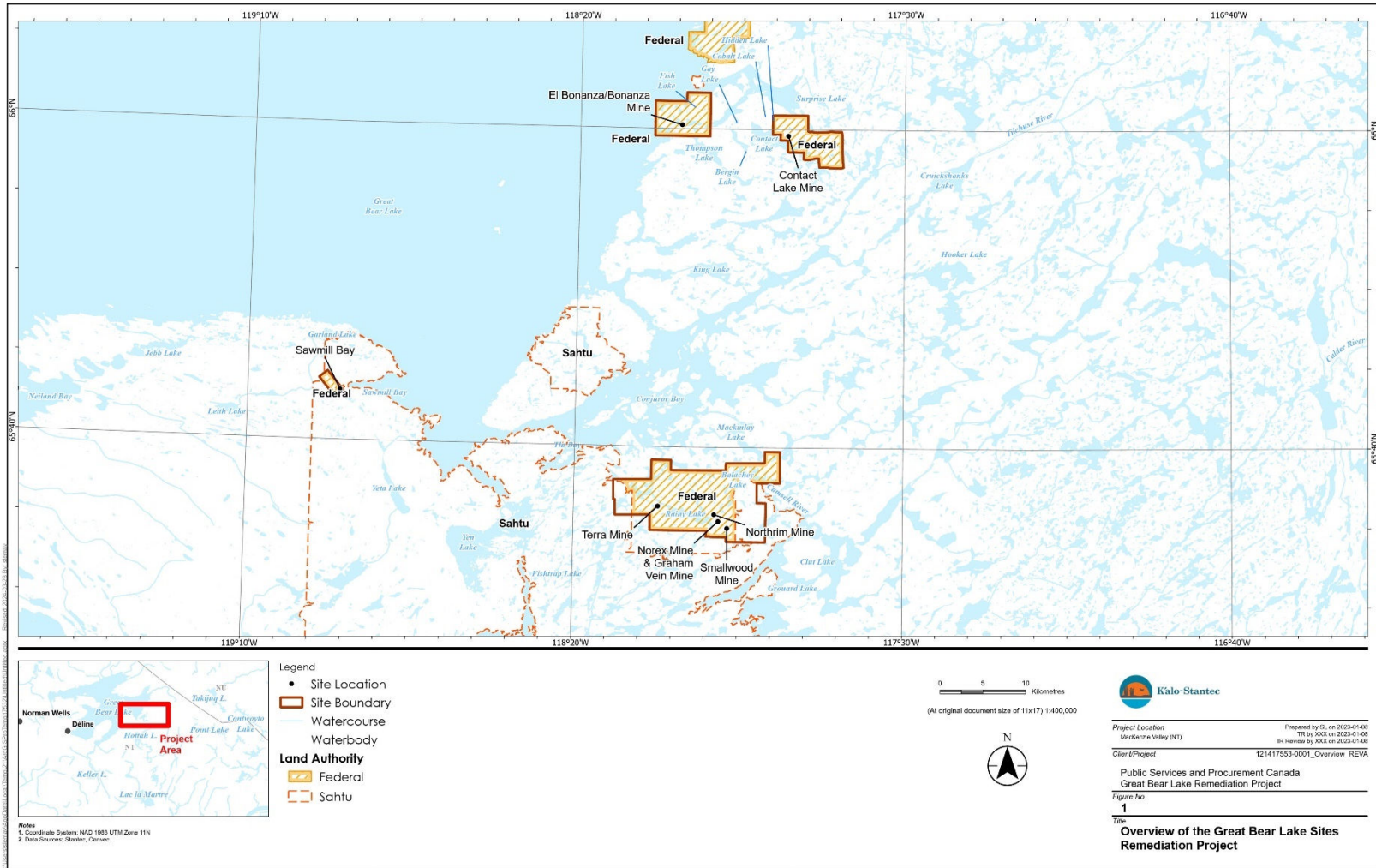
Table 1 presents key corporate information pertaining to CIRNAC-CARD and the Project, while Figure 1 provides a Project overview.

Table 1 Key Information Pertaining to CIRNAC-CARD and the GBL Project Sites

Federal Department	Crown Indigenous Relations and Northern Affairs Canada – Contaminants and Remediation Division
Contact Person	Dawn Keim – Acting Senior Manager Telephone number: (867) 444-0124 Fax number: (867) 669-2439
Project Office Location	4923 52 nd Street Yellowknife, NT, X1A 2R3



Figure 1 Project Overview



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Sinteric has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Sinteric assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.



1.2 Effective Date of Waste Management Plan

This Waste Management Plan is effective as of the date approved by the Sahtu Land and Water Board (SLWB). This Plan is considered to be a living document that will undergo review, at minimum, annually prior to the start of any site activities with additional reviews as warranted to reflect changes in operations, technology, chemicals or fuels, or as directed by the SLWB. Any revisions to the plan will be submitted to the SLWB for review and approval.

1.3 Revisions to the Waste Management Plan

Table 2 will be used to track reviews and revisions to the Waste Management Plan, and ensure that all stakeholders have the most up to date copy of the plan.

Table 2 Revision History of the Waste Management Plan

Version #	Date	Summary of Revisions	Comments	Revision Distribution Date
v.1	May 19, 2017	n/a	Submitted to SLWB for approval	n/a
v.2	April 24, 2024	Addition of overview figure, updated contact information, project description, waste streams, description of waste management, references	n/a	April 26, 2024
v.2.1	July 16, 2024	Update to Table 2, Table 6, section 3.2.1, section 3.2.3, and section 3.2.4.	WMP updated based on LUP and WL review recommendations.	July 18, 2024

1.4 Environment, Health and Safety Policy

CIRNAC's Environment, Health and Safety (EHS) Policy provides direction in order to meet the requirements of the Canada Labour Code, applicable federal and territorial environmental regulations/policies, and related policies of the Treasury Board in the implementation of the Northern Contaminated Sites Program (CSP). The policy serves as an integral component of CIRNAC's CSP and applies to all individuals, including contractors, involved with contaminated sites. Within the Northern CSP, health and safety of employees and protection of the environment are an overriding priority. Management is committed to doing everything possible to prevent injuries and to maintain a healthy environment. To this end:

- Senior managers are responsible for ensuring that all the requirements of the EHS Policy are fully implemented.
- All managers and supervisors are responsible for ensuring that their employees are trained in safe work procedures, to undertake their assigned duties without accidents, injuries or harm to the environment, and for ensuring that employees follow safe work methods and all related regulations. This includes training on industry best practices,



- assessing and managing EHS risks and the emergency spill response plan (outlined in the Spill Contingency Plan).
- All personnel are required to support and comply with the EHS program, making safety, health and protection of the environment a part of their daily routine, and ensuring that they follow safe work methods and relevant regulations.
 - All personnel will be held accountable for implementing, and adhering to, the requirements of the EHS program.
 - All personnel are accountable for reporting to their immediate supervisor any unsafe practices or areas in need of improvement. Personnel are further accountable for bringing such reports to the attention of higher levels in the organization, without fear of reprisal, if the situation is not addressed appropriately.
 - All relevant territorial and federal laws, regulations, policies, and industry best practices including the requirements of CIRNAC's CSP Management Framework, are incorporated into our program as minimum standards.
 - Pollution prevention practices and programs to achieve continuous improvement will be implemented as an ongoing requirement of the program, and will include recycling when possible.
 - Where a conflict arises due to different standards or requirements between different regulations or standards, the more stringent of the two will apply.

CIRNAC-CARD also considers environmental protection to be a priority in our activities and it is our policy to:

- Strive to comply with all applicable environmental laws, regulations and standards.
- Strive to conduct our activities and manage our operations in a manner that minimizes environmental impact by employing the best practices, control mechanisms, processes, and procedures that have been proven technically sound and economically feasible.
- Measure our environmental performance against standards taking into account that which is known to us or apparent to us about environmental consequences of our activities, and going beyond lawful requirements when we know it to be essential to protect the environment.
- Strive to train our employees in environmental matters and responsibilities relating to their particular assignments.
- Periodically examine and evaluate our environmental protection activities to ensure policy implementation, and that appropriate procedures, programs, and systems are being applied.
- Encourage, support and conduct research and development activities to find solutions to technological problems.
- Strive to ensure that ecological considerations are properly identified and evaluated in our projects and long-range planning processes.
- Strive to support all levels of government in the promulgation of cost effective, sound environmental laws, codes, rules, and regulations, based on scientific facts and need.

1.5 Purpose and Scope

The purpose of this Plan is to guide the waste management activities for the Project. The waste will be generated through two general streams: 1) existing legacy waste from the industrial, mining and exploration sites; and 2) waste generated from remediation activities. It is intended to be the minimum standard for waste management that CIRNAC-CARD requires of itself and its contractors for the duration of the project. Application of this plan to all potential waste



generating operations is intended to mitigate any potential EHS risks associated with the project, and will ensure its operations and activities meet all applicable environmental regulatory requirements. All garbage, waste and debris will be disposed of as described in the final approved version of the Waste Management Plan to be submitted by the Contractor, unless otherwise authorized in writing by an Inspector. Waste management practices which best serve the public interest will be employed. This occurs through engagement with and consideration of the Indigenous communities of the project area. CIRNAC-CARD and its contractors will comply with all applicable territorial and federal legislation. The following key federal and territorial environmental acts, regulations and guidelines are applicable to the Project:

- **Federal:**
 - *Transportation of Dangerous Goods Act* and Regulations (2020)
 - *Hazardous Products Act (1985a)* *Canadian Environmental Protection Act* and Regulations (1999)
 - *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* (2020)
 - *Mackenzie Valley Resource Management Act* and Regulations (1998, as amended in 2019)
 - *Fisheries Act (1985b, as amended in 2019)*
 - *Mackenzie Valley Land and Water Boards Guidelines for Developing a Waste Management Plan (MVLWB, 2011)*
- **Territorial:**
 - *Environmental Protection Act* (1998a)
 - *Used Oil and Waste Fuel Management Regulations* (2003)
 - *Guideline for General Management of Hazardous Waste* (2017)
 - *Guideline on Waste Batteries* (1998c)
 - *Guideline on Waste Antifreeze* (1998d)
 - *Guideline on Waste Solvents* (1998e)
 - *Guideline on Waste Paint* (1998f)
 - *Transportation of Dangerous Goods Act* and Regulations (1991, as amended in 2022)
 - *Northwest Territories Waters Act* (2014a) and Regulations
 - *Wildlife Act* (2014b)

This Plan will be presented to all staff during their on-site orientation sessions. During the worker orientation seminar, training sessions will be scheduled to ensure employees have an understanding of their role within the waste management strategy on site.

The primary objective of the Project is to mitigate hazards and remediate the existing legacy waste at the GBL Sites. Waste management strategies for the legacy waste is described within the associated Land Use Permit application and the various site Remedial Action Plans (RAPs). To avoid repetition, this Waste Management Plan will only consider Project generated waste streams.



1.6 Site Description

The Project is to be completed at the following abandoned project sites: Silver Bear Mines (Terra, Northrim, Norex/Graham Vein and Smallwood mine sites), Contact Lake Mine, El Bonanza/Bonanza Mine and the Sawmill Bay site. All sites are located on the eastern and southeastern shores of Great Bear Lake, within the boundaries of the Sahtu Dene and Metis Comprehensive Land Claim Agreement. The Silver Bear Mines are also partially within the Tłıchq Mq̄whì Gogha Dè Nijjèè. The community of Déline is approximately 250 km west of the project area and Gamètì is 160 km to the south. Coordinates are provided in Table 3 below.

Table 3 Great Bear Lake Sites - Coordinates

Site	Latitude	Longitude
Silver Bear Mines - Terra	65° 36' 16.56" N	118° 7' 11.23" W
Silver Bear Mines - Northrim	65° 35' 47.35" N	117° 58' 38.54" W
Silver Bear Mines – Smallwood	65° 34' 56.54" N	117° 56' 38.91" W
Silver Bear Mines – Norex and Graham Vein	65° 35' 22.13" N	117° 58' 0.12" W
Contact Lake Mine	65° 59' 37.36" N	117° 48' 0.63" W
El Bonanza/Bonanza Mines	66° 0' 14.89" N	118° 4' 23.91" W
Sawmill Bay	65° 43' 8.54" N	118° 55' 57.77" W
Bear Portal	66° 0' 26.21" N	118° 1' 25.99" W
Contact Lake Portal	65° 58' 38.15" N	117° 44' 44.19" W
Mystery Island Portal	66° 2' 45.07" N	118° 2' 8.78" W

There is currently no road access to any of the GBL Sites, which must instead be reached by fixed wing (float based at all sites or unmaintained airstrips at Terra Mine and Sawmill Bay) or rotatory wing.

The former industrial properties operated many decades ago and have long since been abandoned by the original occupants. Silver Bear Mines is composed of one large site (Terra Mine) and four smaller satellite sites (Northrim, Smallwood, Norex and Graham Vein). These underground mining properties produced primarily silver, copper and bismuth and were in operation from 1969 to 1985. The Contact Lake Mine was significantly smaller in scale and was originally an underground silver mine during the 1930s and was also mined for uranium in 1949/50. El Bonanza and Bonanza Mines are both located on the Dowdell Peninsula and were small scale silver mines operational 1934-1936, 1956-1957, and in 1965. The Sawmill Bay Site was established as a sawmill in the 1930's, after which it was used for barging and air transportation of uranium ore from Port Radium (1940's-1950). It was subsequently used for various military activities (1950s) and, later, as a fishing lodge (late 1950s to 1987). All GBL Sites fall under the custodial responsibility of CIRNAC, and site remediation is coordinated by CIRNAC-CARD.



Remedial activities at the project sites first commenced as the GBL Phase I Remediation Project in 2010/2011, with secondary activities conducted through to 2016. The scope of the remediation work at the project sites focused on activities which could be practically implemented by small camps without heavy equipment and aimed to address immediate risks. A general summary of the remedial work completed to date is as follows:

- Drum/Product Consolidation: Conducted at all sites. Residual fuels and products were collected from drums and most tanks for testing, consolidation and shipment to off-site licensed management facilities. Most empty drums from Sawmill Bay, Contact Lake and El Bonanza/Bonanza were washed (if containing residual product), crushed and consolidated at Sawmill Bay. Contact Lake and El Bonanza/Bonanza contain some empty drums requiring management; while the empty drums at the Silver Bear sites are yet to be addressed.
- Debris Management: Conducted at Sawmill Bay, Contact Lake and El Bonanza/Bonanza. Surface debris which could be manually lifted was consolidated by category into burnable (untreated unpainted wood), non-hazardous debris and hazardous debris. Most hazardous debris has been shipped to off-site licensed management facilities. Non-hazardous debris stockpiles remain at the respective sites and the combustible materials were burned (with appropriate permit).
- Building Demolition: Conducted at Contact Lake and El Bonanza/Bonanza. The majority of buildings were stripped of materials, which were then consolidated by category into burnable (untreated unpainted wood), non-hazardous debris and hazardous debris. Most of the hazardous debris has been shipped to off-site licensed management facilities. Non-hazardous waste stockpiles remain at the respective sites and the combustible materials were burned (in piles or in-situ for timber frame structures).
- Contaminated Soil Excavation/Removal: A small volume of polychlorinated biphenyls (PCB) contaminated soil was removed from El Bonanza/Bonanza. Petroleum hydrocarbon (PHC) contaminated soil from a recent spill at the Sawmill Bay airstrip was also excavated and the soil remains on site in closed overpacks for future removal.

The Phase I Remediation Project represented only a portion of the remediation requirements for the project sites. Additional remedial work will also be completed as part of the Project, for which this Waste Management Plan has been designed.

1.7 Project Description

The primary objective of the Project is to reduce, and where possible, eliminate the risk to the environment and human health caused by legacy environmental concerns from the abandoned mine/industrial sites, and to promote socio-economic benefits to Indigenous people and other northerners.

Initial Project activities are expected to occur over approximately three years (not including monitoring post remediation), with remaining Phase II remediation activities to be completed following approval of site remedial action plans. Project activities will primarily be limited to the open water season, with the exception of site mobilization and demobilization which may occur by ice road (to be determined by the Contractor).



A summary of the Project related activities for the current phase are provided in the Table 4 below.

Table 4 Project Related Activities for the Great Bear Lake Sites Remediation Project

Site	Activity
Silver Bear Mines	<ul style="list-style-type: none"> • Mine Openings: 17 Vertical openings (shafts and raises) will be closed using engineered caps; 12 Horizontal openings (portals and adits), 1 mined trench and 6 open stopes will be closed using engineered backfill. • Buildings/Equipment: Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste for future management and ship hazardous waste to a licensed waste management facility. • Non-Hazardous Waste: Consolidate non-hazardous debris for future management • Hazardous Waste: Ship off site in accordance with the Transportation of Dangerous Goods Regulations (TDGR) to a licensed disposal facility. • Waste Disposal Sites: Excavate old waste disposal sites and consolidate with surficial non-hazardous or hazardous debris as appropriate. • Roads: Remove culverts, with consultation with the Department of Fisheries and Oceans and allow roads to naturally re-vegetate. • Airstrips: Smallwood airstrip left as is. Maintenance and improvement activities on the Terra Airstrip will be completed as required to promote safe operations during remediation activities. Once Terra Mine airstrip is no longer required to service reclamation activities, consult with Transport Canada. • Docks: Remove the three docks with minimal disturbance to the surrounding sediments and stabilize the shorelines.
Contact Lake Mine	<ul style="list-style-type: none"> • Mine Opening: Vertical Openings (shaft and raise) will be capped, the adit backfilled and Contact Lake portal. • Waste Rock: Cover where exceeding gamma radiation criteria and grade to reduce water infiltration. • Buildings/Infrastructure: Only four buildings remain. Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste in pre-existing stockpiles for future management, and ship hazardous waste offsite to a licenced management facility. • Waste Disposal Area: Excavate old waste disposal sites and consolidate with surficial non-hazardous or hazardous debris as appropriate as described for Silver Bear Mines. • East Arm Fuel Storage and Dock: Remove and containerize oily water in tank for off-site disposal. Disassemble the tank, dock materials, boiler and equipment and manage per non-hazardous or hazardous debris as described for Silver Bear Mines • Roads: Remove culverts (if encountered and with Fisheries and Oceans Canada (DFO) consultation) and allow roads to naturally revegetate.



Site	Activity
El Bonanza/ Bonanza Mine	<ul style="list-style-type: none"> • Mine Openings: Install waste rock backfill seals of the adit at site and at Bear Portal and Mystery Island Portal, install engineered caps of two accessible vertical openings and cap the inaccessible #1 shaft in a safe manner • Buildings/Infrastructure: Only four buildings remain. Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste in pre-existing stockpiles for future management and ship hazardous waste offsite to a licenced management facility. • Airstrip and Fuel Storage Tank Area: Empty drums crushed (on or off site) and consolidated with surface non-hazardous debris. Tanks will be dismantled for management as hazardous or non-hazardous depending on leachable lead paint concentrations. • Waste Disposal Area: Excavate old waste disposal sites and consolidate with surficial non-hazardous or hazardous debris as appropriate as described for Silver Bear Mines. • Roads/Culverts: Remove culverts and allow roads to naturally revegetate (including designed removal of culvert linking Mile Lake and Silver Lake, with DFO consultation).
Sawmill Bay	<ul style="list-style-type: none"> • Buildings and Infrastructure: Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste for future management. Hazardous waste and burn ash exceeding criteria will be transported to a licensed waste management facility. • Drum Caches, Fuel Storage Tanks and Residual Fuels: Crushed drums and fuel storage tanks (with leachable lead levels below criteria) will be consolidated for future management. • Machinery/Equipment: Consolidate as possible per non-hazardous and hazardous waste management discussed below. • Non-Hazardous Waste: Most non-hazardous waste has been consolidated into piles. Complete consolidation for future management. • Hazardous Materials: Consolidate any remaining surface materials as well as those removed from buildings/infrastructure during demolition. Hazardous materials will be transported to licensed off site management facilities. • Submerged Debris: Barge to be left as is pending assessment/management by Atomic Energy Canada Limited (AECL). • Surface Water, Sediment and Groundwater: Remove surface debris to reduce contaminant loadings. • Roads/Airstrips: Maintenance and improvement activities on the airstrip will be completed as required to promote safe operations during remediation activities. Once airstrip is no longer required to service reclamation activities, consult with Transport Canada. At completion of remediation, remove culverts and allow roads/airstrips to naturally revegetate.



2 Waste Management Hierarchy

A waste management hierarchy is useful in identifying what waste management strategies are most desirable. The methodology and definitions here are based on MVLWB Guidelines for Developing a Waste Management Plan (2011). In order of preference (from most preferable to least), the options to be considered for each type of waste are:

- 1) **Source Reduction:** Elimination or decrease of the volume, mass and/or toxicity of waste generated.
- 2) **Reuse:** Reuse of a product more than once for the same or different purpose, either on or off site.
- 3) **Recycle/Recovery:** Materials otherwise destined for disposal are collected, processed and remanufactured either on or off-site.
- 4) **Treatment:** Method to reduce the volume, mass and/or toxicity prior to disposal.
- 5) **Release to the Receiving Environment:** Least desirable option, often involving landfilling or other storage and containment options.

Prior to beginning work on site, the Contractor is required to submit details of the waste reduction approach tailored to the site-specific activities (as a component of the overall Waste Management Plan).

3 Waste Management Approach

3.1 Waste Streams

This Waste Management Plan considers only Project generated waste streams. For reference, Table 5 below displays a breakdown of waste types and the associated document that describes their specific management.

Table 5 Waste Streams and Associated Management Documents

Waste Stream	Waste Management Plan (Project Generated Waste)	Remedial Action Plan (Legacy Mine/Site Waste)
Hazardous or Potentially Hazardous Wastes		
Ash or Incinerator Residue	✓	-
Paints and Solvents	✓	✓
Aerosol Cans (Bear spray, air horns, toiletries)	✓	-
Batteries	✓	✓
Asbestos Containing Materials	-	✓
Lead-Based Painted Materials	-	✓
PCBs or Transformers	-	✓
Chemical Wastes – Liquids and Solids	✓	✓
Sewage/Grey water	✓	-



Waste Stream	Waste Management Plan (Project Generated Waste)	Remedial Action Plan (Legacy Mine/Site Waste)
Used Oil, Fuels, Lubricants, Greases, Oil Filter, and Solvents	✓	✓
Non-Hazardous Waste		
Unpainted/untreated burnable wood	-	✓
Camp Construction/Demolition Waste	✓	-
Camp Facilities Refuse (including food, and food contaminated waste)	✓	-
Metal Debris	✓	✓
Cans/Plastics	✓	✓
Mineral Waste		
Waste rock	-	✓

Legacy Mine/Site Waste

As documented in Table 5 above, estimated amounts and management of Legacy Mine/Site Waste is detailed within the site-specific RAPs and is beyond the scope of this Waste Management Plan. However, the Contractor will be responsible for:

- Tracking the volume of waste burned, moved and managed;
- Documenting the final location of all waste, including transport records and manifests;
- Documenting all materials salvaged during the remedial program;
- Reporting chemical use during waste management; and
- Complying with remedial specifications, governing acts/regulations concerning waste materials and site permits/licences.

A summary level overview of the waste management approaches to be applied to Legacy Mine/Site Waste is as follows:

- **Unpainted/Untreated Wood:** Includes surface debris and historic building materials. Materials will be burned with residual ash sampled and disposed of per non-hazardous or hazardous waste (as confirmed by analysis). 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).
- **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, hazardous materials and tested for leachable lead paint concentrations). Non-hazardous waste will be consolidated at each site for future management.



- **Hazardous Waste:** Includes hazardous materials from waste disposal areas, scattered refuse, chemical use/storage, building infrastructure demolition and vehicles/equipment. Products include asbestos containing materials (ACMs), lead-amended paints (exceeding applicable leachable criteria), on-site chemicals, lead batteries and PCB-amended paints/transformers. All hazardous waste will be packaged and shipped per the *Transportation of Dangerous Good Act* to a licensed hazardous waste management facility. Transport of materials will be tracked by the remedial Contractor.
- **Waste Rock:** Management of these mineral wastes has been designed for individual deposits based on geochemistry, setting and receiving environments, however only remedial works at Contact Lake are within the scope of this Project. The selected approach includes improving drainage to reduce water infiltration. The success of the remedial measures will be measured by conducting ongoing geotechnical inspections and monitoring downstream environments.

Project Generated Waste

The Primary Contractor will be required to prepare a comprehensive Waste Management Plan building upon this document and outlining the proposed method of handling each kind of Project generated waste streams listed in Table 5. Minimum standards and assumptions are provided below.

3.2 Description of Waste Management

Successful waste management requires the separation of different types of wastes as appropriate. The Primary Contractor will include detailed descriptions, as suggested in the MVLWB Guidelines for Developing a Waste Management Plan, for each type of waste management infrastructure. The following five categories are predicted:

- 1) Incineration and open burning;
- 2) Waste Storage or Transfer to Approved Facilities, and
- 3) Wastewater Treatment and Discharge Facilities.

The volumes and potential environmental effects of these materials will be determined by the Contractor’s selected remedial approach and are summarized in Table 6 below. These will be updated in subsequent Waste Management Plans.

Table 6 Estimated Volumes and Potential Environmental Impacts of Project Generated Waste Streams

Waste Type	Source	Volume	Potential Environmental Effects
Hazardous Waste	Ash material, paints and solvents, aerosol cans , batteries, asbestos containing materials, painted materials, PCBs, chemical wastes, used oil, fuels, lubricants, greases	TBD	Air emissions from burning or incineration; soil or groundwater contamination; change in water quality; change in wildlife or fish health; change in human health



Waste Type	Source	Volume	Potential Environmental Effects
Sewage	Camp facility refuse, effluent, sewage sludge	TBD	change in water quality; change in wildlife or fish health; change in human health; increased wildlife mortality risk
Greywater	Camp operations	TBD	Change in water quality; change in wildlife or fish health; increased wildlife mortality risk
Other Non-Hazardous Waste	Unpainted/untreated wood, camp construction/demolition, metal debris, recyclables, food and food contaminated waste	TBD	Change in water quality; change in wildlife or fish health; change in human health, increased wildlife mortality risk
Inert Waste	Materials resupply	TBD	n/a
Non-recoverable Waste	Camp operations, vehicle maintenance, materials resupply	TBD	Air emissions from burning or incineration; change in water quality; change in wildlife or fish health; change in human health
Contaminated Soil	Fuel spills	TBD	Fuel spills on soil could result in local biological impacts, and could spread to surface waters.

3.2.1 General Requirements

Waste management requires a systematic approach to ensure waste reduction and environmental effects are mitigated. Certain processes and protocols are specific to the individual types of waste management infrastructure; however, there are certain procedures common to all:

- Waste must be segregated into categories specific to each waste stream for appropriate manner;
- Storage of waste materials must be done in such a way to prevent environmental impact, limit animal attraction and maintain worker safety;
- Health and safety training must be provided to workers and tailored to the specific scope of work required;
- All waste management activities must be documented, including volumes, personnel responsible, material transport procedures/manifests and any incidents;
- Failures in the waste management approach which result in environmental or health and safety incidents must be evaluated to determine corrective actions; and,
- Throughout all waste management processes, opportunities for source reduction, recycling and reuse/recovery should be evaluated and enacted where possible.



3.2.2 Incineration

Several types of Project generated material will be eligible for incineration. Any incineration should occur after source reduction, reuse and recycling have been considered. Waste suitable for incineration is generally inert waste, with the exception of the odours of camp food waste which are animal attractants. Materials include food waste and camp facilities refuse (including, paper products, cardboard, paper, newspapers and magazines, most packaging, waxed paper, paper towels, serviettes and paper cups); natural cloth materials (clothes, linens, towels, rags); certain building materials; and certain camp construction and demolition materials.

The Contractor will be required to provide a dual chamber, forced air, fuel fired incinerator to site to process applicable Project generated waste. Incinerators must meet the requirements of the the following standard guidelines:

- **Canada-wide Standards for Dioxins and Furans** (CCME 2001)
- **Canada-wide Standards for Mercury Emissions** (CCME 2000)

As part of the larger Waste Management Plan, the Contractor will be required to develop an Incinerator Management Plan. The plan must be aligned with **Environment Canada's Technical Document for Batch Waste Incineration (A.J. Chandler & Associates 2009)** to ensure air emissions are minimized.

Incineration is proposed for various reasons, including reduced wildlife attractant to food waste and reduction of waste volumes. Incineration of eligible waste will generate ash. Any ash produced from incineration will be subject to testing for hazardous material content. Ash material will be disposed of accordingly, which may consolidation onsite for future management if below applicable criteria, or to an off-site licensed hazardous waste management facility if exceeding.

The Contractor will be requested to incinerate materials daily; however, should any food or kitchen wastes require storage, materials must be well sealed to limit wildlife attraction. The incinerator will be located in a designated burn area free from combustible materials or vegetation and downwind of camp facilities. Fire response equipment must be readily available and operators trained in response measures. All incinerator operators will be appropriately trained on the specific unit in use, including operation, maintenance and testing protocols.

With the exception of incineration and the managed burns of legacy site waste (unpainted/untreated wood only), all other fires and burning of rubbish on site is prohibited unless approved by the CIRNAC Departmental Representative.

Project-generated spills (non-legacy) on land that results in contaminated soil will be excavated by hand. Contaminated soils be placed in sealed overpacks. The outer boundary of the excavation will be tested to ensure all contaminated soil has been recovered from the spill. Additional details on storage and transfer can be found in section 3.2.3.

3.2.3 Waste Storage or Transfer to Approved Facilities

All project-generated hazardous waste will be packaged and shipped to an approved waste management facility for disposal. This includes material such as:

- Waste oil/product from vehicles and equipment;
- Vehicle components (e.g. anti-freeze and tires);
- Lead acid or alkaline batteries;



- Aerosol cans;
- Contaminated materials from any spill response or hydrocarbon management (e.g. spill pads, sorbents);
- Incinerator ash and residue exceeding applicable criteria; and
- Solvents and paint.

All materials destined for off-site disposal must be stored safely and securely before transport. Storage of liquid and solid wastes destined for off-site disposal will be stored in steel drum containers meeting *Transportation of Dangerous Goods Act* and Regulations, closeable lids, and labels for marking contents and date filled. Shipment of these materials to licensed facilities must be conducted by trained individuals in accordance with the *Transportation of Dangerous Goods Act*. All wastes shipped to an offsite receiver will be tracked, recorded, and manifested using the 'Waste Generator Registration Number'. Hazardous waste documentation will occur, as per the Guideline for the General Management of Hazardous Waste in the NWT.

If work requires the use of any toxic or hazardous materials or chemicals, or otherwise creates a hazard to life, safety or health, work will be in accordance with the National Fire Code of Canada, Occupational Health and Safety Legislation and the Workplace Hazardous Materials Information System (WHMIS). Material Safety Data Sheets (MSDS) will be available for all on-site chemicals and present management/transport considerations.

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.

Spilled petroleum products and materials, including contaminated soil, will be placed into sealed overpack containers. The overpacks will be temporarily placed in a competent building until such time that they can be disposed of at an approved disposal facility.

3.2.4 Wastewater

The Project will generate two discrete wastewater streams to be contained and managed separately:

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

Treatment systems will be provided for wastewater as necessary to meet discharge criteria provided in the Water Licence. The Primary Contractor will be required to submit design, operation and maintenance details of the wastewater treatment facilities, conforming to all applicable regulations. The treatment facilities will be operated by qualified personnel in accordance with manufacturer's instructions and procedures submitted by the Contractor and approved by the CIRNAC Departmental Representative. Testing will be conducted prior to discharge and at regular frequencies during discharge.

Camp Wastewater - Active Remediation Phase

Exact details of the camp wastewater management methods during the active remediation phase will be ultimately decided by the remediation contractor. This section describes the general approaches for camp wastewater management at CARD project sites. If the



remediation contractor selects an alternative method, or if additional detail is required, then this Waste Management Plan will be updated accordingly prior to commencement of remediation.

It is expected that the Project may require upwards of three years, based primarily at a main camp which would logically be constructed at Terra Mine (i.e. the site with the largest scope of work). While greywater is not classified as a “hazardous material”, the Contractor may elect to use a water management system which combines greywater and blackwater and which would be in use for many years. The following requirements have been designed under this assumption and will be subject to revision based on the Contractor’s final Waste Management Plan. Prior to initial discharge from the treatment facility, camp wastewater must be confirmed below the Water Licence criteria, and sampled at a frequency set within the Water Licence.

Discharge of treated camp wastewater will be conducted in compliance with applicable legislation, permits and licences. Effluent will be released onto the ground at a location, reviewed and accepted by the Departmental Representative 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. Discharge locations will be selected to minimize erosion (bedrock outcrops or sumps if necessary). No direct discharge will be permitted to surface water or wetlands.

In addition to a main camp, the Contractor may also elect to use small satellite camps to address the smaller scope of work required at Contact Lake Mine, Sawmill Bay and El Bonanza/Bonanza Mine. These camps are predicted to be less than 12 persons and require less than three months to complete. In such a situation, a revised camp wastewater approach will be required. In keeping with other small CIRNAC-CARD remediation camps, camp greywater would be tested for compliance with Water Licence criteria and discharged. The Contractor may select between alternate approaches to management of sewage waste, 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.

In the event of a discrepancy between the above listed wastewater requirements and those provided in the Water Licence, the requirements in the Water Licence will govern.

Camp Wastewater – Pre-remediation Phase

Prior to the commencement of remediation, the project will use several field seasons to conduct works in preparation for active remediation. During this period, the existing camp facility at Terra Mine will serve as the primary camp facility. Wastewater from the Terra camp is plumbed/discharged to an underground engineered septic tank, which is located >100m from the Hohum Tailing Containment Area, which is the nearest water body. The pre-remediation contractor(s) may also install Pacto-style toilets at the Terra camp, from which the waste will be incinerated in the on-site incinerator. The pre-remediation contractor(s) may need to establish day-shelters or temporary camps at some of the other project sites. The remote shelters and/or temporary camps would also use Pacto-style toilets, from which the waste would be incinerated in the on-site incinerator.

Process Wastewater – Active Remediation Phase

The initial pre-remediation phase will not require process water. Exact details of the process wastewater management methods during the active remediation phase will be ultimately



decided by the remediation contractor. This section describes the general approaches for process wastewater management at CARD project sites. If the remediation contractor selects an alternative method, or if additional detail is required, then this Waste Management Plan will be updated accordingly prior to commencement of remediation.

Process water will also be required during remedial activities and will be sampled and treated (if necessary) before discharge. The process water treatment facility must be capable of removing oil, suspended solids, particulates, and asbestos fibres. Prior to discharge, process wastewater shall meet requirements as listed in the Water Licence.

Processing water compliant with these criteria will be discharged according to permit conditions to minimize contaminant loadings or erosion to land systems. Discharge of treated processing wastewater will be conducted in compliance with applicable legislation, permits and licences. Effluent will be released onto the ground at a location, reviewed and accepted by the Departmental Representative, 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 remedial work must be implemented at historic infrastructure, a minimum setback of 30 m may be required in select locations. Discharge locations will be selected to minimize erosion (bedrock outcrops or sumps if necessary). No direct discharge will be permitted to surface water or wetlands.

The Primary Contractor will also be responsible for transporting and disposing of process waste water to an approved off-site disposal facility in the event that the on-site facility is not functioning. In the event of a discrepancy between the above listed wastewater requirements and those provided in the Water Licence, the requirements in the Water Licence will govern.

During select remedial activities, the Contractor may be required to relocate water to conduct site improvements, such as backfilling adits or waste rock grading. In such cases, where water may be redirected to a sump or stable surface and kept within the same footprint of work area (e.g. within the same waste rock pile), water consolidation/testing and treatment will not be required. The Sediment and Erosion Control Plan will be utilized to ensure there is no surface runoff or effect to receiving environments. This approach is only applicable when dewatering work areas of metal enrichment (i.e. no hydrocarbons or other contaminants) and where discharge is conducted within the same deposit (i.e. within the same waste rock pile).

4 Closure

Upon completion of work, the Contractor must remove all Project generated waste materials from the sites. Inspections will be conducted by CIRNAC or representatives to ensure conditions for closure have been met.

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