

14 NON-MINERAL WASTE MANAGEMENT

Wafi-Golpu Joint Venture is committed to managing its wastes in accordance with the waste hierarchy (refer to Figure 14.1) and will seek strategies to avoid or minimise the production of waste. Where generation of waste cannot be avoided, options to reuse or recycle wastes will be implemented where possible and disposal will be considered the last resort.

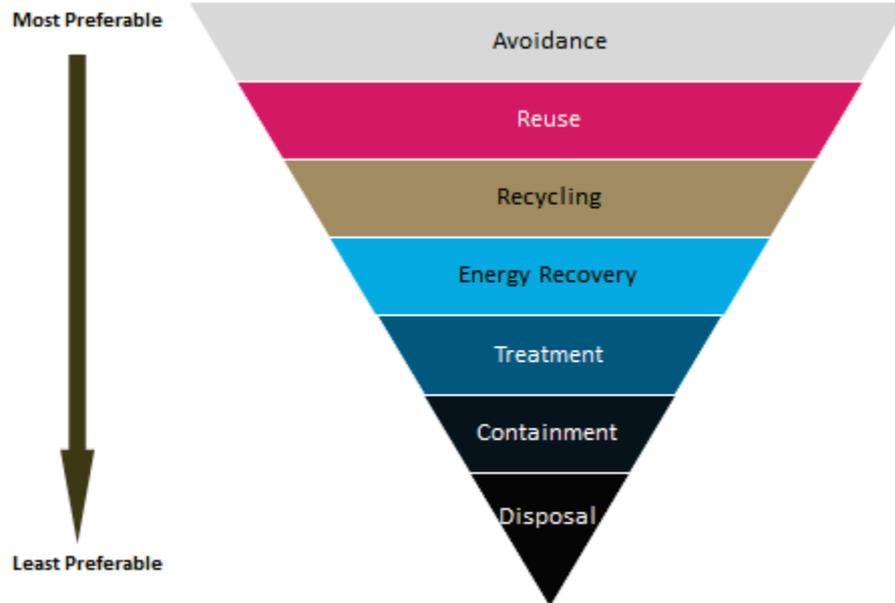


Figure 14.1: Waste management hierarchy

Hazardous and non-hazardous materials will be managed according to the Project Environmental Management Plan (EMP) (refer to Volume 6 Appendix N).

Waste management strategies to be employed for non-mineral wastes include:

- Sale – Where an economic value can be obtained for waste materials, they will be sold to third parties who can either directly reuse or derive economic value from the waste resource e.g., metals for recycling
- Reuse – Where possible, packaging materials will be returned to suppliers for reuse e.g., metal drums and batteries
- Recycling – Where used materials can be reprocessed into useful materials or products by WGJV or third parties
- Energy recovery – Where a waste material has calorific value that can be utilised e.g., waste hydrocarbon that can be used as a supplementary fuel
- Incineration – To reduce the mass of wastes for disposal and reduce the hazard associated with chemical wastes
- Landfill – In-ground disposal of waste which cannot be dealt with using any of the above strategies

14.1 Mine Construction and Operation Wastes

The non-mineral wastes that will be generated from the mine area during both the construction and operation phases of the Project have been identified and estimates

made of amounts that will be generated over the LOM. The broad categories of waste applicable to the mine area are described in Table 14.1.

Table 14.1: Categories of non-mineral waste

Waste	Description
General Waste	Non-hazardous wastes from the consumption of goods during day-to-day activities. Including but not limited to office waste, consumables, tyres, conveyor belts, concrete and excluding putrescible wastes and recyclables.
Recyclable Waste	Materials that can be processed and used again. Including but not limited to paper, cardboard, plastics and metals, excluding timber waste.
Putrescible Waste	Waste containing organic matter capable of being decomposed by microorganisms and of such a character and proportion as to cause obnoxious odours and attract birds or animals. Includes cooking oils and greases and other biodegradable organic matter from Fere Accommodation Facility.
Hazardous Waste	Hazardous waste includes any unwanted or discarded material (excluding radioactive material), which because of its physical, chemical or infectious characteristics can cause significant hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Including but not limited to medical waste, chemicals, paint, batteries, lights, contaminated soils.
Timber/Vegetation Waste	Construction timber and cleared vegetation.
Hydrocarbon Waste	Waste hydrocarbons and hydrocarbon-containing wastes including oily rags, greases, oil-water emulsions, drums and cans contaminated with hydrocarbons, and used oil filters.

Estimates of the quantities of these wastes have been made based on anticipated utilisation of equipment, personnel numbers and mine and plant throughput. Projected waste quantities and the anticipated disposal pathway for each waste stream during construction and operation are shown in Table 14.2.

Table 14.2: Estimated annual mine waste generation during construction and operations

Waste Stream	Total Waste (tpa)			Waste Treatment
	Construction	Operations		
		3Mtpa	6Mtpa	
General Waste	1,122	442	472	Incinerator Landfill
Recyclable Waste	1,375	462	765	Sale Recycle
Putrescible Waste	1,368	592	610	Incinerator Landfill
Hazardous Waste	8	19	19	Incinerator Return to supplier (drums and batteries)

Waste Stream	Total Waste (tpa)			Waste Treatment
				Hazardous landfill
Timber Waste	10,149 ¹¹	10	32	Sale Recycle Biodegradation
Hydrocarbon Waste	97	62	99	Waste oil processing Offsite reuse Incineration Landfill

14.1.1 Concentrate Pipeline and Lae Tidal Basin Concentrate Filtration Plant Waste

The primary waste from the Lae Tidal Basin Concentrate Filtration Plant will be filtrate water that is to be discharged to the marine environment as discussed in Section 13.8. Minor quantities of solid waste will also be generated, comprising predominantly filter cloth and conveyor belt, packaging materials and office waste. Small amounts of hazardous waste may also be generated such as light bulbs, batteries and contaminated soils in the event of spills. These wastes will be managed through existing recycling and waste management facilities in Lae. Projected waste quantities and the anticipated disposal pathway for each waste stream during construction and operation are shown in Table 14.3.

Table 14.3: Estimated annual waste generation during Port of Lae Concentrate Filtration Plant construction and operations

Waste Stream	Total Waste (tpa)			Waste Treatment
	Construction	Operations		
		3Mtpa	6Mtpa	
General Waste	0.4	3.8	4.2	Landfill
Recyclable Waste	8	2.5	2.5	Sale Recycle
Putrescible Waste	3.8	0.6	0.6	Incinerator
Hazardous Waste	2.6	1.3	2.6	Hazardous landfill Bioremediation Return to supplier
Hydrocarbon Waste	-	4.2	6.4	Incinerator

14.1.2 Infrastructure Corridor

It is anticipated that the mass of solid non-mineral waste generated from construction and operation of the infrastructure corridor will be relatively minor. Estimates of the waste will be made once the construction methods have been agreed and a construction contractor engaged.

¹¹ Timber waste accounted for during construction includes all timber waste arising from initial vegetation clearance for the TSF and all subsequent raises of the TSF during LOM.

14.2 Non-mineral Waste Management Facilities

There will be a dedicated Waste Management Facility (WMF) for the mine area located several hundred metres from the Fere Accommodation Facility to ensure appropriate buffer distances. Power and water reticulation will be extended to this facility. A landfill facility will be sited in proximity to the WMF, within the catchment of the TSF. All wastes will be collected and sorted at the WMF and then managed according to waste type. The area will be hard paved and runoff collected for treatment.

A variety of waste management technologies and facilities will be employed to manage non-mineral wastes generated from the mine area. These include:

- Incinerators – A diesel-fired incinerator sited within the WMF will be used to incinerate liquid and solid wastes including hydrocarbons and other combustible hazardous materials to reduce waste volumes. Ash will be disposed in the landfill. Additionally, smaller mobile units may be used throughout the mine area in preference to transporting wastes to the WMF.
- Metal crushing – A drum crusher will be employed in order to reduce the volume occupied by used 205L drums prior to shipment offsite. An oil filter crusher and can press will also be used to crush wastes to a smaller size, thereby reducing the frequency of bin/skip movements.
- Cardboard and plastic baler – A baler will crush and bale cardboard and plastic waste for removal from site for recycling.
- Wood chipper and/or mulcher – A wood chipping unit may be used for processing timber and vegetation. The mulch produced will be used in progressive rehabilitation and offered to nearby communities.
- Waste oil processing – Prior to reuse either on-site or offsite, basic waste oil processing may take place at the WMF. This would typically involve:
 - Settling and dewatering of the used oil (to remove any water phase that may be present)
 - Filtering to remove any solids present
 - Chemical treatment to demineralise the oil, or to remove heavy fractions

Some waste oils may be able to be processed for reuse on site such as a fuel injection into the incinerator burn chamber.

- Recycling – Where possible, waste materials such as paper, cardboard, glass and metals will be collected and prepared for recycling. The volume of material that is able to be recycled will depend upon the availability of recycling facilities in the mine area.
- Hydrocarbon skimmers – Hydrocarbon skimmer units will be placed in all sump pits to separate hydrocarbon from water. Hydrocarbon liquid may then be stored for later incineration or offsite disposal.

14.2.1 Landfill

The landfill will be designed and operated in general accordance with the intent of the DEC ECoP for Sanitary Landfill Sites, 2001 (Landfill Code of Practice), now adopted by CEPA. The landfill will be a Class 3 landfill under the Landfill Code of Practice and will incorporate the following design and operation considerations:

- Site selection in accordance with the principles outlined in the code and with consultation of relevant government agencies
- All weather access
- A low-permeability liner

- A leachate and gas collection and management system
- Stormwater management
- Final site landscaping and use following closure
- Landfill equipment such as compactor, excavator and dump truck
- Excess soil for waste cover
- Tracking of waste volumes and types landfilled