APPENDIX R. WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN:

LUPIN MINE WINTER ACCESS ROAD PROJECT

24 October 2024

Revision History

Revision #	Date	Section	Summary of Changes	Author
1	Apr 2024	All	New document	N. McLaren, Falkirk Environmental
2	Sept 2024	1.2, 3.1, date , contact information.	Plan Updates	A. Jebb, Falkirk Environmental
3	Oct.25, 2024	All	• Updated waste management options for sewage, greywater and non-mineral waste for the project and camp operations. • Updated waste stream disposal details. • Updated waste reduction options and waste impact mitigation options.	K. Leedham, Falkirk Environmental

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1. INTRODUCTION

In support of ongoing reclamation of the Lupin Mine, Lupin Mine Incorporated a subsidiary of Mandalay Resources, is planning to access the Lupin Mine in winter along a portion of the existing Tibbitt to Contwoyto Winter Road corridor between the Ekati Mine turnoff on Lac de Gras and the Lupin Mine in Northwest Territories and Nunavut, respectively (the Project). This Plan considers the guidance and requirements related to waste management provided in the documents listed in Table 1-1 and recommendations from government regulators.

The table below outlines documents referenced in the development of this waste management plan.

Table 1-1: Relevant Guidance Documents Including Legislation, Permits and Licenses

Document	Authority
MVLWB Guidelines for Developing a Waste Management Plan (2011a)	Mackenzie Valley Land and Water Board
Contingency Planning and Spill Reporting in Nunavut: A guide to the new regulations	Government of Nunavut
Environmental Guideline for the General Management of Hazardous Waste in Nunavut (2010)	Government of Nunavut
Guideline for Hazardous Waste Management (2017)	Government of Northwest Territories
A Guide to the Spill Contingency Planning and Reporting Regulations (2011)	Government of Northwest Territories
Nunavut Water Nunavut Surface Rights Tribunal Act (2002) and Nunavut Water Regulations (2013)	Indigenous and Northern Affairs Canada
Mackenzie Valley Resource Management Act (1998)	Government of Canada
Northwest Territories Lands Act (2014)	Government of Northwest Territories
Northwest Territories Lands Use Regulations (2014)	Government of Northwest Territories
Northwest Territories Waters Regulations (2014)	Government of Northwest Territories
Environmental Protection Act (1988)	Government of Northwest Territories, Nunavut
Waters Act (2014)	Government of Northwest Territories
Spill Contingency Planning and Reporting Regulations (1993)	Government of Northwest Territories, Nunavut
Canadian *Environmental Protection Act* (1999)	Environment and Climate Change Canada
Environmental Emergency Regulations (2003)	Environment and Climate Change Canada
Transportation of Dangerous Goods Act (1992)	Transport Canada
Transportation of Dangerous Goods Regulations (2012)	Transport Canada

1.1 COMPANY NAME

Lupin Mines Incorporated
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Contact: Kellie Leedham, Falkirk Environmental Consultants – an authorized agent of Mandalay Resources

Email: kellie@falkirk.ca

1.2 MANDALAY CORPORATE ENVIRONMENTAL POLICY

Mandalay Resources is committed to maintaining the highest level of integrity in its corporate responsibilities toward resource development and environmental stewardship. Mandalay is committed to environmental protection throughout the exploration, development, operation and eventual closure and rehabilitation of each of its projects by applying sound judgment, by meeting or exceeding legislative requirements and by minimizing adverse impacts its activities may have on the environment. Mandalay views adherence to the policy's environmental guidelines as a continual improvement process.

1.3 PROJECT DESCRIPTION

The Tibbitt to Contwoyto Winter Road (TCWR) will be built along an existing route established in the 1970's and since used intermittently to service the Lupin Mine and the Jericho Mine (Figure 1-1). The Winter Road route predominantly traverses lakes, with few portages where the road occurs overland. Of the 210 km, 95 km occur in Northwest Territories and 115km occur in Nunavut. Seven (7) portages occur in Northwest Territories and there is one (1) portage in Nunavut. Staging areas along the route which may be utilized to store equipment and fuel include existing portage areas as discussed with and approved by the Inspector. Figure 1-1 shows the general routing of the Lupin Mine Winter Road.

The Winter Road occurs entirely above the tree line, with overland portions traversing the barren lands of the Southern Arctic Ecozone and the Tundra Shield Low Arctic Ecoregion, within the Slave Geologic province. Portages generally follow low-lying terrain found between lakes along the road route (EBA 2001, Ecosystem Classification Group 2012).

The Winter Road is accessed in mid- to late-winter only. At this time, the ground is frozen and snow covered, and ice thickness on lakes is up to 2 m thick.

The Project will consist of up to two portable, temporary camps may be used to support seasonal construction. Each camp will house an average of 15 persons,

The first camp location will be adjacent to Portage 55 of the TCWR. The camp will follow the construction and maintenance crews along the length of the winter road. All camps will be located adjacent to the winter road and will be established on durable ground. Proper setbacks from the nearest watercourses will be maintained. The Inspector will be notified of the campsite locations and the construction and land use operations progress.

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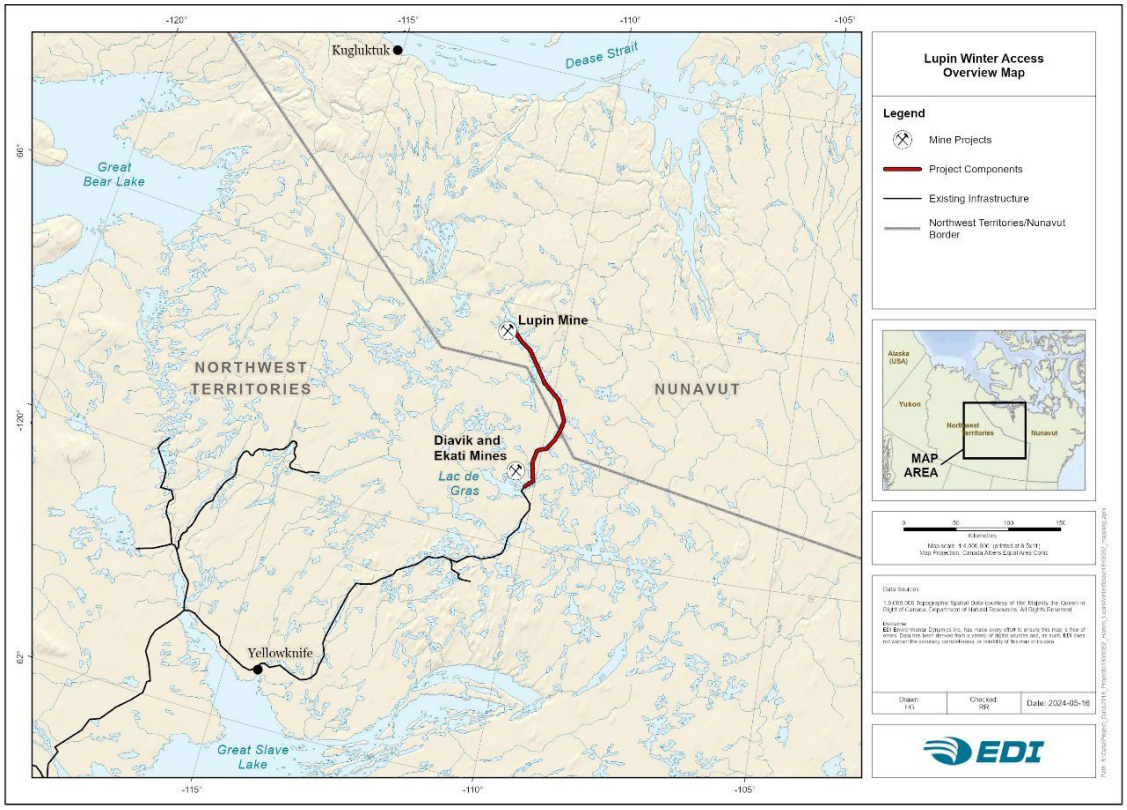

Figure 1.-1: Lupin Mine Winter Road Location

1.4 SCOPE

The Program involves constructing and operation a portion of the Tibbitt to Contwoyto Winter Road (TCWR) route from the Ekati Mine turnoff on Lac de Gras to Lupin to mobilize and demobilize equipment and supplies that may be used for ongoing reclamation of Lupin in the Kitikmeot Region of Nunavut (the Program). The Program includes transportation only of equipment and supplies such as bulk fuel, soda ash, and lubricants activities occurring at the Lupin mine site are authorized elsewhere and are outside of the scope of the Program. The Program involves constructing and operation a portion of the Tibbitt to Contwoyto Winter Road (TCWR) route from the Ekati Mine turnoff on Lac de Gras to Lupin to mobilize and demobilize equipment and supplies that may be used for ongoing reclamation of Lupin in the Kitikmeot Region of Nunavut (the Program). The Program includes transportation only of equipment and supplies such as bulk fuel, soda ash, and lubricants activities occurring at the Lupin mine site are authorized elsewhere and are outside of the scope of the Program.

The scope of the Lupin Mine Winter Access Road generally includes:

- Winter road construction and maintenance.
- Water withdraws to support winter road construction.
- Hauling and transport of equipment to support Lupin mine reclamation.
- Establishment of a temporary camp to house workers during road construction.
- Proper storage of all wastes at the camp facility until disposal.
- Sewage treatment and discharge of greywater into constructed sumps.
- Possible incineration of domestic waste from the camp.
- Possible backhaul of domestic waste from the camp to the Yellowknife Solid Waste Disposal Facility.
- Backhauling of potentially hazardous wastes to KBL Waste Transfer site in Yellowknife.
- Waste management goals include limiting impacts to the environment including terrestrial and aquatic resources and operating in a manner that is compliant with all authorizations.

1.5 PLAN MANAGEMENT AND IMPLEMENTATION

The onsite Project Manager or designate is responsible for Plan implementation.

A copy of this Plan is maintained in the Lupin Mine's office in both Yellowknife. A copy of this Plan will also be maintained by the Project Manager onsite, during the construction of the road.

The Plan will be reviewed annually by the Project Manager and updated as needed. When material changes occur, the updated document will be issued externally as needed.

All workers and contractors involved in the winter road construction and any associated activities (i.e. camp operations), will be trained on proper waste handling and disposal options during the project.

2. IDENTIFICATION OF WASTE TYPES

Types of waste that may be generated through the Program include:

- Non-mineral waste:
- Potentially hazardous waste

No mineral waste will be produced because of this program.

2.1 IDENTIFICATION OF NON-MINERAL WASTES

Given the nature and duration of the winter road construction project, minimal non-mineral refuse is expected to be produced. The Project is of short duration and requires minimal supplies that produce waste. Examples of this type of waste that may be produced domestic waste include domestic waste such as organic food waste and putrescible waste and wastes related to camp activities. Also, construction of the road may produce wastes or bi-products such as wood, metal, and plastics. Treated sewage and other greywater will be produced from workers and camp operations

2.2 IDENTIFICATION OF POTENTIALLY HAZARDOUS WASTES

Potentially hazardous wastes produced may include fuels, antifreeze, fuel transport containers (e.g. jerry cans), oil filters, batteries, oily rags, solvents, and sorbent materials (which can also be referred to as Listed Wastes). In the event of a spill, spill response materials may be generated in the event of an unplanned release from the vehicles constructing, maintaining, or transiting the road. Implementing a robust safety program will minimize waste of this type from being generated; however, in the event of an unplanned release the volume of waste generated may vary depending on the magnitude of the spill.

3. MANAGEMENT OF WASTES

The section below details how different types of waste will be handled throughout the project. Pollution prevention is the most effective and proactive management practice to eliminate and reduce the generation of waste. Best management options will be followed to reduce the amount of waste produced at the site. Where possible and appropriate options are available, efforts will be made to re-use, repurpose, or recycle materials.

Table 4-1 below provides summary of the types of expected waste, best management approaches, treatment, and disposal options.

3.1 NON-MINERAL WASTE MANAGEMENT

3.1.1 Sewage and Greywater

A portable sewage treatment unit will be placed at the camp to treat sewage from flush toilets. This sewage treatment plant will also treat greywater from the camp kitchen and camp washing facilities. Treated waters will be disposed of into a sump that is located no less than 100m from any waterbody. Sump locations will be determined once the exact location of the camp and any nearby waterbodies are determined

3.1.2 Other Waste Management

Appropriate waste disposal containers to allow for appropriate waste separation will be available to crews during road construction. All waste will be hauled back to the camp location. The camp will be equipped with appropriate containers to accommodate all types of waste that may be produced until disposal. These containers will be durable and in good condition and will minimize attractants and interactions with wildlife and crews.

The project is considering two options for domestic waste disposal. Selection will depend on the successful

camp contractor for the project and their current equipment availability. These options had not finalized at the time this report was created. A preferred option will be presented to regulators as soon as available.

The two options are described below:

1. **Incineration**: A dual chamber diesel incinerator that meets the Environment and Climate Change Canada (ECCC) Canada-wide standards for Dioxins and Furans: (80 pg I-TEQ/Rm3 @ 11% O2) and Mercury (20 µg/Rm3 @ 11% O2) is being considered. Operations of the incinerator would only be performed by certified operators and would meet incineration practices and standards and documentation requirements.
2. **Store waste at Camp and backhaul to Yellowknife Solid Waste Facility (landfill) at the end of the Project:**
    - Kitchen waste will be stored at camp in a secure containment unit meant for domestic waste, within an outdoor structure or building. This will function to prevent wildlife encounters. Cold weather will help prevent odours.
    - Other waste, such as scrap wood and metal will be separated and stored in a designated area that is kept tidy and properly labelled.

3.2 POTENTIALLY HAZARDOUS WASTE MANAGEMENT

All hazardous and potentially hazardous wastes will be handled and stored in accordance with the NWT Guidelines for Hazardous Waste Management (2017) and other applicable regulation and best management practices.

All hazardous and potentially hazardous wastes will be labelled and stored in accordance with Workplace Hazardous Materials Information System (WHMIS) and will be transported in accordance with Transportation of Dangerous Goods (TDG) Regulations (2012).

The storage of such materials will occur at the camp facility. At the end of the project, all hazardous wastes will be back-hauled to Yellowknife by a certified waste hauler for final disposal at the KBL Waste Facility.

4. WASTE STORAGE AND DISPOSAL

4.1 NON-MINERAL WASTE

4.1.1 Sewage and Greywater

Sewage and greywater will be treated via the sewage treatment facility onsite at the camp. Treatment and disposal to associated sumps will be continuous. The camp operations will have a designated employee assigned to ensure the proper operations of this facility and disposal option.

4.1.2 Food Waste Storage

Food waste will be stored in sealed storage containers, either until disposal via incineration or until they can food waste can be backhauled at the end of the project for disposal in Yellowknife at the Solid Waste Disposal Facility. Food waste will be kept in a sealed containers (i.e. sealed barrels) within a secure structure (i.e. sea-can). Cold temperatures will facilitate to minimize smell to minimize wildlife attractants and interactions

4.1.3 Dry Storage

Non-hazardous waste such as wood, scrap metal, plastics will be sorted and stored in designated areas until disposal via incineration or until they can be backhauled at the end of the project for disposal in Yellowknife at the Solid Waste Disposal Facility.

4.2 HAZARDOUS AND POTENTIALLY HAZARDOUS WASTES

The storage of hazardous and potentially hazardous, and listed wastes will follow all appropriate regulations, including the Guideline for Hazardous Waste Management in the Northwest Territories (2017).The following sections provide details on specific storage and handling procedures specific to the Project.

4.2.1 Used Oil and Waste Fuel

Used oil and filters from vehicle maintenance and waste fuel will be managed in accordance with the Used Oil and Waste Fuel Management Regulation (NWT, 2004). Storage of used oil and waste fuel will be securely stored at the camp facility until the end of the season, when they will be backhauled to Yellowknife for final disposal at KBL.

- Storage will occur in a container that was manufactured for the purpose of storing petroleum products. Such containers can be easily inspected, tightly sealed, closed and handled to prevent leakages or spill and will be
- Storage in an area where access is controlled and monitored.
- Storage containers and areas will be labelled according to WHIMIS.

4.2.2 Antifreeze (and other chemicals)

Antifreeze will be stored in accordance with the NWT Guideline for the Management of Waste Antifreeze (1998). Storage best management practices include:

Antifreeze storage will include:

- Storage in containers (preferably originals) that are sound, sealed and not damaged or leaking and should be sealed or closed at all times.
- Waste antifreeze will NEVER be stored with food or in used food containers such as bottles or cans.
- Storage in an area where access is controlled and monitored.
- Storage containers and areas will be labelled according to WHIMIS.

4.3 TRANSPORTATION OF HAZARDOUS AND OTHER LISTED WASTES

The transportation of all hazardous and potentially hazardous wastes from the camp back to KBL in Yellowknife will be done by a certified hauler, who's operations are compliant with all applicable regulations.

5. WASTE MANAGEMENT OVERVIEW AND IMPACT ASSESSMENT

The table below summarizes the various waste streams of the project,

Given the short duration of the project and the limited number of people involved in road construction and staying at the camp at any one-time, non-mineral waste production is expected to be fairly minimal. Similarly, hazardous, and potentially hazardous waste production is expected to be minimal. Efforts to manage both non-mineral wastes and hazardous and potentially hazardous will seek to minimize volumes of waste produced.

Table 4.-1: Waste Steam Summary

Waste Stream	Management Approach			Impact Assessment	
	Reduce/ Reuse/ Recycle Options	Treatment	Disposal Option	Potential Effects	Mitigation Measures
Non – Mineral Wastes					
Treated Sewage effluent	N/A	Bioreactor wastewater treatment unit	Treated effluent disposed in a sump >100 m from water body in area with good drainage.	Attract wildlife Contamination nutrient enrichment of nearby waterbodies	Secure waste storage to minimize attraction Situate sumps >100 m from waterbody and place sump in area of good infiltration (e.g. sands, gravels)
Sewage Solids	N/A	N/A	Proper disposal at landfill	No potential effects if securely contained.	n/a
Camp Greywater	Efforts to conserve water in camp will be encouraged.			Attract wildlife Contamination/nutrient enrichment of nearby waterbodies	Use strainers in the camp kitchens to prevent food waste in greywater Secure waste storage to minimize attraction Located sumps >100 m from waterbody and place sump in area of good infiltration (e.g. sands, gravels)
Organic and putrescible waste	Order minimal amounts of food, to meet the camp demands and reduce excess waste. Where appropriate, re-purpose food leftovers in new meals		Either incinerate or store properly until able to backhaul to the Yellowknife Landfill.	Attract wildlife	Prompt incineration with proper storage until incineration, or; Store in industrial grade garbage bags in secure containers that can be cleaned if needed with properly fitting lids for later disposal.
Wood scraps and pallets	Utilize construction methods and planning that minimize materials and allow for product reuse.		Wood can be burned in the incinerator or backhauled to Yellowknife for landfill disposal.	N/A	
Plastics (large items, such as 10gallon buckets)	Utilize construction methods and planning that minimize materials and allow for product reuse.	Reuse or recycle as appropriate	Backhaul to Yellowknife for recycling or landfill disposal.	N/A	

Waste Stream	Management Approach			Impact Assessment	
Scrap metal	Utilize construction methods and planning that minimize materials and allow for product reuse.	Reuse or recycle as appropriate	Backhaul to Yellowknife for recycling or landfill disposal.		
Potentially Hazardous Wastes					
Used oil and Waste Fuel	Bulk fuel will reduce reliance on disposable containers that tend to produce more waste		Proper onsite storage until final disposal at KBL in Yellowknife.	Potential for pollution, particularly aquatics and threat to human health	Proper handling and storage
Lubricants, filters, spent sorbent materials	Only required amounts will be purchased		Proper onsite storage until final disposal at KBL in Yellowknife.	Potential for pollution, particularly aquatics and threat to human health	Proper handling and storage
Antifreeze	Only required amounts will be purchased If possible, collect antifreeze and return it to heating systems after maintenance Possibly, filter and use additive to extend life of product		Proper onsite storage until final disposal at KBL in Yellowknife.	Potential for pollution, particularly aquatics and threat to human health	Proper handling and storage.
Miscellaneous Batteries, paint cans, aerosols)	Recycling options are available in Yellowknife.		Backhaul for recycle in Yellowknife	Potential for pollution. Aerosols can explode in landfills or if heated.	Proper handling and storage.
Hydrocarbon contaminated water from secondary containment facilities (snow/ice, or drip trays)	Cover containment areas to reduce ingress of rain and snow to reduce volumes of contaminated water.		Pump and store in adequate, sealed, properly labelled containers. Backhaul to Yellowknife to KBL Hazardous Waste TS.	Potential for pollution, threat to human health	Proper handling and storage. Routine inspection of secondary containment facilities.
Incinerator ash/residue (if incineration is chosen as an option)	Waste reduction in general will result in less product to incinerate		Storage in sealed container and backhaul to KBL.	Ash contains chemicals that could cause harm to human health	Wear adequate PPE when handling.

6. ROLES AND RESPONSIBILITIES

Lupin Mines Incorporated and ultimately is responsible for activities associated with Lupin winter access, including implementation and management of this Plan.

6.1 STAFF, CONTRACTORS, SUPPLIERS AND VISITORS

All personnel conducting activities on site, including staff, contractors, suppliers, and visitors, are required to implement this Plan as it pertains to their activities on site. Specifically, these responsibilities include:

- Disposing of domestic waste in designated containers and adhering to all waste management practices;
- Responding to spills in accordance with the Spill Contingency Management Plan;
- Cooperating with your supervisor and/or Lupin Mine management to implement a waste management program;
- Carrying out only those duties and tasks that you are experienced at and trained to perform;
- Where there is uncertainty, asking questions and bring concerns to the attention of your supervisor when working with waste.

6.2 MANAGERS AND SUPERVISORS

Managers and supervisors have a responsibility to ensure that staff, contractors, consultants, and visitors have been trained in Lupin Mine waste management expectations and procedures. They have the responsibility to ensure that waste management practices and activities are followed in accordance with this plan and updated if necessary.

7. REPORTING AND DOCUMENTATION

Waste management reporting will occur in accordance with record keeping and reporting requirements of various project authorizations. All documentation records will be available to an inspector on request.

8. TRAINING

All attendees to site, including visitors, will participate in a site orientation which outlines waste management expectations, roles, and responsibilities. All training records will be available to an inspector on request.