



Appendix D

Waste Management Plan

Vista Gold Australia Pty Ltd

Mount Todd Project Area





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1. Introduction

A general environmental duty of care exists to manage and control waste materials under Commonwealth and Northern Territory legislation. Policies and guidelines become mandatory if referred to in the Waste Management and Pollution Control Act (Northern Territory) and approval conditions.

The Mt Todd Project Area (MTPA) is located approximately 55 km northwest of Katherine and 250 km south of Darwin. The Northern Territory (NT) has a sub-tropical climate with distinct wet and dry seasons. A number of creeks and/or rivers are located within the mining lease. The area surrounding the mining lease is rural and sparsely populated. The Werenbun community is the closest residential area located approximately 6.5 km from the site. The Stuart Highway, the main arterial road in the region, is located west of the MTPA.

1.1 Objective

The Waste Management Plan (WMP) forms part of the Environmental Management System (EMS) for the MTPA and is considered a working document. This WMP has been updated following formal assessment by Department of Primary Industry and Resources (DPIR) as part of the mining authorisation process.

The WMP has been created to minimise potential impacts to human health and/or the environment from waste generation. The main objectives of the WMP are to:

- Identify and characterise waste;
- Ensure waste is disposed appropriately;
- Ensure disposal areas are managed and maintained; and
- Ensure a waste recycling program is implemented.

1.2 Legislation and guidelines

A summary of waste management legislation and guidelines for the MTPA are provided in **Table 1-1**.

Table 1-1 Waste Management Legislation and Guidelines

Legislation and Guidelines	Relevance
Waste Management and Pollution Control Act and Regulations.	Provides for the protection of the environment by encouraging effective waste management and pollution prevention and control practices.
	The removal of hazardous wastes from the MTPA is managed under this Act. The subcontractor is required to hold an Environmental Protection Licence through the NT Environmental Protection Authority (EPA).
	In addition, locations at the MTPA which have potential to cause pollution off the lease will be investigated and managed in accordance with the requirements of the contaminated land provisions of the Act.
Waste Management Guidelines for Small Communities in the Northern Territory (LGANT)	Guidelines for the management of waste in remote/small communities in the Northern Territory. The guidelines were developed in consultation with councils and municipalities in the NT and various government agencies.
	Guidance on hazard reduction, environmental protection, service delivery and ongoing site management are provided.
	Due to the size and location of the MTPA it will be operated in general accordance with these guidelines.
Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory (NT EPA)	This guideline provides recommendations for visual amenity, nuisance control, fire prevention, water management, landfill gas, closure and monitoring.
	The siting of landfill will be in general accordance with the guidelines. However, management of the landfill will be undertaken in accordance with the Waste Management Guidelines for Small Communities in the NT.

1.3 Definition

Waste in the context of this WMP refers to all substances requiring recycling or disposal as a by-product of the MTPA with the exception of hazardous substances, which are covered in the *Hazardous Substances Management Plan* (HSMP) (Appendix C to the MMP).

Waste has the potential to impact human health and/or the surrounding environment. This WMP has been developed to provide a framework for waste management across the MTPA. The management of waste includes storage, handling and disposal requirements.

1.4 Waste categories

The majority of waste will be managed onsite in a landfill located within the waste rock dump. Licensed waste carriers will remove hazardous wastes and recyclables to appropriate licensed facilities. The waste streams and their management are detailed below.

1.4.1 Non-hazardous waste

Non-hazardous wastes are wastes composed of, or containing, materials that are not harmful to humans and do not have a serious negative impact on the environment. Non-hazardous wastes can include putrescible solids and liquids, inert solids, food waste, domestic waste, plastics and concrete.

1.4.2 Recyclables

Recycle/recovery is the conversion of wastes into usable materials and/or extraction of energy or materials from wastes. Recyclable materials can include paper, cardboard, plastics, glass, metal, wood, tyres, vegetation and organic matter. Waste shall be recycled or recovered whenever it is deemed to be practicable.

1.4.3 Hazardous waste

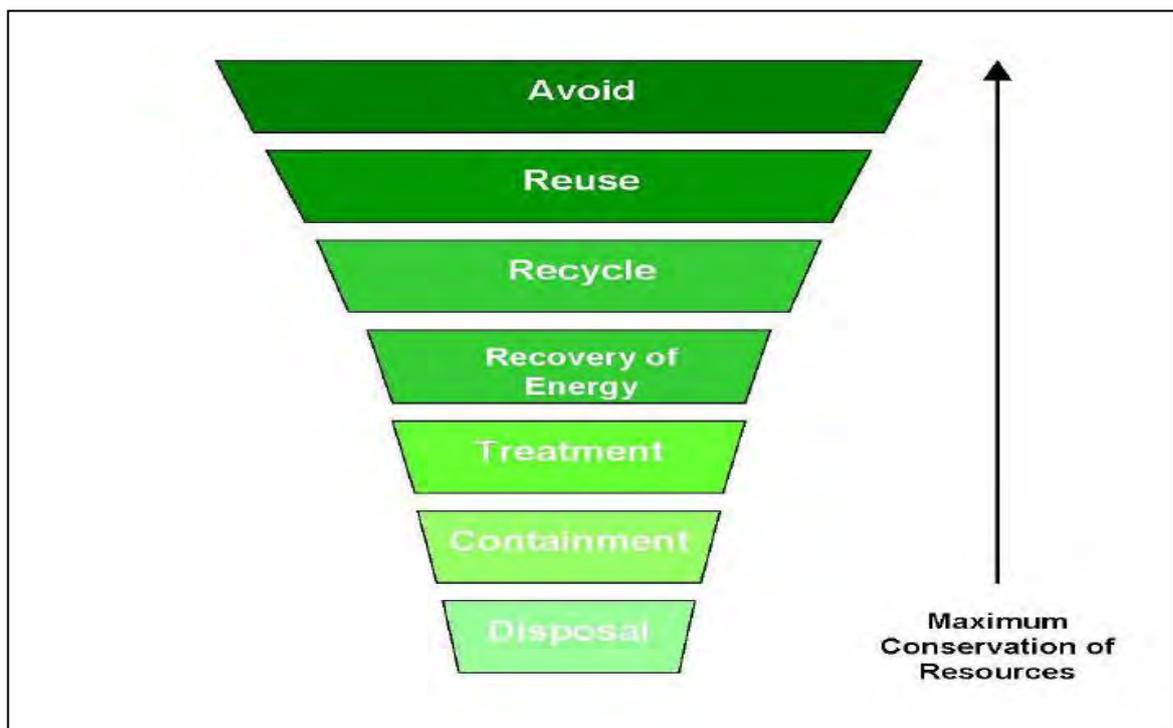
Hazardous waste will be addressed in the Hazardous Substances Management Plan (Appendix C).

1.5 Waste management hierarchy

The Waste Management Hierarchy is a list of waste management strategies, arranged in hierarchical order. **Figure 1-1** is a common graphical representation of the Hierarchy, with the least preferred option for managing waste disposal located at the bottom and the most preferred option, i.e. avoidance and minimisation, located at the top. The Waste Management Hierarchy below is widely used to communicate:

- Strategies which try to avoid products becoming waste are generally preferable to;
- Strategies which seek to find a use for waste, which are in turn generally preferable to; and
- Strategies for disposal, which should be used as a last resort.

Figure 1-1 Waste Management Hierarchy of Control





1.6 Existing conditions

A landfill will be located at the mine site for the disposal of inert (clean waste) and municipal solid waste.

Hazardous Wastes and recyclables will be stored at a designated area prior to removal to appropriate licensed facilities.

1.7 WRD Landfill

Whilst a design of the landfill is not yet available, the landfill is proposed to be located within the waste rock dump (WRD). The location, size and layout of the landfill within the WRD will be determined during the detailed design phase. The landfill will be designed so that waste disposed of is encapsulated wholly within the WRD.

The landfill will be sited in general accordance with the *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory* (NT EPA) and be operated in accordance with the *Waste Management Guidelines for Small Communities in the Northern Territory* (LGANT).

Not all wastes produced on site are proposed to be disposed of within the WRD landfill. Many waste materials will be re-used, recycled or disposed off-site (listed wastes) as detailed in **Table 1-2 Anticipated Waste Streams**.

Encapsulation of inert material, which cannot be recycled or reused, within the active WRD will be investigated further during detailed design. As a minimum, the inert waste material being disposed of is to comply with the following requirements:

- To be located no closer than 5 horizontal metres from the final waste dump outer batters.
- To be covered by a minimum of 5 metres of waste rock.
- The location does not compromise the waste dump design or segregation of waste rock within the profile of the waste dump.

The ultimate design of the WRD is intended to keep surface water from infiltrating into the dump for the long term. The WRD design uses low permeability Geosynthetic clay liner (GCL) or linear low-density polyethylene (LLDP) liners to cover waste. Any non-mining wastes that could result in leachate generation would be disposed of with the potentially acid forming (PAF) waste rock which would be covered by the low permeability liner and encapsulated by non-acid forming (NAF) waste rock material, minimising the likelihood of infiltration resulting on impacts to the environment.

The volume of putrescible waste to be produced throughout the life of the mine has been identified to be minimal when compared to the volume of mineral waste rock (0.02% by mass). Therefore, the impact of putrescible waste on slumping and leachate generation is considered to be negligible.

Where listed wastes are proposed to be disposed of within the WRD, approval will be obtained from the regulator prior to disposal and encapsulation.

1.8 Anticipated waste streams

During construction and operations, numerous waste streams will be generated on site. **Table 1-2** outlines some of the wastes expected to be generated on site.



Table 1-2 Anticipated Waste Streams

Material	Management
In Offices and Cribbs	
General waste	Onsite Landfill.
Commingled bins (plastic, aluminium, steel)	Recycled. Sent to recycling centre
Toner and printer cartridges	Recycled. Sent to recycling centre
Paper and cardboard	Recycled. Sent to recycling centre
Mobile phones	Recycled. Sent to recycling centre
Small batteries	Recycled. Sent to recycling centre
Computer equipment / white goods	Recycled. Sent to recycling centre
In the Field	
General waste	Onsite Landfill.
Steel	Recycled. Sent to recycling centre
Timber	Recycled or reused of formwork.
Nonferrous metals (aluminium, copper)	Recycled. Sent to recycling centre
Concrete	Reused on site (gravel/hardstand material)
Green waste mulch	Reused on site. Rehabilitation / Erosion and Sediment Control.
Oil/oil filters/oily rags	Regulated waste. Removed off site by licensed waste contractor.
Herbicide and chemical drums	Triple rinse and recycle or triple rinse and drill out and dispose of on site.
Herbicide and chemical residue	Regulated waste. Removed off site by licensed waste contractor.
Sewage	Regulated waste. Removed off site by licensed waste contractor for disposal at an appropriate facility.
Plant Batteries	Collected on-site in a segregated area. Then transported off-site by a licensed regulated waste transporter to a licensed facility for recycling.
Tyres	Regulated waste. Light vehicle tyres will be stored on-site and transported off-site by licensed regulated waste contractor to a licensed facility for recycling or disposal or buried in WRD if approved by regulator.



Material	Management
	Mine truck tyres will be buried on-site within the WRD, the locations of which will need to be recorded in accordance with regulatory requirements.
Contaminated soils	Remediated on site or sent off as regulated waste by a licensed waste contractor.

1.9 Off-site waste facility (Listed and recycled waste)

All recycled material will be sent to a licensed recycling centre in Katherine, approximately 55 km south-west of the mine site.

All regulated wastes will also be sent to a licensed disposal facility in Katherine or alternatively sent to a licensed disposal facility in Darwin, which is approximately 250 km north of the mine site.

Vista Gold is responsible for the coordination of the removal of all waste streams from the site. Licensed waste removal contractors will remove all regulated waste streams from site.

2. Waste Management

Waste Management refers to non-hazardous and recyclable waste streams at the MTPA. Hazardous waste streams will be addressed in the Hazardous Substances Management Plan.

2.1 Key activities, risks and impacts

The key activities and potential impacts for waste for the MTPA are provided in **Table 2-1** Table 2-1 Key Activities, Risks and Impacts. The residual risk level identified is the risk remaining once management and mitigation measures are implemented.

Table 2-1 Key Activities, Risks and Impacts.

Activity	Potential Environmental Impact	Residual Risk Level		
		Consequence	Likelihood	Risk
Generation of putrescible waste, sewage on-site and at the contractor camp.	<ul style="list-style-type: none"> Release of putrescible, construction and non-mining wastes to the environment Release of sewage to the environment 	Moderate	Rare	Low

2.2 Management objectives

Waste management objectives have been established and are detailed in **Table 2-2**.

Table 2-2 Waste Management Objectives

Objective	Target	Indicator
Prevent environmental impact from waste generation.	Zero environmental incidents associated with the landfill and waste collection sites.	Number of incidents which occur in relation to the landfill and waste generation sites.
Efficient use of resources and minimisation of waste generation and disposal.	Reduce level of waste produced and associated environmental impact.	Volume of waste disposal and associated cost.
	Reuse and recycle where practicable	
Appropriate disposal of wastes over the life of the mine.	Create awareness of the waste management strategy and waste commitments/targets. Optimise re-use and recycling systems.	Volume of waste minimised and reused/recycled wherever possible.



2.3 Mitigation measures

Mitigation measures have been developed to minimise potential impacts associated with waste. The mitigation measures, timing and responsibilities are provided in **Table 2-3**.



Table 2-3 Mitigation Measures

ID	Mitigation Measures	Timing	Responsibility
Site Inductions / Training			
WM1	Site induction includes the following specific waste management components: <ul style="list-style-type: none"> • Waste hierarchy; • Identification of waste types and associated disposal requirements; • Waste burning health implications; • All waste/items brought to mine landfill for appropriate disposal; and • All site employees and contractors to undertake the necessary training on the handling of, and disposal of, waste material types on site. 	Site Induction	All employees and contractors
Landfill			
WM2	The landfill will be fenced with a single entry/exit gate which will be kept closed.	At all times	All personnel
WM3	Wherever practical and economically viable, all waste materials will be recycled.	At all times	All personnel
WM4	Mine waste is to be disposed of at the Landfill or suitable licensed offsite facility, currently determined to be the Katherine Town Council Waste Transfer Station. Recyclables to be transferred to recycling facility.	At all times	All personnel
WM5	Separation of waste for disposal, recycling and recovery.	At all times	All personnel
WM6	Removal of residual waste to landfill.	At all times	All personnel
WM7	Putrescible and domestic waste will be collected and disposed of at a designated landfill site.	As required	All personnel
WM8	Disposal areas will be appropriately maintained.	At all times	All personnel
WM9	Provision of the appropriate number and types of bins on site for each of the different types of waste. Bins will be clearly marked and monitored for cross-contamination of wastes.	As required	Environmental Department
WM10	For office waste, providing receptacles or processes for recycling (as a minimum), paper, general waste, aluminium cans, and bottles), mobile phones, batteries and fluorescent lighting tubes.	As required	Environmental Department



ID	Mitigation Measures	Timing	Responsibility
Off Site disposal			
WM11	Waste oil will be collected for transport and disposal off-site.	Monthly or as required	Licensed contractor
WM12	Batteries will be transported off-site for disposal.	6 monthly or as required	Licensed contractor
WM13	Record waste types and volumes generated on-site and being transported off-site.	At all times	Contractors/ Environmental Officer
WM14	Vegetation waste (weed free) will be managed on site through reuse for ground surface stabilisation and rehabilitation.	As required	Mining Department/ Environment Department
Waste Burning			
WM15	<p>Where possible the best practice at managing putrescible waste is burying. An acceptable but less desirable option is controlled burns to reduce the volume of putrescible and windblown waste. The impacts of burning wastes are reduced by:</p> <ul style="list-style-type: none"> • Transferring recyclable products to an appropriate licenced facility for recycling offsite; and • Burning waste within the designated fire pit, burn smaller volumes regularly rather than large volumes irregularly. <p>Maintain firebreaks and to control potential spread of fire to the surrounding area. In event of uncontrolled fire follow fire response procedure within the Emergency Response Management Plan.</p>	At all times	Environmental Officer
Inspection and Monitoring			
WM16	Litter sweep of the Landfill on monthly intervals required to collect any windblown waste.	Monthly	Environmental Officer/ designated personnel.
WM17	Regular inspections of landfill.	Monthly	Environmental Officer
WM18	Annual Waste Management Plan performance review.	Annually	Environmental Manager



2.4 Trigger, Action and Response Plan

The Trigger, Action and Response Plan (TARP) outlines remedial actions and responses to the situation. The TARP is provided in **Table 2-4**.

Table 2-4 TARP

Trigger	Action	Response
Non-compliance is triggered if waste is incorrectly disposed of resulting in potential cross contamination of other wastes within the burn pit	<ul style="list-style-type: none"> Remove and segregate hazardous waste, recyclable waste and tyres from the landfill. 	<ul style="list-style-type: none"> Conduct weekly inspections of landfill and litter sweep as required. Monthly inspections of hazardous substance storage areas to ensure compliance with HSE requirements and spill kits are present/contain sufficient materials for potential spillages.
Spill of hazardous waste causing environmental harm.	<ul style="list-style-type: none"> Isolate and contain the spill utilising the spill kit; Evacuate from the area if potential danger; Notify Emergency Response Team Coordinator. Monitor and determine if spill kit response has been effective in containing and managing spill. Undertake remediation recommendations as required. Assist in the investigation of the spill. 	<ul style="list-style-type: none"> Conduct weekly inspections of landfill and litter sweep as required. Removal of recyclables as required. Monthly inspections of hazardous substance storage areas to ensure compliance with HSE requirements and spill kits are present/contain sufficient materials for potential spillages. Conduct weekly inspections of landfill and litter sweep as required. Removal of recyclables as required. Monthly inspections of hazardous substance storage areas to ensure compliance with HSE requirements and spill kits are present/contain sufficient materials for potential spillages. Ensure mine site compliance with the WMP.
Uncontrolled burn within the landfill.	<ul style="list-style-type: none"> Management of an uncontrolled burn at the landfill will be managed by following the fire response procedure within the Emergency Response Management Plan. 	<ul style="list-style-type: none"> Transferring of recyclable products to an appropriate licenced facility for recycling offsite. Transfer of hazardous wastes to an appropriately licenced offsite facility for disposal. Storage of tyres onsite in a stable form and outside of potential impact from bushfires.



Trigger	Action	Response
Uncontrolled burn outside the landfill.		<ul style="list-style-type: none">• Burning waste within the landfill along with maintaining firebreaks to control potential spread of fire to the surrounding area.• Controlled burns on low wind days at the landfill as necessary to control the amount of putrescible and windblown wastes. Hazardous waste and recyclables are kept out of the landfill.• Inform Emergency Response Team Coordinator prior to conducting controlled burn and monitor the controlled burn to ensure fire is contained. Close landfill during the burning of wastes to reduce impact to human health (related to dioxins, sulphur dioxide, lead and mercury).



3. Monitoring

Monitoring of the site by the Environmental Officer will be undertaken for:

- Cross contamination of bins;
- Identifying locations where additional bins may be required; and
- The presence of litter around the mine site.

Any waste issues identified during environmental workplace inspections will be documented and corrective actions raised to correct these issues. Areas of con-conformance will be entered into Vista Gold's Environmental Management System to track and monitor completion of corrective actions.

The Environmental Officer will monitor the overall reuse and recycling rate of all departments and contractors on site. The Environmental Officer will liaise with work area supervisors regarding any issues with waste management and provide advice and recommendations if required.

3.1 Corrective actions

Should an incident requiring corrective action occur the following will be undertaken:

- The Project Manager and Contractor will be verbally notified pending more detailed analysis and written confirmation;
- The Environmental Team will raise an Incident Report and undertake a detailed investigation if required by the Environmental Manager to determine the cause of the problem and necessary remedial measures mitigate and to prevent recurrence;
- Post investigation, remedial measures will be implemented and the Incident Report closed out by the Environmental Manager, with a copy transmitted to the Resident Site Manager;
- Toolbox talks and environmental alerts will be used to communicate any incident and the corrective actions undertaken or required, to all personnel and where necessary, training will be performed to address issues and prevent recurrence; and
- Preventive measures will be implemented to ensure the incident does not re-occur.

3.2 Reporting

The Waste Management Plan will be reviewed annually and/or any time there is a change to project activities that alter the risk profile. Mitigation strategies will be reviewed for effectiveness and any corrective actions will be implemented.

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