

Annex A

Waste Management Optimisation Strategy and Programme



De Beers – Venetia Mine

Waste Management Optimisation
Strategy and Programme

May 2014

Venetia Mine, Limpopo Province

SHANGONI
Management Services (Pty) Ltd



WASTE MANAGEMENT OPTIMISATION STRATEGY AND PROGRAMME

De Beers – Venetia Mine

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May 2014

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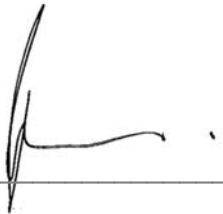
PROJECT DETAILS

Project Title: De Beers Venetia Mine – Waste Management Optimisation Strategy and Programme

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DEFINITIONS

Best environmental practice

Means to perform or exercise a particular activity or activities in the most suitable, appropriate, advantageous or best advised manner in order to achieve the highest standards while performing or exercising such activity or activities;

Best practicable waste management option (BPWMO)

For a given waste management objective, this is the option that provides the most benefit or the least damage to the environment, at an acceptable cost, in the short and long term.

Building and demolition waste

Waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.

Cleaner production (CP)

The continuous application of integrated preventative environmental strategies to processes, products and services to increase overall efficiency and to reduce the impact of such processes, procedures and services on health and the environment.

Colour coding

Means the use of colour on a container or bag or the label attached to such, which serves to identify the category of waste that it contains.

Compost

Composting is nature's way of recycling. Composting refers to a solid waste management technique that uses natural processes to convert organic materials to humus through the action of micro-organisms. Compost is a mixture that consists largely of decayed organic matter and is used for fertilising and conditioning of land.



Conservation

Conservation is the wise use of natural resources (nutrients, minerals, water, plants, animals, etc.) and includes planned action or non-action to preserve or protect living and non-living resources.

Contaminated

The presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land, which substance or micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely.

Continuous improvement

The process of enhancing environmental management to achieve improvements in overall environmental performance in line with an organisation's environmental policy.

Cost benefit analysis (CBA)

An economic analysis of an undertaking, involving the conversion of all positive and negative aspects into common units (e.g. money), so that the total benefits and total costs can be compared. This includes estimates and comparisons of short-term and long-term costs (losses) and benefits (gains).

Disposal

The burial, deposit, discharge, abandoning, dumping, placing or release of any waste into, or onto, any land.

Domestic waste

Waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.

Duty of care and remediation of environmental damage

Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.



Effluent

Wastewater, either treated or untreated, that flows from an industrial outfall, sewer or treatment plant.

Environment

The surroundings (biophysical, social and economic) within which humans exist and that are made up of

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental aspects

Elements of an organisation's activities, products or services that can interact with the environment.

Environmental audit

A regular formal examination to ascertain whether an organisation or facility is operating in terms of its environmental performance requirements or some other measure of performance.

Environmental degradation

Refers to pollution, disturbance, resource depletion, loss of biodiversity and other kinds of environmental damage. Usually refers to damage occurring accidentally or intentionally as a result of human activities.

Environmental impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisations' activities, products or services.

Environmental management

Those aspects of an overall management function (including planning) that determine and lead to implementation of an environmental policy.



Environmental policy

A statement by an organisation of its intentions and principles in relation to its overall environmental performance. Environmental policy provides a framework for action and for the setting of its environmental objectives and target.

Environmental sustainability

The ability of an activity to continue indefinitely at current and projected levels, without depleting the social, cultural and natural resources required to meet present and future needs.

General waste

Waste that does not pose an immediate hazard or threat to health or to the environment, and includes—

- (a) domestic waste;
- (b) building and demolition waste;
- (c) business waste: and
- (d) inert waste;

General waste storage facility

Means a storage facility that has a capacity to store in excess of 100m³ of general waste continuously.

Green waste

Green waste refers to the vegetative biodegradable portion of the waste stream. It can biodegrade (decompose) naturally and organically and includes leaves, tree pruning, branches, etc.

Handling

Means the functions associated with the movement of waste, including storage, treatment and ultimate disposal, by the use of manual systems and automated systems.

Hazard

Means the intrinsic potential property or the ability of any agent, equipment, material or process to cause harm.



Hazardous waste

Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Hazardous waste storage facility

Means a storage facility that has a capacity to store in excess of 80m³ of hazardous waste continuously.

Impermeable surface

Means a physical barrier or a membrane that prevents leaching of waste.

Incineration

Any method, technique or process to convert waste to flue gases and residues by means of oxidation.

Integrated environmental management (IEM)

A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process in order to achieve a desirable balance between conservation and development.

Integration

Approaches to integration with regard to pollution prevention may be divided into philosophical, functional and organisational approaches. These approaches need to be dealt with separately in order to provide resolution to these aspects. They are, however, inter-related and can thus not be developed in isolation.

Landfill

A commonly used method of final disposal of solid waste to land. The waste is spread on the land, compacted, and a soil cover applied so that impacts on the environment are minimised.

Leachate

Liquid with a high pollution potential that flows through and drains from landfill sites.



Pollution

Any change in the environment caused by -

- (i) substances;
- (ii) radioactive or other waves; or
- (iii) noise, odours, dust or heat

emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Pollution Prevention

Any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal.

Reduce

The first and most effective component of the waste hierarchy is reducing the waste created. Consumers are encouraged to reduce their waste by purchasing in bulk, buying items with less packaging and switching to reusable instead of single-use items. Businesses can adopt manufacturing methods that require fewer resources and generate less waste. In addition to benefiting the environment, these efforts often offer consumers and businesses a financial incentive of lower expenses in purchases.

Recycle

A process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material

Re-use

To utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.

Renewable Resource

A resource that can naturally restore and replenish itself (e.g. trees).



Risk assessment

A process of gathering data and making assumptions to estimate short- and long-term harmful effects on human health or the environment from exposure to hazards associated with the use of a particular product or technology, or establishing the probability of an event occurring, the factors that could bring about that event, likely exposure levels and the acceptability of the impact resulting from exposure.

Storage of waste

The accumulation of waste in a manner that does not constitute treatment or disposal of that waste.

Sustainability

The conservation of an ecological balance, ensuring that natural resources are not depleted.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Toxic (poisonous) waste

A form of hazardous waste that causes death or serious injury, such as respiratory diseases, cancer or genetic mutations.

Treatment of waste

Any method, technique or process that is designed to -

- (a) change the physical, biological or chemical character or composition of a waste; or
- (b) remove, separate, concentrate or recover a hazardous or toxic component of a waste; or
- (c) destroy or reduce the toxicity of a waste,

in order to minimise the impact of the waste on the environment prior to further use or disposal.

Vegetation

The combination of different plant communities found in and characterising a specific area of region.

Waste

The definition of waste, as per the Waste Act, is as follows:

“waste” means any substance, whether or not that substance can be reduced, re-used, recycled and



recovered –

- (a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
- (b) which the generator has no further use of for the purposes of production;
- (c) that must be treated or disposed of; or
- (d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector; but –
 - (i) a by-product is not considered waste; and
 - (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste;

Given the exclusion of by-products, their definition in terms of the Waste Act is also important: “**by-product**” means a substance that is produced as part of a process that is primarily intended to produce another substance or product and that has the characteristics of an equivalent virgin product or material.

Waste classification

Means establishing-

- (a) whether a waste is hazardous based on the nature of its physical, health and environmental hazardous properties (hazard classes); and
- (b) the degree or severity of hazard posed (hazard categories).

Waste generator

Means any person whose actions, production processes or activities, including waste management activities, results in the generation of waste.

Waste manager

Means any person who re-uses, recycles, recovers, treats or disposes of waste.

Waste management facility

Means a place, infrastructure, structure or containment of any kind, wherein, upon or at, a waste management activity takes place and includes a waste transfer station, container yard, landfill site, incinerator, a lagoon, recycling or a composting facility.

Waste manifest system

Means a system of control documentation, which accompanies a load of hazardous waste transported from the point of generation to the waste management facility.



Waste transporter

Means any person who conveys or transfers waste-

- (a) between the waste generator and a waste management facility; or
- (b) between waste management facilities.



ABBREVIATIONS

BPWMO	-	Best Practise Waste Management Option
I&AP	-	Interested and Affected Party
NEMA	-	Environmental Management Act, 1998 (Act No. 107 of 1998) as amended
NEMWA	-	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
PPP	-	Public Private Partnership
R	-	Regulation
WCMS	-	Waste Classification & Management System
WMF	-	Waste Management Facility
WMS	-	Waste Management Strategy
WMP	-	Waste Management Programme



EXECUTIVE SUMMARY

The purpose of this report is to convey the methodology and results of an extensive non-mineral waste management strategy and planning process that was undertaken by the Mine's Environmental Management Department in conjunction with Shangoni Management Services.

The process was carried out according to the requirements and principals as per the National Environmental Management Act, Act 107 of 1998, the National Environmental Management: Waste Act, Act 59 of 2008, and the associated Norms and Standards for the assessment, classification, management, storage and disposal of waste.

Potential shortcomings in terms of effective waste management were flagged in order to commit to improvement objectives that are measurable, quantifiable and that would give effect to immediate waste management improvement at the Mine.

The process allowed for the consideration of best practical waste management options for the different waste streams. Reasonable targets and objectives were set to realise immediate waste improvement objectives and to allow for continual waste management improvements in future.

A conceptual Waste Management improvement Programme, comprising of a number of priority waste management projects, was compiled in order to realise the set objectives and targets within an allocated budget and allowed timeframe.



1. INTRODUCTION AND BACKGROUND

The De Beers Consolidated, Venetia Mine, is situated on the farm Venetia 103 MS, approximately 33kms to the north-east of Alldays and 74kms to the west of Musina, in the Limpopo Province of South Africa. The mine is the largest diamond mine in the country, accounting for 40% of the annual diamond production turnover.

The Venetia Mine Environmental Department took the initiative to scrutinise the effectiveness of current waste management practice at the Mine. Management is committed to best environmental practice and sustainability and view non-mineral waste management as one of their key performance indicators in this regard.

During 1996 the Constitution of South Africa provided the foundation for environmental regulation and policy in South Africa. The right to environmental protection and to live in an environment that is not harmful to health or well-being was set out in the Bill of Rights (Section 24, Chapter 2).

This fundamental right underpins environmental policy and law, in particular the framework environmental legislation of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

NEMA introduced a number of additional guiding principles into South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle. Chapter 5 of NEMA specifically provides instruments for integrated waste management. It places a duty of care on any persons who may cause significant pollution or degradation of the environment, requiring them to institute measures to either prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided.

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (referred to hereafter as “the Act”) gave effect to the White Paper on Integrated Pollution Control and Waste Management in South Africa.

For the first time the Act provided a coherent and integrated legislative framework addressing all the steps in the waste management hierarchy. The Act echoes the duty of care provision by forcing holders of waste (waste generators) to take reasonable measures to implement the waste management hierarchy. The hierarchy provides a systematic and hierarchical approach to integrated waste management, addressing, in turn, waste avoidance, reduction, re-use, recycling, recovery, treatment and safe disposal, as a last resort.



Within the Act, the underlying philosophy of proactive environmental management, as defined by NEMA, outlined a road map that would redirect the nations' approach towards sustainable waste management for years to come.

The Act and supporting regulatory papers that followed, provided much needed structure to industry by redefining:

- Legal rectification and the processes involved with waste license applications;
- Terminology and definitions within the Act and associated regulatory requirements;
- Waste management activities that would require licensing; and
- Norms and Standards guiding the correct classification of waste, reduction and re-use thereof and the best storage and disposal options at end of life.

The proactive initiative of the Venetia Environmental Department to initiate a valiant pursuit towards waste management optimisation, gave effect to this living document, known as the Venetia Mine - Waste Management Optimisation Strategy and Programme (WMS). The aim of this report is to align the Mine's WMS to the vision of the National Department of Environmental Affairs (DEA), as stipulated within the National Waste Management Strategy document published in 2012.

The driving objective of the WMS is to achieve the best health, environmental, economic and engineering results from applied actions. This can only be achieved through the consideration and application of the best practical waste management options (BPWMO) for key elements relating to every individual waste stream generated at the mine. The key elements relating to individual waste streams have inherent linkages to one another and this necessitates an integrated approach in order to reach the abovementioned objective.

The waste management strategy preparation process involved a series of sequential steps that ultimately culminated in the formalisation of this report namely:

- A status quo assessment,
- Setting improvement objectives and targets, and
- Formulating a conceptual Waste Management Programme.

2. SITE DESCRIPTION

The De Beers Venetia Mine is an open pit, diamond mine, mining a diamond bearing kimberlite cluster. The cluster consists of a series of dykes and pipes, with a vertical displacement. The cluster consists of three kimberlite ore bodies, namely K1, K2 and K3. There are also a number of satellite ore bodies present. The open pit will be mined to a depth of approximately 450 metres. To enable the extraction of the kimberlite ore, waste rock is removed by way of drilling, blasting, loading and hauling. The kimberlite ore is hauled to the main treatment plant where it is processed and diamonds are



obtained through a number of processes, including crushing, scrubbing, screening, x-rays and dense media separation. Fine and course tailings waste is generated at the treatment plant. There are also associated services and infrastructures present at the mine.

It is estimated that the open pit operations will end between 2020 and 2023, depending on production targets, market conditions and open pit mining scenarios. Open pit mining becomes uneconomical below a depth of 450 metres. This is due to the amount of waste rock that needs to be removed. The mining method will therefore be changed to underground mining in future, using sublevel caving, open benching and inclined caving mining methods. The change in mining method will entail large scale changes to existing surface infrastructures (ERM, 2012).

Table 1: Site Description

SITE INFORMATION	<p>Company Name: De Beers Consolidated Mines Limited – Venetia Mine</p> <p>Registration Number: 1888/000007/06</p> <p>Postal Address: PO Box 668, Musina, 0900</p> <p>Contact Person: Gavin Anderson</p> <p>Contact Number: 015 575 2710</p>
SITE DESCRIPTION	<p>GPS Co-ordinates: 22°26'6.76"S; 29°19'24.59"E</p> <p>Property description: The farm Venetia 103 MS</p> <p>Zoning: Agriculture</p>
DESCRIPTION OF SITE SURROUNDINGS	<p>The areas surrounding the mine are mostly used for game farming. The DBCM owned Venetia Limpopo Nature Reserve lies to the north, west and east of the mine. The Gotha Farm lies to the south of the mine and is used for stock and game farming.</p>



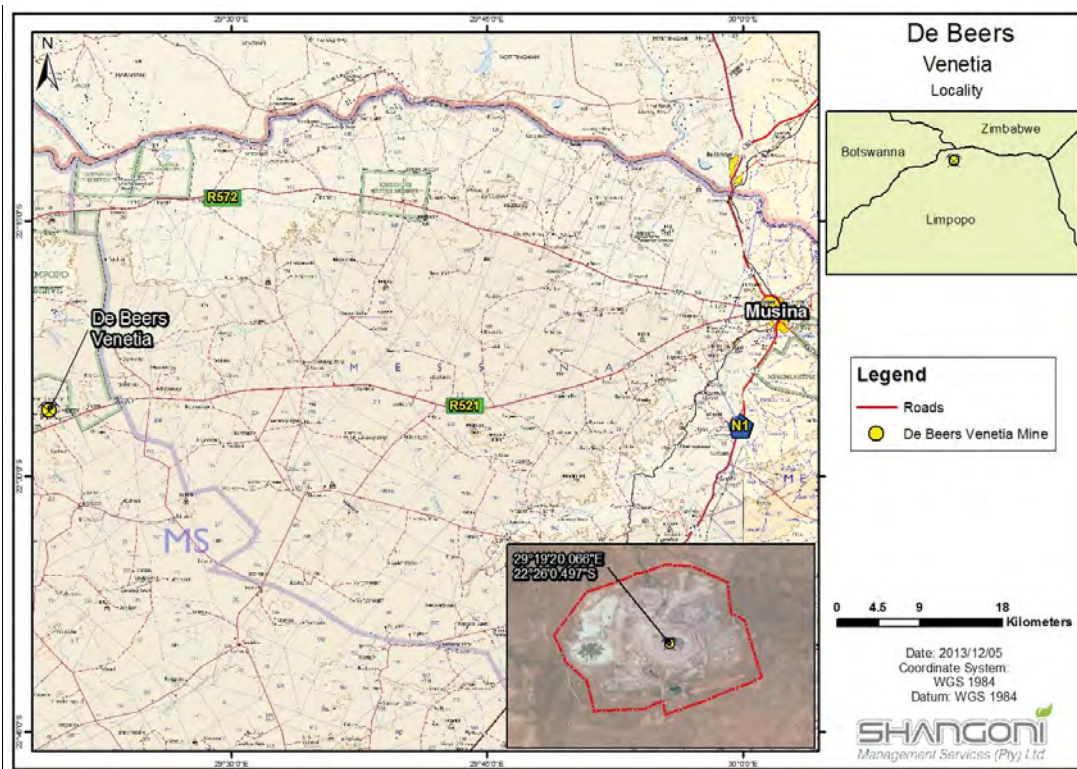


Figure 1: Site Locality Map

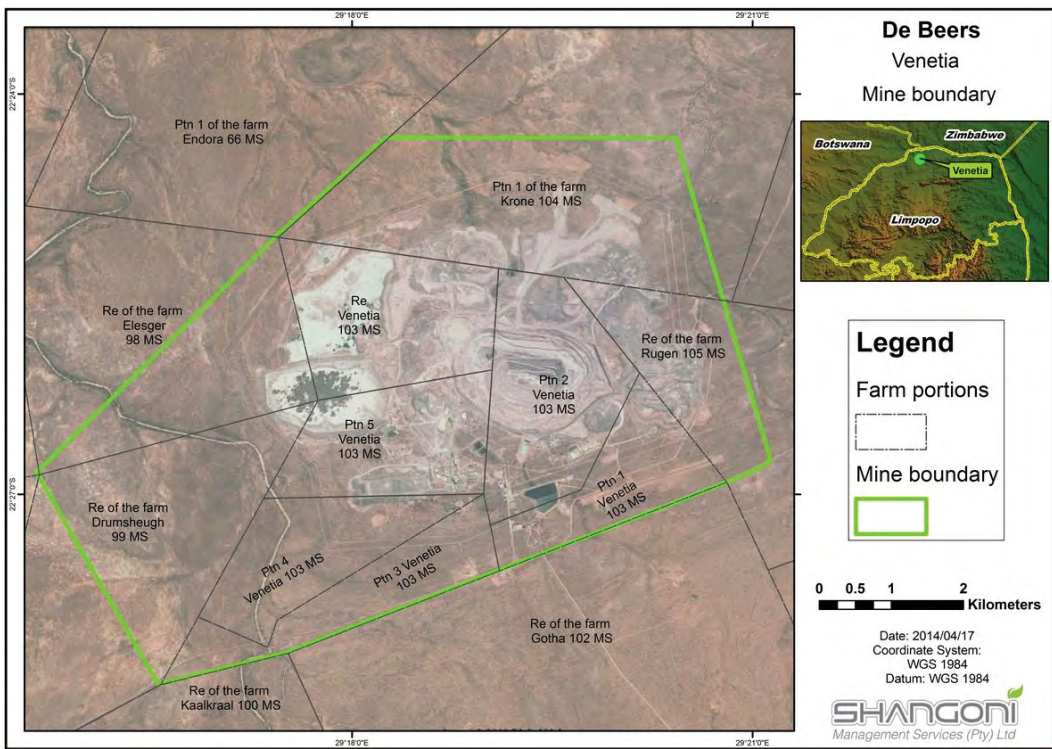


Figure 2: Mine site plan

3. STATUS QUO ASSESSMENT

The purpose of the Status Quo Assessment was to assess current non-mining waste management and to identify and flag potential shortcomings in terms of effective waste management options at the mine.

Certain key elements needed to be identified in order to determine and commit to improvement objectives that is measurable, quantifiable and that would give effect to immediate waste management improvement at the Mine.

The following key elements were identified:

- Adequate waste management awareness and training,
- Functional waste management system design,
- Optimal waste management operations
 - Separation,
 - Minimisation (reduce, re-use, recycle),
 - Storage,
 - Transfer, and
 - Disposal.
- Meeting legal requirements, and
- Ensuring natural- and socio-economic viability.

Using this baseline information it was possible to consider best practical waste management options for the different waste streams and to set reasonable targets and objectives to work from.

3.1 Current Waste Handling Areas

In terms of GN R. 634, Waste Classification and Management Regulations, 23 August 2013, waste handling is defined as “the functions associated with the movement of waste, including storage, treatment and ultimate disposal, by the use of manual systems and automated systems”.

Throughout the mine there are different functions and activities that occur and these activities all handle non-mineral waste (waste handling areas) in some way or another. The waste types, composition, and quantities generated, collected and stored in these areas differ from one another.

Even though there are some significant differences in the management of the different waste streams at these areas, an overarching management system and associated procedures govern the alignment of waste management at the mine.



As a practical measure for the purpose of this study the Mine was dissected into focus areas where waste handling would be associated with a specific process or activity.

The focus areas that was selected for the purpose of the study were:

Blue Areas including:

- The waste management facility (salvage yard),
- The mining engineering workshop,
- Plant area and associated engineering workshop,
- Sewage treatment plant,
- Wellness centre,
- Current waste tyre stockpile,

The Red area:

- Diamond recovery area.

Table 2: GPS coordinates of the waste handling areas

Blue Area	
Waste Management Facility (Salvage Yard)	22°26'7.02"S; 29°18'39.91"E
Mining Engineering Workshops	22°26'40.97"S; 29°19'43.47"E
Plant area and Engineering Workshops	22°26'50.49"S; 29°18'46.36"E
Sewage Treatment plant	22°26'31.41"S; 29°18'24.41"E
Wellness Centre	22°26'54.97"S; 29°19'08.20"E
Current Waste tyre stockpiles	22°26'3.49"S; 29°18'41.51"E and 22°26'38.60"S; 29°19'40.92"E and 22°26'20.20"S; 29°20'22.14"E
Red Area	
Red Area	22°27'5.67"S; 29°18'48.33"E

The waste handling areas are shown in two colours, namely red and blue. The “red area” represent the diamond recovery area whilst all other areas are referred to as “blue areas” for the purpose of this document.



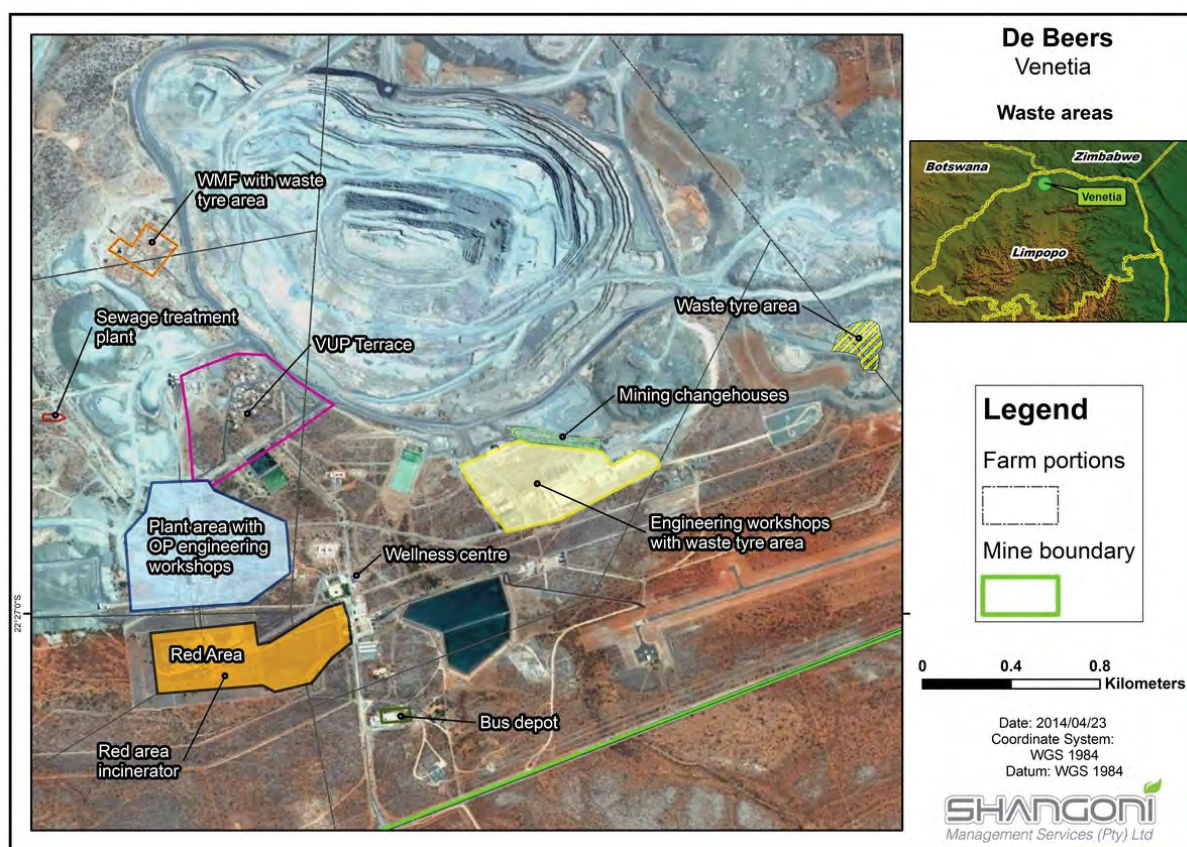


Figure 3: Waste handling areas

3.1.1 Waste Management Facility (Salvage Yard)

This area is also known as the salvage yard because of its partial function to collect waste for sorting, laydown, re-use, recycling and screening before final disposal.

At the salvage yard general as well as hazardous waste is received, stored, sorted, recycled and finally transferred from the mine for final disposal.

Currently almost all waste streams collected at the mine passes through this facility. Waste streams typically include:

- **Recyclable domestic waste** that include paper, plastic, cardboard, cans and glass;
- **Non-recyclable domestic waste** that include non-recyclable dry waste to landfill and food waste;
- **Recyclable or non-recyclable general waste** such as green waste;
- **Recyclable hazardous liquids** – used oil;
- **Non-recyclable hazardous liquids** such as grease, contaminated diesel, engine coolant, hydrocarbon sludge, old cooking oil, battery acid, chemical containers with redundant chemicals;



- **Recyclable hazardous solids** that include used Ink cartridges, sealed batteries, un-sealed batteries, empty (mostly 25l) chemical containers;
- **Non-recyclable hazardous solids** such as oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers, contaminated spill sorb, hardened sludge, contaminated soil not suitable for bioremediation (due to levels of contamination), launder grease, fluorescent tubes, mercury vapour lamps and sodium lamps, empty chemical containers, chemical containers with redundant chemicals – solid, electronic waste, sandblasting grit, incinerator ash.
- **Recyclable Industrial waste** including used screen panels, ferrous and non-ferrous metals, wood (pallets and boxes), conveyor belting, hard hats, safety boots, overalls, plastic water containers, blasting wire, all cabling
- **Non-recyclable industrial** including LDV and EMV tyres, building rubble, demolition and construction waste, rubber, air filters, redundant furniture.

3.1.2. Mining Engineering Workshops as well as the Plant area and Engineering Workshops

The majority of the mines hazardous waste is generated in these areas. Hydrocarbon contaminated waste make up the bulk of the hazardous waste and can be either recyclable or non-recyclable.

The amount of staff (technicians) working in these areas also contribute a large portion of the total domestic waste generated at the mine.

The waste streams encountered in these areas include:

- **Recyclable domestic waste** that include paper, plastic, cardboard, cans and glass;
- **Non-recyclable domestic waste** that include non-recyclable dry waste to landfill and food waste;
- **Recyclable hazardous liquids** such as used oil;
- **Non-recyclable hazardous liquids** such as grease, contaminated diesel, engine coolant, hydrocarbon sludge, old cooking oil, battery acid, chemical containers with redundant chemicals and expired medicine;
- **Recyclable hazardous solids** that include used Ink cartridges, sealed batteries, un-sealed batteries, empty (mostly 25l) chemical containers;
- **Non-recyclable hazardous solids** such as oily rags, material contaminated with oil diesel or grease, oil filters, empty oil/chemical containers, contaminated spill sorb, hardened sludge, contaminated soil not suitable for bioremediation (due to levels of contamination), sanitary waste generated in bathrooms and 'SHE' bins, fluorescent tubes, mercury vapour lamps and sodium lamps and empty chemical containers.
- **Recyclable Industrial waste** including ferrous and non-ferrous metals, wood (pallets and boxes), hard hats, safety boots, overalls, plastic water containers, blasting wire, all cabling;



- **Non-recyclable industrial** including LDV and EMV tyres and air filters.

3.1.3. Sewage Treatment plant

The sewage treatment plant generates two waste streams namely:

- **Recyclable hazardous solids** in the form of sewage treatment plant sludge;
- **Non-recyclable hazardous solids** in the form of incinerator ash, generated from the incineration of sanitary waste as well as other foreign objects collected by the pre-treatment screen and incinerated in the mobile incinerator at the treatment plant.

3.1.4. Wellness Centre

The following waste streams are generated at the wellness centre:

- **Recyclable domestic waste** that include paper, plastic, cardboard, cans and glass;
- **Non-recyclable domestic waste** that include non-recyclable dry waste to landfill and food waste;
- **Non-recyclable hazardous liquids** in the form of expired medicine;
- **Recyclable hazardous solids** that include used Ink cartridges;
- **Non-recyclable hazardous solids** such as medical waste, sanitary waste generated in bathrooms and 'SHE' bins, fluorescent tubes, mercury vapour lamps and sodium lamps and empty chemical containers.

3.1.5. Current Waste tyre stockpile

- **Non-recyclable industrial waste** in the form of LDV and EMV tyres are stored on this tyre stockpile area.

3.1.6. Diamond recovery area

Because of strict security control at the Red area, waste generated end up being stored in this area for extensive periods.

Because of all the related activities occurring within the area, that include office work, processing as well as workshop activities the Red area generates a wide variety of waste streams such as:

- **Recyclable domestic waste** that include paper, plastic, cardboard, cans and glass;
- **Non-recyclable domestic waste** that include non-recyclable dry waste to landfill and food waste;
- **Recyclable or non-recyclable general waste** such as green waste;
- **Recyclable hazardous liquids** – used oil;
- **Non-recyclable hazardous liquids** such as grease, hydrocarbon sludge, old cooking oil, battery acid, chemical containers with redundant chemicals and expired medicine;



- **Recyclable hazardous solids** that include used Ink cartridges, sealed batteries, un-sealed batteries, empty (mostly 25l) chemical containers.
- **Non-recyclable hazardous solids** such as oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers, contaminated spills orb, launder grease, sanitary waste generated in bathrooms and 'SHE' bins, fluorescent tubes, mercury vapour lamps and sodium lamps, empty chemical containers, chemical containers with redundant chemicals – solid, electronic waste, sandblasting grit, incinerator ash, and sewerage sludge.
- **Recyclable Industrial waste** including used screen panels, ferrous and non-ferrous metals, wood (pallets and boxes), conveyor belting, hard hats, safety boots and overalls.
- **Non-recyclable industrial** including building rubble, demolition and construction waste and redundant furniture.

3.2 Current Waste Streams

As a starting point it was important to interrogate each step in the process cycle pertaining to the handling of different waste streams.

In order to get a better understanding of the handling of waste at the mine the first step was to divide the waste up into waste type, category and waste stream. A volume had to be determined for each of the waste streams over a 12 month period.

Waste were divided into solid and liquid waste. Both solid and liquid waste were sub-categorised into recyclable and non-recyclable waste.

For liquid waste it was established that all liquid waste will need to be treated as hazardous waste as all the liquid wastes that were investigated fell under the hazardous category.

Solid waste was sub-categorised into domestic-, green-, industrial-, building/demolition and tyres waste of which each may fall under hazardous or non-hazardous waste. This will depend on the composition of the waste and the potential of contamination by other hazardous substances and/or hazardous waste during the handling thereof.

This approach allowed for the opportunity to compare statistical data for preceding years in order to plan ahead.

The handling of waste were mapped out in different process flows for the different waste streams identified. By mapping these process flows it was possible to interrogate the current waste handling practice in terms of the key elements for effective waste management mentioned earlier. This enabled the team to identify areas for improvement in terms of waste management awareness and training,



planning, waste handling (separation, minimisation, storage, transfer and disposal), meeting legal requirements and ensuring natural- and socio-economic viability of the adopted strategy.

3.2.1 Waste Stream Inventory

For each waste stream identified, the following aspects were evaluated and documented as part of the status quo assessment:

- Waste stream description including type, quantities and quality of waste generated as well as area (blue or red) of origin within the mining process;
- Description of any relevant environmental authorisations associated with the specific industry and waste stream, and linked to operational activities (the licensing authority for hazardous waste is the National Department of Environmental Affairs (DEA) and for general waste the Limpopo Department of Economic Development, Environment and Tourism (LEDET));
- A full description of current waste management practices, systems and strategies including:
 - Waste prevention/avoidance initiatives;
 - Waste minimisation initiatives;
 - Internal re-use and recycling;
 - Separation, collection, removal and storage at the points of generation;
 - External re-use and recycling;
 - Recovery practices;
 - Treatment; and
 - Transportation and safe disposal methods.

The categories of waste encountered at Venetia are listed in the Figure below and is followed by the 2012 waste stream inventory, providing more benchmark information on the composition and volume of the waste streams generated throughout the mine.

Statistical data pertaining the waste volume composition for the years 2011 and 2012, provides more insight on the year on year fluctuations in waste movement from the mine.



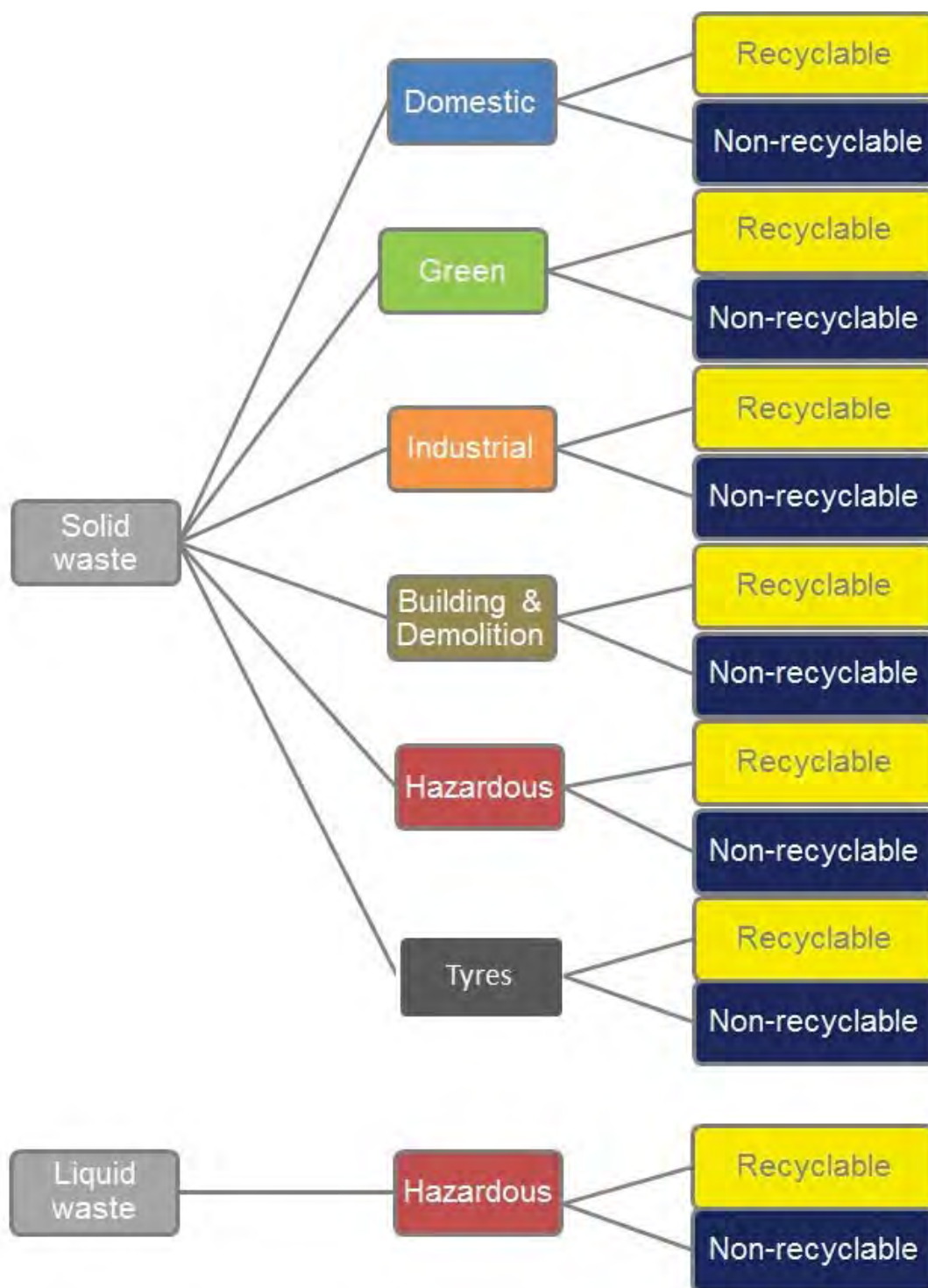


Figure 4: Solid and liquid waste categories



Table 3: Waste Stream Inventory

No.	Area	Waste Type and Category	Waste stream	Volumes (maximum monthly volume generated/removed during 2012)
1	Blue	Recyclable general waste	Paper	6.97 tonnes
2	Blue	Recyclable general waste	Plastic	4.65 tonnes
3	Blue	Recyclable general waste	Cardboard	9.683 tonnes
4	Blue	Recyclable general waste	Cans	2.96 tonnes (only one removal for 2012)
5	Blue	Recyclable general waste	Glass	Unknown
6	Blue	Non-recyclable general waste	Non-recyclable dry waste to landfill	3.99 tonnes
7	Blue	Non-recyclable general waste	Food waste	Unknown
8	Blue	Recyclable or non-recyclable general waste	Green waste	Unknown
9	Blue	Recyclable hazardous liquids	Used oil	85838 litres used oil and grease
10	Blue	Non-recyclable hazardous liquids	Grease	
11	Blue	Non-recyclable hazardous liquids	Contaminated diesel	Unknown
12	Blue	Non-recyclable hazardous liquids	Engine coolant	Unknown
13	Blue	Non-recyclable hazardous liquids	Hydrocarbon sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste
14	Blue	Non-recyclable hazardous liquids	Old cooking oil	Unknown
15	Blue	Non-recyclable hazardous liquids	Battery Acid	Unknown
16	Blue	Non-recyclable hazardous liquids	Chemical containers with redundant chemicals - Liquid	Unknown
17	Blue	Non-recyclable hazardous solids	Expired medicine	Unknown
18	Blue	Hazardous solids	Sewage treatment plant sludge	Unknown
19	Blue	Recyclable hazardous solids	Used Ink cartridges	130 cartridges
20	Blue	Recyclable hazardous solids	Sealed batteries	183 lead acid batteries
21	Blue	Recyclable hazardous solids	Un-sealed batteries	Unknown

No.	Area	Waste Type and Category	Waste stream	Volumes (maximum monthly volume generated/removed during 2012)
22	Blue	Recyclable hazardous solids	Empty (mostly 25l) chemical containers	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste
23	Blue	Recyclable hazardous solids	Empty 210l oil drums	Unknown
24	Blue	Non-recyclable hazardous solids	Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste
25	Blue	Non-recyclable hazardous solids	Contaminated spills orb	Unknown
26	Blue	Non-recyclable hazardous solids	Hardened Sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste
27	Blue	Non-recyclable hazardous solids	Contaminated soil not suitable for bioremediation (due to levels of contamination)	Unknown
28	Blue	Non-recyclable hazardous solids	Laundry grease	Unknown
29	Blue	Non-recyclable hazardous solids	Medical waste	Up to 5m ³ incinerated per month (combination of medical and sanitary waste)
30	Blue	Non-recyclable hazardous solids	Sanitary waste generated in bathrooms and 'SHE' bins	Up to 5m ³ incinerated per month (combination of medical and sanitary waste)
31	Blue	Non-recyclable hazardous solids	Fluorescent tubes, mercury vapour lamps and sodium lamps	Unknown
32	Blue	Non-recyclable hazardous solids	Empty chemical containers	Unknown
33	Blue	Non-recyclable hazardous solids	Chemical containers with redundant chemicals - Solid	Unknown
34	Blue	Non-recyclable hazardous solids	Electronic waste	Unknown
35	Blue	Non-recyclable hazardous solids	Sandblasting grit	Unknown
36	Blue	Non-recyclable hazardous solids	Incinerator ash	Unknown
37	Blue	Recyclable Industrial	Used Screen Panels	Unknown
38	Blue	Recyclable Industrial	Ferrous and non-ferrous metals	474.31 tonnes
39	Blue	Recyclable Industrial	Wood (pallets and boxes)	Unknown
40	Blue	Recyclable Industrial	Conveyor belting	Unknown



No.	Area	Waste Type and Category	Waste stream	Volumes (maximum monthly volume generated/removed during 2012)
41	Blue	Recyclable Industrial	Hard hats	Unknown
42	Blue	Recyclable Industrial	Safety boots	Unknown
43	Blue	Recyclable Industrial	Overalls	Unknown
44	Blue	Recyclable Industrial	Plastic water containers	Unknown
45	Blue	Recyclable Industrial	Blasting wire	Unknown
46	Blue	Recyclable Industrial	All cabling	Unknown
47	Blue	Non-recyclable industrial	Windscreen glass	Unknown
48	Blue	Non-recyclable industrial	LDV and EMV tyres	Approximately 500 EMV tyres and 120 LDV tyres at the mine currently
49	Blue	Non-recyclable industrial	Building rubble, demolition and construction waste	Unknown
50	Blue	Non-recyclable industrial	Rubber	Unknown
51	Blue	Non-recyclable industrial	Air filters	Unknown
52	Blue	Non-recyclable industrial	Redundant furniture	Unknown
53	Red	Recyclable general waste	Paper	Unknown
54	Red	Recyclable general waste	Plastic	Unknown
55	Red	Recyclable general waste	Cardboard	Unknown
56	Red	Recyclable general waste	Cans	Unknown
57	Red	Recyclable general waste	Glass	Unknown
58	Red	Non-recyclable general waste	Food waste	Unknown
59	Red	Non-recyclable general waste	Green waste	Unknown
60	Red	Recyclable hazardous solids	Batteries (sealed or unsealed)	Unknown
61	Red	Recyclable Hazardous - Liquid	Used oil	Unknown
62	Red	Non-recyclable Hazardous - Liquid	Grease	Unknown



No.	Area	Waste Type and Category	Waste stream	Volumes (maximum monthly volume generated/removed during 2012)
63	Red	Non-recyclable Hazardous - Solid	Contaminated soil not suitable for bioremediation (due to levels of contamination)	Unknown
64	Red	Non-recyclable Hazardous - Solid	Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers	Unknown
65	Red	Non-recyclable Hazardous - Solid	Contaminated spills orb	Unknown
66	Red	Non-recyclable Hazardous - Solid	Fluorescent tubes, Mercury Vapour lamps and Sodium lamps	Unknown
67	Red	Recyclable Hazardous - Solid	Used Ink cartridges	Unknown
68	Red	Recyclable Hazardous - Solid	Empty chemical containers	Unknown
69	Red	Non-recyclable Hazardous - Solid	Empty chemical containers	Unknown
70	Red	Non-recyclable Hazardous - Solid	Chemical containers with redundant chemicals - Solid	Unknown
71	Red	Non-recyclable Hazardous - Liquid	Chemical containers with redundant chemicals - Liquid	Unknown
72	Red	Non-recyclable Hazardous - Solid	Electronic waste	Unknown
73	Red	Recyclable Hazardous - Solid	Empty oil drums	Unknown
74	Red	Recyclable Industrial	Used Screen Panels	Unknown
75	Red	Non-recyclable Industrial	Building rubble, demolition and construction waste	Unknown
76	Red	Recyclable Industrial	Ferrous and non-ferrous metals	Unknown
77	Red	Recyclable Industrial	Conveyor belting	Unknown
78	Red	Recyclable Industrial	Hard hats	Unknown
79	Red	Recyclable Industrial	Safety boots	Unknown
80	Red	Recyclable Industrial	Overalls	Unknown
81	Red	Recyclable Industrial	Cabling	Unknown



3.2.2 Waste Stream Statistical Data (2011 & 2012)

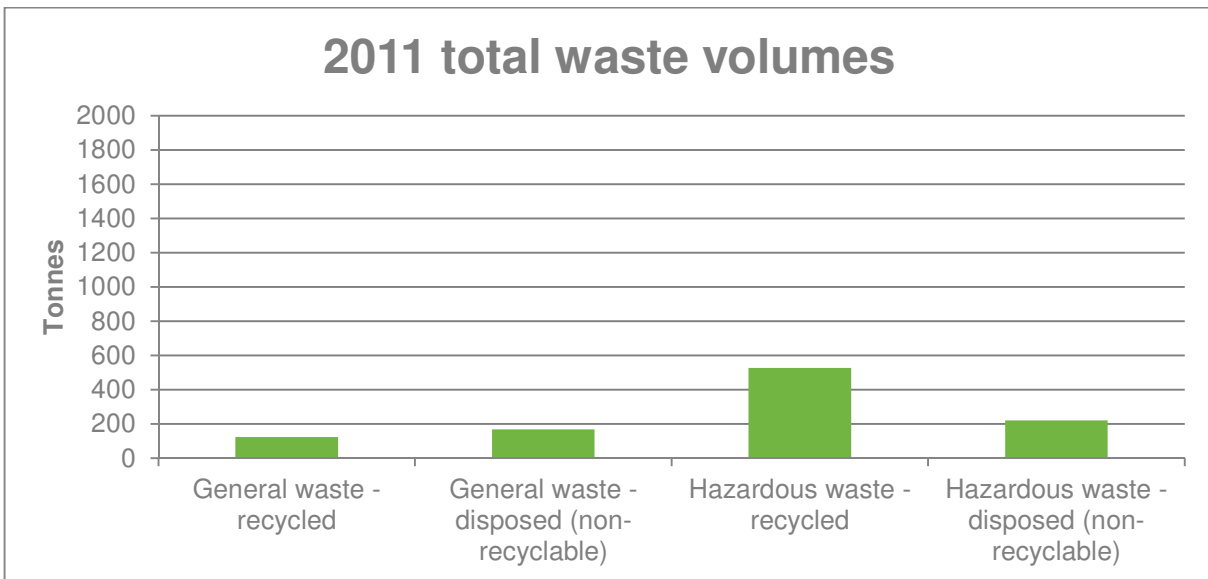


Figure 5: Total volume of waste removed from the mine in 2011 (1)

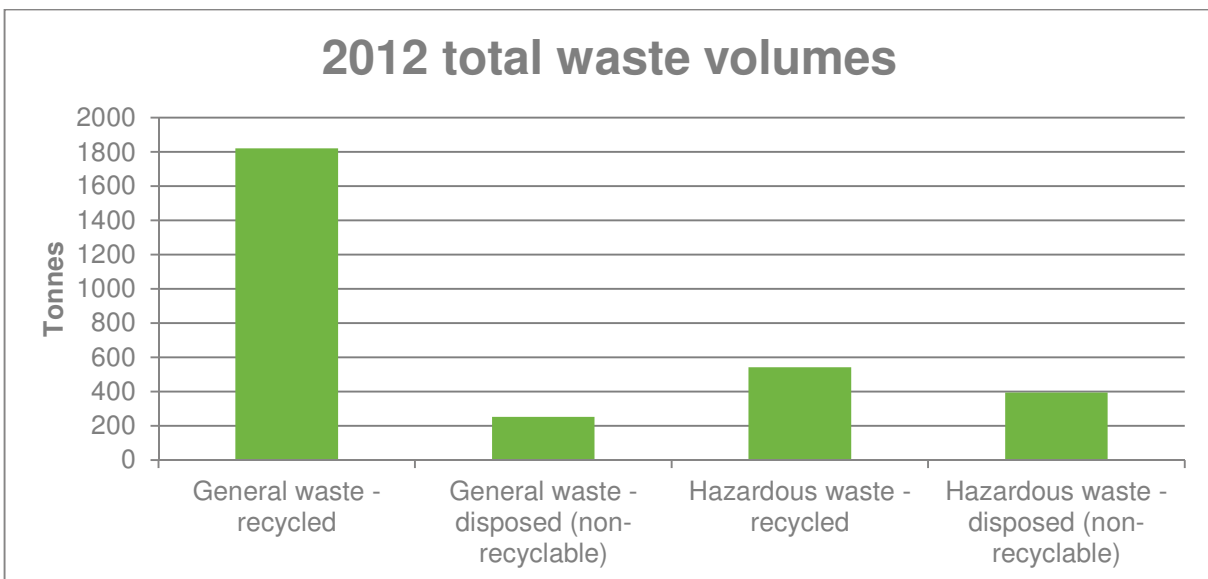


Figure 6: Total volume of waste removed from the mine in 2012 (1)

By comparison it is clear that the volume of general waste removed during 2012 that was more than 1800 tonnes far exceed the tonnages removed during 2011 that was less than 200 tonnes for the year.

The removal of a large volume of steal waste during 2012 as part of a salvage yard clean-up project gave effect to the spike in volume of general waste removed.

It is important to note that waste volumes were only monitored in terms of removal from the salvage yard. Balance sheets for waste entering and leaving the salvage yard (WMF) will provide better insight into the



day to day or month on month generation and/or removal of waste. This will allow for better waste monitoring and planning over the long-term.

3.2.3 Waste Stream Process Flows and SWOT analysis – Blue Areas

3.2.3.1 Recyclable general waste

Currently general waste are disposed of in colour coded wheelie bins and the wheelie bins are placed at the identified recycling stations outside waste generating areas. This allows for the effective separation of waste at source.

The wheelie bins are clearly marked with the waste type and number of the recycling station. The wheelie bins are collected at the designated recycling stations and transported to the waste handling facility according to the waste collection schedule.

Upon arrival at the waste management facility (WMF) all general waste containers are emptied in the sorting area. Currently the sorting area is an open bare soil area designated for this purpose. The waste gets separated by hand and all recyclable waste are stored in separate bale-bags comprising of paper, plastic, cardboard, cans or glass.

Strengths with regards to the management of general waste, is the fact that recycling is a well-entrenched part of the overall waste management mechanism of the mine.

Current challenges however (weaknesses) entail:

- The build-up of waste as a result of Infrequent removal by waste contractor;
- Build-up of waste as a result of security constraints with the scanning of waste prior to removal;
- Inadequate, ineffective or impractical storage areas;
- Inadequate or shortage on baling and re-cycling equipment;
- The fact that the salvage yard do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The salvage yard that is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by change in operational protocol in conjunction with security firm;



- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Upgrading of baler or the purchase of a second baler to optimise the recycling throughput capacity. Purchase of a cable stripper in order to increase selling price on recycled cables;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.

Table 4: Colour codes for recyclable general waste

Containment	Colour	Waste stream	Definition
Wheelie Bins	White	Paper and Cardboard	Paper and Cardboard includes but are not limited to: All paper shredded or sheets Small cardboard Milk boxes Newspaper Magazines Small boxes
Wheelie Bins	Green	Glass	Glass includes but are not limited to: Glass bottles Glass containers Glasses Glass excludes: Windscreens Window glass
Wheelie Bins	Orange	All plastics	Plastics include but are not limited to: Plastic bottles Plastic containers Plastic bags Plastic container caps and lids Plastic excludes: Black bags
Wheelie Bins	Brown	Cans	Cans include but are not limited to: Cool drink cans Rinsed foodstuff cans Coffee cans No aerosol cans



3.2.3.2 Non-recyclable general waste

Non-recyclable general waste of domestic origin is stored in FeSi bulk bags at the WMF. It is removed, under security escort, by the waste contractor in 28 m³ skips or Ro-Ro containers for final disposal at a licensed domestic waste landfill facility. Currently the waste is sent to the Onderstepoort landfill site in Pretoria North.

Food waste that is also seen as a “wet” waste is placed into a 6m3 skip to "decompose" and is removed every 2-3 months by a waste contractor.

Green waste generated through garden maintenance in the form of pruning and cut grass is stockpiled in the WMF and are accumulating onsite.

Strengths with regards to the management of general waste, is the fact that recycling is a well-entrenched part of the overall waste management mechanism of the mine.

Current challenges however (weaknesses) entail:

- The build-up of waste as a result of infrequent removal by waste contractor;
- Relatively long distance of mine from a licensed landfill site;
- Build-up of waste as a result of security constraints with waste scanning prior to removal;
- Inadequate, ineffective or impractical storage areas;
- Inadequate or shortage on baling and re-cycling equipment;
- The fact that the salvage yard do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The salvage yard that is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Reducing the distance for landfill disposal by using a closer licensed landfill site;
- Addressing security constraints by change in operational protocol in conjunction with security firm;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Upgrading of baler or the purchase of a second baler to optimise the recycling throughput capacity. Purchase of a cable stripper in order to increase selling price on recycled cables;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and






- Obtain a waste permit in terms of the NEM:WA requirements.

Table 5: Colour codes for non-recyclable general waste

Containment	Colour	Waste stream	Definition
Wheelie Bins	Black	Wet waste	Wet waste includes but are not limited to: Leftover food like: pap & sous meat & chicken bones apple cores fruit / vegetable peels bread Tea bags
Wheelie Bins	Yellow	Other domestic waste	Other domestic waste include but are not limited to: Foil Polystyrene Black bags Redundant stationary Any general waste that is not in included in the recyclable bins
Skip	Light Green	Green waste	Green waste generated through garden maintenance in the form of pruning and cut grass.



<p>Paper and cardboard:</p> <ul style="list-style-type: none"> All paper Shredded or sheets Small cardboard Milk boxes Newspaper Magazines Small boxes <p>Wet waste (food):</p> <ul style="list-style-type: none"> Left over food Meat Vegetables and Fruit Bread Tea bags <p>Glass:</p> <ul style="list-style-type: none"> Glass bottles Glass containers Glasses Windscreens Window glass <p>All plastics:</p> <ul style="list-style-type: none"> Plastic bottles Plastic containers Plastic bags Plastic container caps and lids <p>Excludes:</p> <ul style="list-style-type: none"> Black bags 	<p>Cans:</p> <ul style="list-style-type: none"> Cooldrink cans Rinsed foodstuff cans Coffee cans No aerosol cans <p>Other domestic:</p> <ul style="list-style-type: none"> Foil Polystyrene Black bags Redundant stationary General waste not included in the recyclable bins <p>Green waste:</p> <ul style="list-style-type: none"> Grass Branches Stems <p>Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets</p> <p>Skip </p> <p>Drum/container </p> <p>Bale </p>
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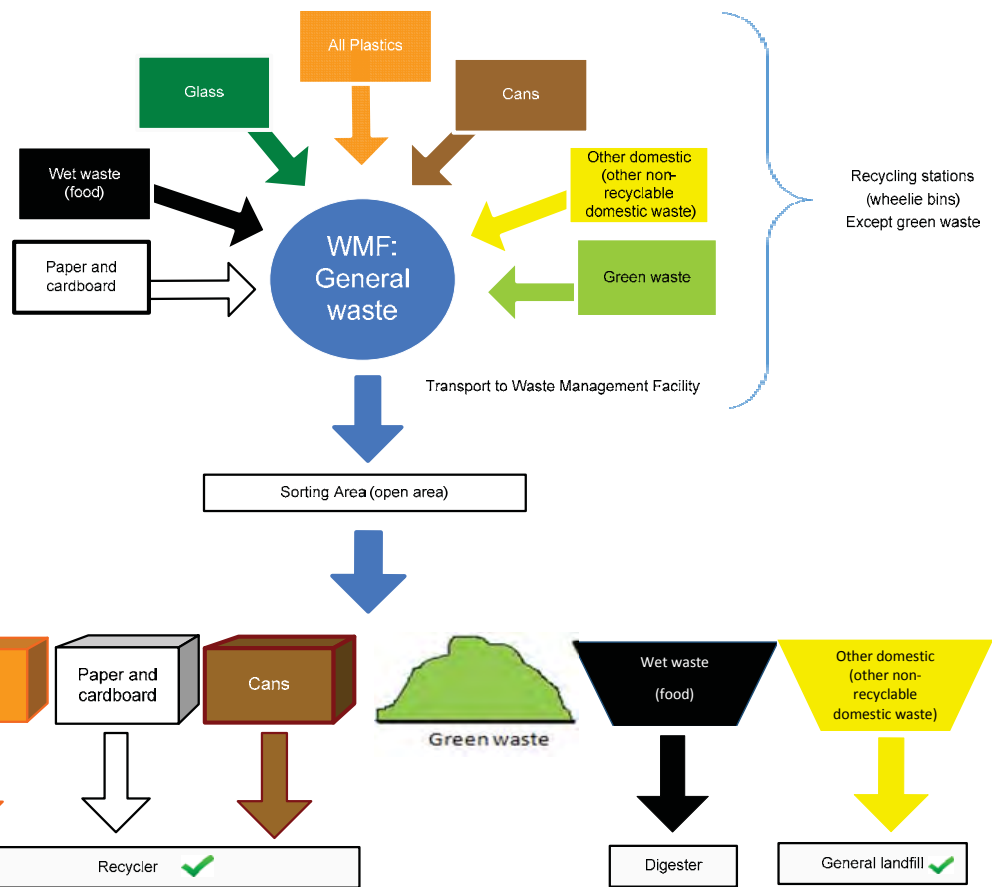


Figure 7: Current general waste process flow in the Blue Area

Table 6: SWOT Analysis of general waste in the Blue Area

Waste Type and Category	Waste stream	Volumes monthly generated (during 2012)	(maximum volume removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable general waste	Paper	6.97 tonnes		Weight of waste sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Waste recycling contractor separates recyclable domestic waste and makes bales in the waste management facility. Bales are then removed by the contractor under security escort.	<ul style="list-style-type: none"> •Recycled. •Adequate reporting on process flow. •Monitored. •Separated. •Volume reduced. •Revenue generating. •Licensed process (e.g. disposal). •Cost effective. 	<ul style="list-style-type: none"> •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •PPP. •Volume reduction. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Increased collection frequency. •Procurement alternatives. •Effective security protocol. •Training. 	<ul style="list-style-type: none"> •Unreliable contractors. •Diamond control risk - Security •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Unlawful conduct by waste managers (generators, operators and contractors).
Recyclable general waste	Plastic	4.65 tonnes	Weight of waste sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.						
Recyclable general waste	Cardboard	9.683 tonnes	Weight of waste sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.						
Recyclable general waste	Cans	2.96 tonnes (only one removal for 2012)	Weight of waste sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.						
Recyclable general waste	Glass	Unknown		No monitoring and reporting of volumes or weights.	Glass is stored in 210 litre drums in the waste management facility and is currently not removed from the mine.	<ul style="list-style-type: none"> •Separated. •Contained storage. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Poor reporting on process flow. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •PPP. •Volume reduction. •Increased collection frequency. •Effective security protocol. •Improved monitoring. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable general waste	Non-recyclable waste to landfill	3.99 tons		Weight sent to landfill captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	The waste is stored in FeSi bulk bags in the waste management facility. It is removed, under security escort, by the waste contractor in 28 m ³ skips or Ro-Ro containers to a licensed domestic waste landfill site in Pretoria.	<ul style="list-style-type: none"> •Monitored. •Licensed process (e.g. disposal). •Separated. •Contained storage. •Adequate reporting on process flow. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. 	<ul style="list-style-type: none"> •Alternative contractor. •PPP. •Alternative disposal. •Volume reduction. •Improved cost effectiveness. •Improved monitoring. •Increased collection frequency. •Procurement alternatives. •Training. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (during 2012)	(maximum volume removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable general waste	Food waste	Unknown		Not monitored	Food waste is placed into a 6m ³ skip to "decompose" and is removed every 2-3 months by a waste contractor.	<ul style="list-style-type: none"> •Contained storage. •Volume reduced. •Cost effective. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Inadequate, ineffective or impractical storage. •Poor management. •Risk to the environment. 	<ul style="list-style-type: none"> •Alternative contractor. •Alternative disposal. •Alternative treatment technology. •Alternative storage. •Improved monitoring. •Improved management. •Increased collection frequency. •Training. •Effective security protocol. 	<ul style="list-style-type: none"> •Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Air pollution.
Non-recyclable general waste	Green waste	Unknown		Not monitored	Green waste is removed from site by the waste contractor to a domestic/general landfill site.	<ul style="list-style-type: none"> •Separated. •Licensed process (e.g. disposal). 	<ul style="list-style-type: none"> •Not recycled. •Not monitored (separately). •Infrequent removal from generators and/or mine. •No volume reduction. 	<ul style="list-style-type: none"> •Recyclable. •Alternative contractor. •Alternative treatment technology. •Improved monitoring. •Volume reduction. •Improved separation. •Improved cost effectiveness. 	<ul style="list-style-type: none"> •Diamond control risk - Security. •Accumulation of waste. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).



3.2.3.3 Industrial waste

Currently industrial waste are disposed of in colour coded wheelie bins and skips. These containers are placed at the identified recycling stations outside waste generating areas. This allows for the effective separation of waste at source.

These containers are clearly marked with the waste type and number of the recycling station. The containers are collected at the designated recycling stations and transported to the waste handling facility according to the waste collection schedule.

Upon arrival at the waste management facility (WMF) all industrial wheelie bins are emptied into colour coded skips and skips entering the yard are placed along with the other colour coded skips in the designated areas. Some of the industrial waste gets recycled while the other gets disposed of.

Strengths with regards to the management of industrial waste, is the fact that recycling is a well-entrenched part of the overall waste management mechanism of the mine.

Current challenges however (weaknesses) entail:

- The build-up of waste as a result of Infrequent removal by waste contractor;
- Build-up of waste as a result of security constraints with the scanning of waste prior to removal;
- Inadequate, ineffective or impractical storage areas;
- Inadequate or shortage on baling and re-cycling equipment;
- The fact that the salvage yard do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste;
- The salvage yard that is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by change in operational protocol in conjunction with security firm;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Upgrading of baler or the purchase of a second baler to optimise the recycling throughput capacity. Purchase of a cable stripper in order to increase selling price on recycled cables;






- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements.
- Obtain a waste permit in terms of the NEM:WA requirements.

Table 7: Colour codes for industrial waste

Containment	Colour	Waste stream	Definition
Wheelie Bins	Black	Wet waste	Wet waste includes but are not limited to: Left over food like: pap & sous meat & chicken bones apple cores fruit / vegetable peels bread Tea bags
Wheelie Bins	Green	Glass	Glass includes but are not limited to: Glass bottles Glass containers Glasses Glass excludes: Windscreens Window glass
Skip	Blue	Rubber	Rubber and rubber lined steel (Excl.Tyres)
Open Skip	Yellow	Wood and Large Cardboard	Wood and large cardboard
Closed Skip	Cream with an orange stripe	Electronic waste	Electronic waste like redundant computer components, radios and IC'S
Skip	Grey	Steel	All scrap steel and steel waste
Skip	Light green	Other industrial waste	Hard hats, used screen panels, water containers, furniture, cables, blasting wire, air filters, safety boots, overalls.



Steel: <ul style="list-style-type: none"> Scrap steel Steel waste 	Wood and large cardboard
Electronic waste: <ul style="list-style-type: none"> Redundant computer components Radios ICs 	Other industrial waste: <ul style="list-style-type: none"> Hard hats Used screen panels Water containers Furniture Cables Blasting wire Air filters Safety boots Overalls
Windscreen glass	Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets ✓
Rubber: <ul style="list-style-type: none"> Conveyor belts Rubber Rubber lined steel LDV tyres 	
Skip 	
Stockpile 	
Wooden crates 	

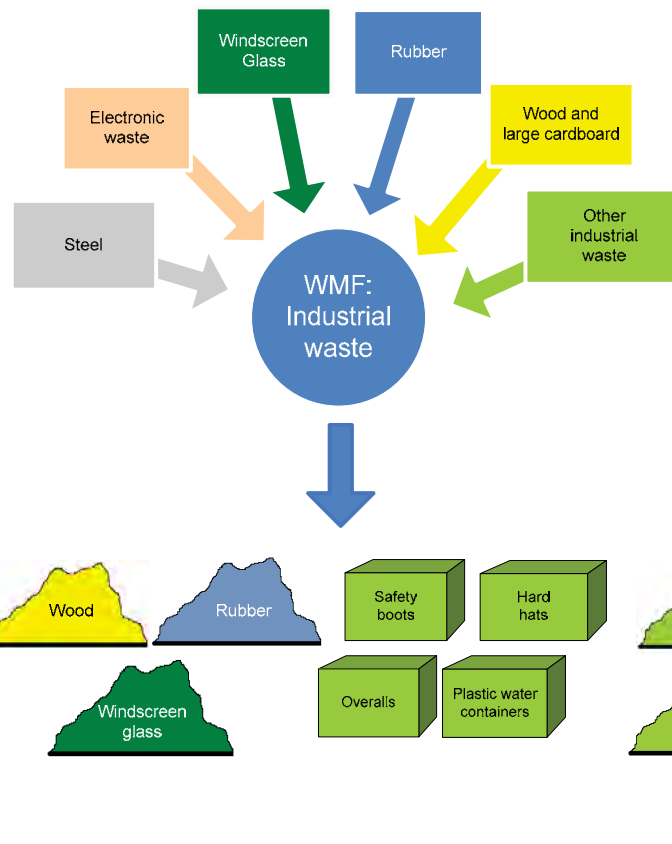


Figure 8: Current industrial waste process flow in the Blue Area

Table 8: SWOT Analysis of industrial waste in the Blue Area

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable Industrial	Used Screen Panels	Unknown	Not monitored	Used screen panels are stored at the waste management facility and elsewhere on the mine and are removed by a contractor for recycling.	<ul style="list-style-type: none"> •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Return policy. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Ferrous and non-ferrous metals	474.31 tonnes	Weight sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Metals are stockpiled at the waste management facility and removed for recycling by the waste contractor.	<ul style="list-style-type: none"> •Recycled. •Monitored. •Separated. •Revenue generating. •Cost effective. 	<ul style="list-style-type: none"> •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •No volume reduction. 	<ul style="list-style-type: none"> •Recyclable. •Revenue generating (e.g. auction). •Alternative storage. •Volume reduction. •Increased collection frequency. •Effective security protocol. •Training. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Wood (pallets and boxes)	Unknown	Not monitored	Wood is stacked in the waste management facility and is crushed using a dozer. It is not currently removed from the mine.	<ul style="list-style-type: none"> •Separated. •Volume reduced. 	<ul style="list-style-type: none"> •Not recycled. •Not re-used. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Procurement alternatives. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Conveyor belting	Unknown	Not monitored	Conveyor belts are stored at source and the auction yard and are not currently removed from the mine.	<ul style="list-style-type: none"> •Separated. •Recycled. •Revenue generating. •Volume reduced. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •Poor management. 	<ul style="list-style-type: none"> •Recyclable. •Re-use. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Revenue generating (e.g. auction). •Return policy. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Hard hats	Unknown	Not monitored	Hard hats are stored at source, the waste management facility and the auction yard. They are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •No volume reduction. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Alternative treatment technology. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Return policy. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume /removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable Industrial	Safety boots	Unknown	Not monitored	Safety boots are stored at the waste management facility and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not re-used. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Re-useable. •Alternative contractor. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Procurement alternatives. •Return policy. •Effective security protocol. •Social donation programme. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Overalls	Unknown	Not monitored	Overalls are stored at the waste management facility and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not re-used. •Not monitored. •No volume reduction. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Re-use. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Procurement alternatives. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Plastic water containers	Unknown	Not monitored	Containers are stored at the waste management facility and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Return policy. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Blasting wire	Unknown	Not monitored	Blasting wire is stored at the waste management facility and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable Industrial	All cabling	Unknown	Not monitored	Cables are stored at the waste management facility and are not currently removed from the mine.	•Separated.	•Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage.	•Alternative treatment technology. •Volume reduction. •Alternative storage. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable industrial	Windscreen glass	Unknown	Not monitored	Windscreen glass is stored (sometimes in blue skips and 210 litre drums) at the waste management facility and is not currently removed from the mine.	•Separated.	•Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment. •Inadequate, ineffective or impractical storage.	•Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable industrial	Rubber	Unknown	Not monitored	Rubber is stored at the waste management facility and is not currently removed from the mine.	•Separated.	•Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage.	•Recyclable. •Alternative contractor. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable industrial	Air filters	Unknown	Not monitored	Air filters are stored at the waste management facility and are not currently removed from the mine.	•Separated.	•Not monitored. •No volume reduction. •Infrequent removal from generators and/or mine. •No volume reduction. •Risk to the environment. •Inadequate, ineffective or impractical storage.	•Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Return policy. •Effective security protocol.	•Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable industrial	Redundant furniture	Unknown	Not monitored	Redundant furniture is stored at the waste management facility and is not currently removed from the mine.	•Separated.	•Not monitored. •Not recycled. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage.	•Recyclable. •Re-useable. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

3.2.3.4 Waste Tyres

LDV and EMV tyres are stockpiled at the WMF, mining engineering workshops and waste rock dump (WRD) and are currently not removed from the mine.

Current challenges however (weaknesses) entail:

- The build-up of waste tyres; and
- The waste tyre storage areas are not registered as required by Government Notice 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.

Improvement opportunities are in:

- Preventing a build-up of waste tyres by sending old tyres back to supplier when new tyres are delivered; and
- Registering the storage areas in accordance with GN R. 926.



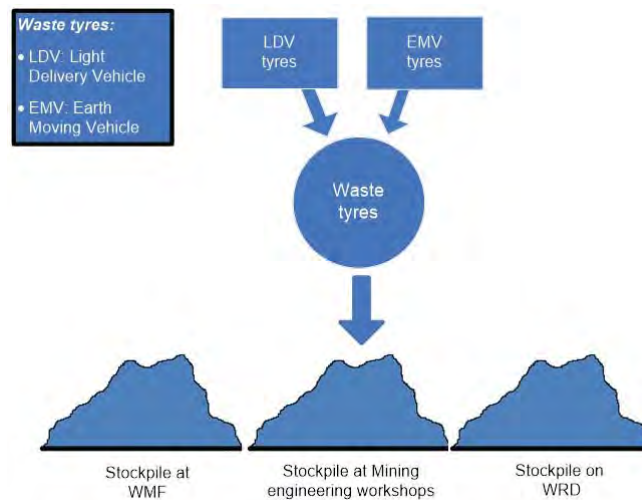


Figure 9: Current waste tyre process flow in the Blue Area

Table 9: SWOT Analysis of waste tyres in the Blue Area

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable industrial	LDV and EMV tyres	Approximately 500 EMV tyres and 120 LDV tyres at the mine currently	Not monitored	Tyres are stockpiled at the waste management facility, mining engineering workshops and WRD. The tyres are not currently removed from the mine.	•Separated.	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. •Poor management. 	<ul style="list-style-type: none"> •Recyclable. •Alternative treatment technology. •Alternative storage. •Volume reduction. •Procurement alternatives. •Improved monitoring. •Return policy. •Improved legal compliance. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Unlawful conduct by waste managers (generators, operators and contractors).

3.2.3.5 Building waste, construction waste and demolition waste

Building rubble, demolition and construction waste is stored at the waste management facility and is not currently removed from the mine.

Current challenges however (weaknesses) entail:

- The build-up of building waste in salvage yard; and
- The salvage yard is not licensed as required by Government Notice 921 National Environmental Management: Waste Act (59/2008): List of waste management activities that have, or are likely to have, a detrimental effect on the environment and also not registered in terms of Government Notice 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.

Improvement opportunities are in:

- Preventing a build-up of building waste in salvage yard, by temporarily storing the rubble for further use as filling in roads or building foundations; and
- This will however require a license in terms of GN R. 921.



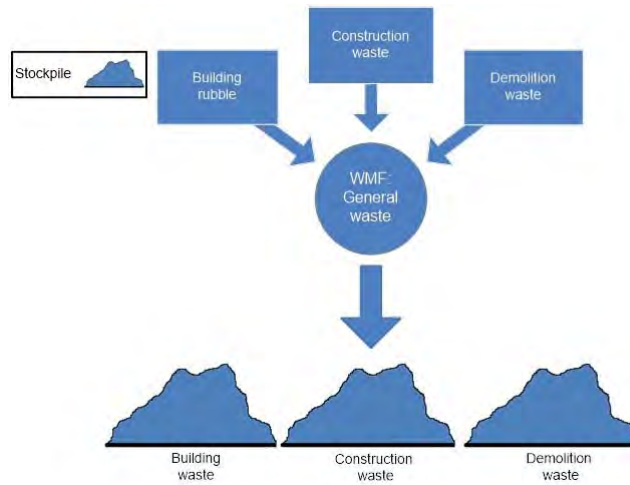


Figure 10: Current process flow for building, construction and demolition waste in the Blue Area

Table 10: SWOT Analysis of building, construction and demolition waste in the Blue Area

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable industrial	Building rubble, demolition and construction waste	Unknown	Not monitored	The waste is stored at the waste management facility and is not currently removed from the mine.	•Separated.	•Not re-used. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage.	•Re-use. •Alternative disposal. •Alternative storage. •Improved legal compliance. •Improved cost effectiveness. •Improved monitoring. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Unlawful conduct by waste managers (generators, operators and contractors).

3.2.3.6 Recyclable hazardous liquids

Recyclable hazardous liquids, such as used oil is collected at the workshops in used oil storage tanks. The oil is collected by the used oil removal contractor (OILKOL) for recycling at their refinery. All used oil passes through a diamond trap prior to removal from site.

Current challenges however (weaknesses) entail:

- The build-up of old oil as a result of infrequent emptying of storage tanks; and
- The storage areas are not registered as required by Government Notice 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.

Improvement opportunities are in:

- Increased frequency of oil collection by contractor; and
- Registering the storage areas in accordance with GN R. 926.

3.2.3.7 Non-recyclable hazardous liquids

Used grease generated from maintenance work at the workshops are collected in 210 litre drums. These drums are transported to the waste management facility. Currently, these drums are accumulating in the WMF as it is not removed on a regular basis. Usually the grease gets removed only during clean-ups.

Contaminated diesel and engine coolant are stored in separate 1 000litre IBC Containers at various locations on the mine and is currently not removed from the mine.

Hydrocarbon sludge is present in the Drizit sumps, workshop sumps and IBC containers at various locations. The removal of sludge does not occur pro-actively or as per a procedure. It is removed by a supersucker on an ad hoc basis when the risks are acknowledged and/or materialise.

Old cooking oil is stored in 210 litre and other small drums and is currently not removed from the mine.

Battery acid is stored in 210 litre drums and is not currently removed from the mine.

Containers with redundant chemicals are stored at various locations and the waste management facility. They are not currently removed from the mine. Expired medicine is stored at the Wellness Centre.



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Current challenges however (weaknesses) entail:

- The build-up of hazardous chemicals as a result of infrequent removal of waste by contractors; and
- The storage areas are not registered as required by Government Notice 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.

Improvement opportunities are in:

- Increased frequency of waste collection by contractor; and
- Registering the storage areas in accordance with GN R. 926.

3.2.3.8 Recyclable and Non-recyclable hazardous solids

- Sewage treatment plant sludge is currently placed into an unlined evaporation pond to the east of the sewage treatment plant;
- De Beers' used ink cartridges are returned to the contractor after being scanned (x-ray). Contractor's cartridges are stored at the waste management facility;
- Sealed batteries are stored at various source locations and stores and are not currently removed from the mine;
- Unsealed batteries are stored at various source locations and stores and are not currently removed from the mine;
- Empty (mostly 25l) chemical containers are stacked in the waste management facility and are removed by the waste recycling contractor under security escort to a hazardous waste disposal facility;
- Empty 210l oil drums are stored at the waste management facility and used as demarcation. They are not currently removed from the mine;
- Oily rags, material contaminated with oil, diesel or grease, oil filters and empty oil/chemical containers is stored in 11 m³ skips in the waste management facility and is removed under security escort by the waste contractor to a hazardous waste disposal facility (Holfontein);
- Contaminated spillsorb is stored in various containers, including 210 litre drums and IBC containers, at various source locations from where it gets transferred to the waste management facility. It is currently not removed from the mine;
- Hardened sludge is stored in various containers, including 210 litre drums and IBC containers, at various source locations and the waste management facility. The removal of sludge does not occur pro-actively or as per a procedure. It is removed by a supersucker on an ad hoc basis when the risks are acknowledged and/or materialise;
- Contaminated soil not suitable for bioremediation (due to levels of contamination) is stored in various containers, including 210 litre drums and IBC containers, at various source locations and at the waste management facility. It is not currently removed from the mine;
- Launder grease is stored in 210 litre drums or skips in the waste management facility. It is not currently removed from the mine;



- Medical waste is stored in waste boxes and containers (provided by the waste contractor) at the Wellness Centre prior to removal by the contractor for incineration at a licensed facility;
- Sanitary waste generated in bathrooms and 'SHE' bins is stored in waste boxes and containers (provided by the waste contractor) at the Wellness Centre prior to removal by the contractor for incineration at a licensed facility;
- Fluorescent tubes, mercury vapour lamps and sodium lamps are crushed and stored in 210 litre drums at electrical workshops and the waste management facility. These drums are not currently removed from the mine;
- Chemical containers with redundant solid chemicals are stored at source as well as at the waste management facility. These chemicals are currently not removed from the mine;
- Electronic waste is stored at source and at the waste management facility and is currently not removed from the mine;
- Sandblasting grit is stored at source and is currently not removed from the mine; and
- Incinerator ash is stored in skips at the waste management facility and not currently removed from the mine.

Current challenges however (weaknesses) entail:

- The build-up of hazardous waste in salvage yard as a result of infrequent removal of waste by contractors; and
- The storage areas are not registered as required by Government Notice 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.

Improvement opportunities are in:

- Increased frequency of waste collection by contractor; and
- Registering the storage areas in accordance with GN R. 926.



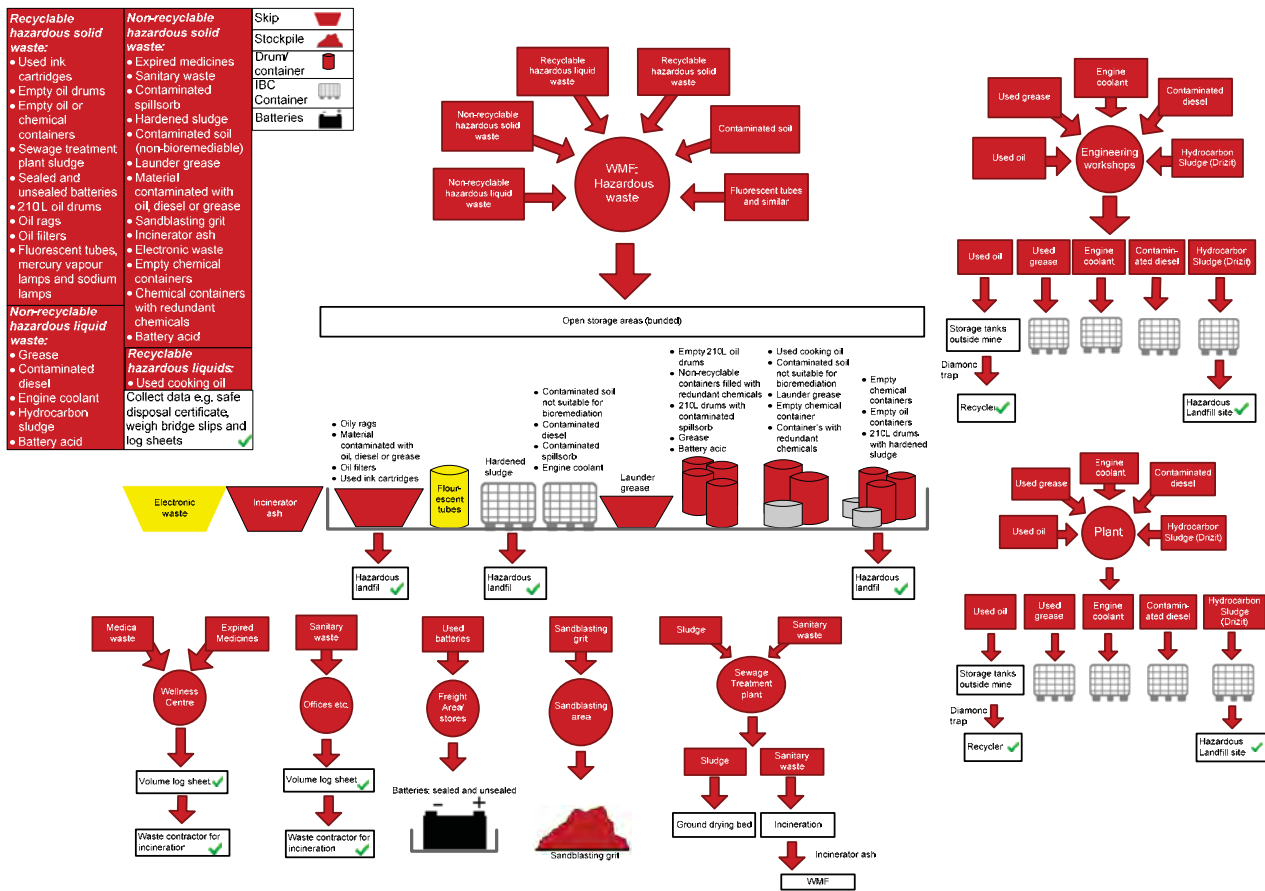


Figure 11: Current hazardous waste process flow in the Blue Area

Table 11: SWOT Analysis of hazardous waste in the Blue Area

Waste Type and Category	Waste stream	Volumes monthly generated during 2012 (maximum volume /removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable hazardous liquids	Used oil	85838 litres used oil and grease	Volume sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Used oil is stored in tanks outside of the mine after passing through a diamond trap. The oil is collected by OILKOL for recycling at the OILKOL refinery.	<ul style="list-style-type: none"> •Recycled. •Regular removal from generators and/or mine. •Revenue generating. •Separated. •Contained storage. •Cost effective. •Licensed process (e.g. disposal). 	<ul style="list-style-type: none"> •Not monitored (separately). •Risk to the environment. 	<ul style="list-style-type: none"> •Recyclable. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Improved monitoring. •Alternative storage. •Improved separation. •Effective security protocol. 	<ul style="list-style-type: none"> •Diamond control risk - Security. •Water pollution (ground and surface water). •Water pollution (ground and surface water). •Soil pollution.
Non-recyclable hazardous liquids	Grease	85838 litres used oil and grease	Volume sent for recycling captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Grease is stored in 210 litre drums and is not currently removed from the mine on a regular basis (only during clean ups)	<ul style="list-style-type: none"> •Recycled. •Regular removal from generators and/or mine. •Revenue generating. •Separated. •Contained storage. •Revenue generating. •Licensed process (e.g. disposal). •Cost effective. 	<ul style="list-style-type: none"> •Not monitored (separately). •Infrequent removal from generators and/or mine. •Revenue generating (e.g. auction). 	<ul style="list-style-type: none"> •Recyclable. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Alternative storage. •Improved monitoring. •Improved separation. •Effective security protocol. 	<ul style="list-style-type: none"> •Diamond control risk - Security. •Water pollution (ground and surface water). •Soil pollution.
Non-recyclable hazardous liquids	Contaminated diesel	Unknown	Not monitored	Contaminated diesel is stored in 1 000litre IBC Containers at various locations and is currently not removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No consequence management for poor waste management performance. •Risk to the environment. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Alternative disposal. •Increased collection frequency. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Improved monitoring. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Water pollution (ground and surface water). •Soil pollution.
Non-recyclable hazardous liquids	Engine coolant	Unknown	Not monitored	Engine coolant is stored in 1 000litre IBC Containers at various locations and is currently not removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No consequence management for poor waste management performance. •Risk to the environment. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Alternative disposal. •Increased collection frequency. •Revenue generating (e.g. auction). •Improved cost effectiveness. •Improved monitoring. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Water pollution (ground and surface water). •Soil pollution.



Waste Type and Category	Waste stream	Volumes monthly generated /removed during 2012	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable hazardous liquids	Hydrocarbon sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Total volume hazardous waste is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Hydrocarbon sludge is present in the Drizit sumps, workshop sumps and IBC containers at various locations. The removal of sludge does not occur pro-actively or as per a procedure. It is removed by a supersucker on an ad hoc basis when the risks are acknowledged and/or materialise.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •No consequence management for poor waste management performance. •Risk to the environment. •Inadequate, ineffective or impractical storage. •Poor management. 	<ul style="list-style-type: none"> •Alternative storage. •Alternative disposal. •Increased collection frequency. •Effective security protocol. •Improved monitoring. •Training. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Water pollution (ground and surface water). •Soil pollution.
Recyclable hazardous liquids	Old cooking oil	Unknown	Not monitored	Old cooking oil is stored in 210 litre and other small drums and is currently not removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment. 	<ul style="list-style-type: none"> •Recyclable. •Alternative contractor. •Alternative storage. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous liquids	Battery Acid	Unknown	Not monitored	Battery acid is stored in 210 litre drums and washed into drains. It is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Not recycled. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •Risk to the environment. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Increased collection frequency. •Return policy. •Procurement alternatives. •Effective security protocol. •Improved monitoring. •Training. 	<ul style="list-style-type: none"> •Health risk. •Accumulation of waste. •Diamond control risk - Security •Soil pollution. •Water pollution (ground and surface water). •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Chemical containers with redundant chemicals - Liquid	Unknown	Not monitored	Containers with redundant chemicals and stored at various locations and the waste management facility. They are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored. •Not separated. •Infrequent removal from generators and/or mine. •Not characterised in terms of hazard rating. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Improved separation. •Return policy. •Increased collection frequency. •Procurement alternatives. •Return policy. •Improved monitoring. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume /removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable hazardous solids	Expired medicine	Unknown	Not monitored	Expired medicine is stored at the Wellness Centre.	•Contained storage.	•Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment.	•Alternative disposal. •Improved monitoring. •Return policy. •Increased collection frequency. •Effective security protocol.	•Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable hazardous solids	Sewage treatment plant sludge	Unknown	Not monitored	The sludge is currently placed into an unlined evaporation pond to the east of the sewage treatment plant.	•Separated.	•Not recycled. •Infrequent removal from generators and/or mine. •Risk to the environment. •Inadequate, ineffective or impractical storage. •Poor management.	•Recyclable. •Alternative storage. •Alternative treatment technology. •Improved legal compliance. •Volume reduction. •Improved cost effectiveness. •Improved monitoring. •Improved management.	•Accumulation of waste. •Water pollution (ground and surface water). •Unlawful conduct by waste managers (generators, operators and contractors). •Soil pollution. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable hazardous solids	Used Ink cartridges	130 cartridges	Number removed from site captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	De Beers' cartridges are returned to the contractor after being scanned (x-ray). Contractor's cartridges are stored at the waste management facility.	•Recycled (except contractor's cartridges). •Monitored (except contractor's cartridges). •Separated (except contractor's cartridges). •Contained storage.	•Not recycled (contractor's cartridges). •Not monitored (contractor's cartridges). •No consequence management for poor waste management performance.	•Recyclable. •Alternative contractor. •Return policy. •Alternative storage. •Improved monitoring. •Improved management. •Increased collection frequency. •Effective security protocol.	•Unreliable contractors. •Accumulation of waste. •Diamond control risk - Security. •Unlawful conduct by waste managers (generators, operators and contractors). •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable hazardous solids	Sealed batteries	183 lead acid batteries	Number removed from site captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Sealed batteries are stored at various source locations and stores and are not currently removed from the mine.	•Contained storage. •Monitored. •Separated.	•Not recycled. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •Risk to the environment. •Inadequate, ineffective or impractical storage.	•Recyclable. •Alternative contractor. •Return policy. •Alternative storage. •Increased collection frequency. •Effective security protocol.	•Health risk. •Accumulation of waste. •Diamond control risk - Security. •Water pollution (ground and surface water). •Soil pollution. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable hazardous solids	Un-sealed batteries	Unknown	Not monitored	Unsealed batteries are stored at various source locations and stores and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •Risk to the environment. 	<ul style="list-style-type: none"> •Recyclable. •Alternative contractor. •Improved monitoring. •Return policy. •Procurement alternatives. •Alternative storage. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Health risk. •Accumulation of waste. •Diamond control risk - Security. •Water pollution (ground and surface water). •Soil pollution. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable hazardous solids	Empty (mostly 25l) chemical containers	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Total volume hazardous waste is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Chemical containers are stacked in the waste management facility and are removed by the waste recycling contractor under security escort to a hazardous waste disposal facility.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored (separately). •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •No volume reduction. 	<ul style="list-style-type: none"> •Procurement alternatives. •Volume reduction. •Alternative treatment technology. •Alternative disposal. •Improved monitoring. •Improved separation. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable hazardous solids	Empty 210l oil drums	Unknown	Not monitored	Drums are stored at the waste management facility and used as demarcation. They are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Procurement alternatives. •Volume reduction. •Improved monitoring. •Revenue generating (e.g. auction). •Increased collection frequency. •Alternative treatment technology. •Alternative disposal. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Total volume hazardous waste is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	The material is stored in 11 m ³ skips in the waste management facility and is removed under security escort by the waste contractor to a hazardous waste disposal facility (Hollfontein).	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored (separately). •Not recycled (oil filters and oil rags). •Infrequent removal from generators and/or mine. 	<ul style="list-style-type: none"> •Recyclable (oil filters and oil rags). •Alternative disposal. •Improved monitoring. •Improved separation. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable hazardous solids	Contaminated spillsorb	Unknown	Not monitored	The contaminated spillsorb is stored in various containers, including 210 litre drums and IBC containers, at various source locations and the waste management facility. It is currently not removed from the mine.	•Contained storage.	•Not separated. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage.	•Alternative storage. •Alternative contractor. •Alternative disposal. •Improved monitoring. •Effective security protocol. •Increased collection frequency.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Hardened Sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Total volume hazardous waste is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Hardened sludge is stored in various containers, including 210 litre drums and IBC containers, at various source locations and the waste management facility. The removal of sludge does not occur pro-actively or as per a procedure. It is removed by a supersucker on an ad hoc basis when the risks are acknowledged and/or materialise.	•Contained storage.	•Infrequent removal from generators and/or mine. •Not monitored (separately). •Poor management.	•Improved management. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Contaminated soil not suitable for bioremediation (due to levels of contamination)	Unknown	Not monitored	Contaminated soil is stored in various containers, including 210 litre drums and IBC containers, at various source locations and the waste management facility. It is not currently removed from the mine.	•Contained storage.	•Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction.	•Improved monitoring. •Alternative disposal. •Dilution of contaminants. •Alternative treatment technology. •Volume reduction. •Increased collection frequency. •Training. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Launder grease	Unknown	Not monitored	Launder grease is stored in 210 litre drums or skips in the waste management facility. It is not currently removed from the mine.	•Contained storage.	•Not monitored (separately). •Infrequent removal from generators and/or mine.	•Alternative treatment technology. •Improved separation. •Alternative disposal. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Medical waste	Unknown	Up to 5m ³ incinerated per month (combination of medical and sanitary waste)	Medical waste is stored in waste boxes and containers (provided by the waste contractor) at the Wellness Centre prior to removal by the contractor for incineration at a licensed facility.	•Licensed process (e.g. disposal). •Separated. •Contained storage. •Cost effective.	•Not monitored. •Infrequent removal from generators and/or mine.	•Alternative contractor. •Improved monitoring. •Increased collection frequency. •Effective security protocol.	•Unreliable contractors. •Accumulation of waste. •Diamond control risk - Security. •Unlawful conduct by waste managers (generators, operators and contractors).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume /removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable hazardous solids	Sanitary waste generated in bathrooms and 'SHE' bins	Unknown	Up to 5m ³ incinerated per month (combination of medical and sanitary waste)	Sanitary waste is stored in waste boxes and containers (provided by the waste contractor) at the Wellness Centre prior to removal by the contractor for incineration at a licensed facility.	<ul style="list-style-type: none"> Licensed process (e.g. disposal). Separated. Contained storage. Cost effective. 	<ul style="list-style-type: none"> Not monitored. Infrequent removal from generators and/or mine. 	<ul style="list-style-type: none"> Alternative contractor. Improved monitoring. Increased collection frequency. Effective security protocol. 	<ul style="list-style-type: none"> Unreliable contractors. Accumulation of waste. Diamond control risk - Security. Unlawful conduct by waste managers (generators, operators and contractors).
Non-recyclable hazardous solids	Fluorescent tubes, mercury vapour lamps and sodium lamps	Unknown	Not monitored	Crushed tubes are stored in 210 litre drums at electrical workshops and the waste management facility. They are not currently removed from the mine.	<ul style="list-style-type: none"> Contained storage. Separated. Volume reduced. 	<ul style="list-style-type: none"> Infrequent removal from generators and/or mine. Not recycled. Not monitored. Risk to the environment. 	<ul style="list-style-type: none"> Procurement alternatives. Recyclable. Alternative disposal. Alternative storage. Improved monitoring. Increased collection frequency. Effective security protocol. Training. 	<ul style="list-style-type: none"> Health risk. Accumulation of waste. Diamond control risk - Security. Inadequate use of waste management resources (travel, landfill air space, storage space etc.). Unlawful conduct by waste managers (generators, operators and contractors).
Non-recyclable hazardous solids	Chemical containers with redundant chemicals - Solid	Unknown	Not monitored	The containers are stored at source and the waste management facility and are currently not removed from the mine.	<ul style="list-style-type: none"> Contained storage. 	<ul style="list-style-type: none"> Not monitored. Infrequent removal from generators and/or mine. No consequence management for poor waste management performance. Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> Improved monitoring. Volume reduction. Return policy. Alternative storage. Increased collection frequency. Effective security protocol. 	<ul style="list-style-type: none"> Accumulation of waste. Diamond control risk - Security. Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable hazardous solids	Electronic waste	Unknown	Not monitored	Electronic waste is stored at source and the waste management facility and is currently not removed from the mine.	<ul style="list-style-type: none"> Contained storage. Separated. 	<ul style="list-style-type: none"> Not monitored. Infrequent removal from generators and/or mine. Not recycled. No volume reduction. Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> Recyclable. Alternative treatment technology. Revenue generating (e.g. auction). Alternative contractor. Alternative storage. Volume reduction. Improved monitoring. Increased collection frequency. Return policy. Effective security protocol. 	<ul style="list-style-type: none"> Accumulation of waste. Diamond control risk - Security. Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable hazardous solids	Sandblasting grit	Unknown	Not monitored	Sandblasting grit is stored at source and is currently not removed from the mine.	None.	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment. •Not characterised in terms of hazard rating. •No consequence management for poor waste management performance. •Inadequate, ineffective or impractical storage. •Poor management. 	<ul style="list-style-type: none"> •Alternative storage. •Re-use. •Alternative contractor. •Improved monitoring. •Alternative disposal. •Improved legal compliance. •Improved management. •Increased collection frequency. •Waste characterisation. •Effective security protocol. 	<ul style="list-style-type: none"> •Water pollution (ground and surface water). •Soil pollution. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.). •Unlawful conduct by waste managers (generators, operators and contractors).
Non-recyclable hazardous solids	Incinerator ash	Unknown	Not monitored	Stored in skips at the waste management facility and not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Not characterised in terms of hazard rating. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Waste characterisation. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

3.2.4 Waste Stream Process Flows and SWOT analysis – Red Areas

3.2.4.1 Recyclable and non-recyclable general waste

Paper, plastic and cardboard gets incinerated in the Red Area incinerator. Cans and glass are stored in the Red Area and are not removed from the Red Area or mine.



Current challenges however (weaknesses) entail:

- Build-up of non-incinerated waste as a result of security constraints with the scanning of waste prior to removal;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.



<p>Paper and cardboard:</p> <ul style="list-style-type: none"> • All paper (shredded or sheets) • Small cardboard • Milk boxes • Newspaper • Magazines • Small boxes 	<p>Cans:</p> <ul style="list-style-type: none"> • Cooledrink cans • Rinsed foodstuff cans • Coffee cans • No aerosol cans
<p>Wet waste (food):</p> <ul style="list-style-type: none"> • Left over food • Meat • Vegetables and Fruit • Bread • Tea bags 	<p>Other domestic:</p> <ul style="list-style-type: none"> • Foil • Polystyrene • Black bags • Redundant stationary • General waste not included in the recyclable bins • Non-recyclable green waste
<p>Glass:</p> <ul style="list-style-type: none"> • Glass bottles • Glass containers • Glasses <p>Excludes:</p> <ul style="list-style-type: none"> • Window glass 	<p>Green waste:</p> <ul style="list-style-type: none"> • Grass • Branches • Stems
<p>All plastics:</p> <ul style="list-style-type: none"> • Plastic bottles • Plastic containers • Plastic bags • Plastic container caps and lids <p>Excludes:</p> <ul style="list-style-type: none"> • Black bags 	<p>Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets ✓</p> <p>Skip </p> <p>Drum/ container </p> <p>Stockpile </p>

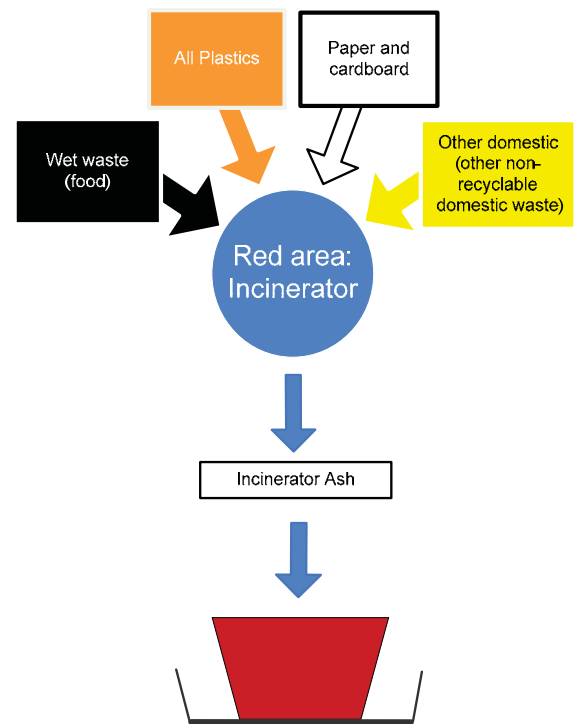
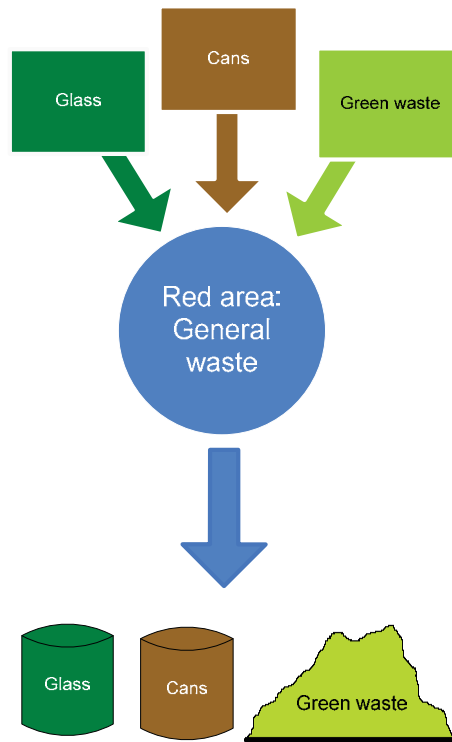


Figure 12: Current general waste process flow in the Red Area

Table 12: SWOT Analysis of general waste in the Red Area

Waste Type and Category	Waste stream	Volumes monthly generated during 2012 (maximum volume removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable general waste	Paper	Unknown	Total volume of waste incinerated is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> •Separated. •Licensed process (e.g. disposal). •Regular removal from generators and/or mine. •Volume reduced. •Risk to the environment. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored (separately). 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Improved monitoring. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Air pollution. •Unlawful conduct by waste managers (generators, operators and contractors).
Recyclable general waste	Plastic	Unknown	Not monitored	Incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> •Separated. •Licensed process (e.g. disposal). •Regular removal from generators and/or mine. •Volume reduced. •Risk to the environment. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored (separately). 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Improved monitoring. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Air pollution. •Unlawful conduct by waste managers (generators, operators and contractors).
Recyclable general waste	Cardboard	Unknown	Total volume of waste incinerated is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> •Separated. •Licensed process (e.g. disposal). •Regular removal from generators and/or mine. •Volume reduced. •Risk to the environment. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored (separately). 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Improved monitoring. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Air pollution. •Unlawful conduct by waste managers (generators, operators and contractors).
Recyclable general waste	Cans	Unknown	Not monitored	Cans are stored in the Red Area and are not removed from the Red Area or mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Volume reduction. •Revenue generating (e.g. auction). •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable general waste	Glass	Unknown	Not monitored	Glass is stored in the Red Area and is not removed from the Red Area or mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Volume reduction. •Revenue generating (e.g. auction). •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable general waste	Food waste	Unknown	Total volume of waste incinerated is captured in "Monitoring and Measurement" spreadsheet on a monthly basis.	Incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> •Separated. •Licensed process (e.g. disposal). •Regular removal from generators and/or mine. •Volume reduced. •Risk to the environment. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored (separately). 	<ul style="list-style-type: none"> •Recyclable. •Alternative treatment technology. •Improved monitoring. •Volume reduction. •Effective security protocol. •Increased collection frequency. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Air pollution. •Unlawful conduct by waste managers (generators, operators and contractors).
Non-recyclable general waste	Green waste	Unknown	Not monitored	Stored within the red area and periodically burned (once couple of years)	<ul style="list-style-type: none"> •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Risk to the environment. •Inadequate, ineffective or impractical storage. •No consequence management for poor waste management performance. 	<ul style="list-style-type: none"> •Recyclable. •Alternative treatment technology. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Air pollution. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.) •Unlawful conduct by waste managers (generators, operators and contractors).

3.2.4.2 Recyclable Industrial

- Used screen panels are stacked in the red area and are not currently removed from the mine;
- Metal is stockpiled and ad hoc removals for recycling occurs through the waste contractor;
- Conveyor belts are stored and are not currently removed from the area;
- Hard hats, safety boots and overalls are stored and not removed from the mine; and
- Cables are stored and not removed from the red area.




Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.



Steel: <ul style="list-style-type: none"> • Scrap steel • Steel waste 	Wood and large cardboard Other industrial waste: <ul style="list-style-type: none"> • Hard hats • Used screen panels • Water containers • Furniture • Cables • Safety boots • Overalls
Electronic waste: <ul style="list-style-type: none"> • Redundant • Computer components • Radios • ICs 	Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets ✓
Rubber: <ul style="list-style-type: none"> • Conveyor belts • Rubber • Rubber lined steel 	
Skip 	
Stockpile 	
Wooden crates 	

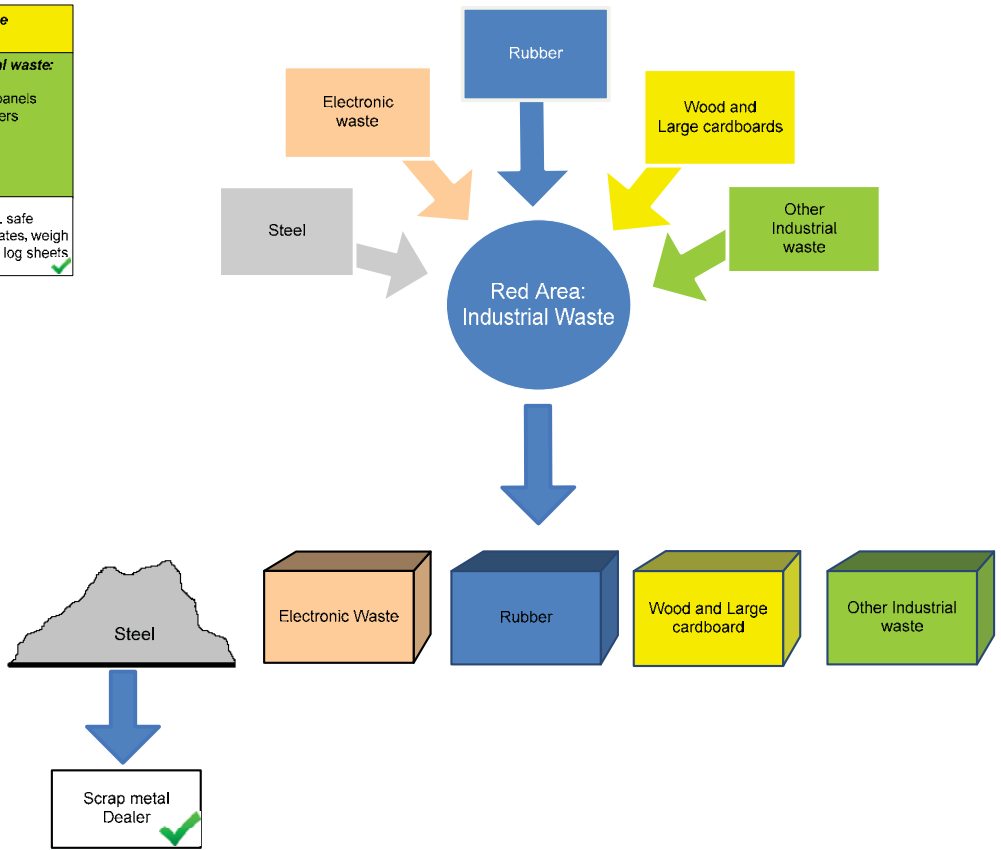


Figure 13: Current industrial waste process flow in the Red Area

Table 13: SWOT Analysis of industrial waste in the Red Area

Waste Type and Category	Waste stream	Volumes monthly generated during 2012 (maximum volume removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable Industrial	Used Screen Panels	Unknown	Not monitored	Used screen panels are stacked in the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Return policy. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Industrial	Building rubble, demolition and construction waste	Unknown	Not monitored	The waste is stockpiled in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Not re-used. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Re-useable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Ferrous and non-ferrous metals	Unknown	Not monitored	Metal is stockpiled in the red area and ad hoc removals for recycling occurs through the waste contractor.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. (separately). •No volume reduction. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Volume reduction. •Revenue generating (e.g. auction). •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Conveyor belting	Unknown	Not monitored	Conveyor belts are stored in the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not re-used. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Re-useable. •Alternative storage. •Volume reduction. •Revenue generating (e.g. auction). •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Hard hats	Unknown	Not monitored	Hard hats are stored in the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative storage. •Volume reduction. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Safety boots	Unknown	Not monitored	Safety boots are stored in the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. •Social donation programme. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated during 2012 (maximum volume removed)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable Industrial	Overalls	Unknown	Not monitored	Overalls are stored in the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not re-used. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Re-usable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Industrial	Cabling	Unknown	Not monitored	Cables are stored in the Red Area and are not currently removed from the Red Area or mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Not separated. •No volume reduction. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Volume reduction. •Alternative treatment technology. •Improved monitoring. •Improved separation. •Revenue generating (e.g. auction). •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).



3.2.4.3 Building waste, construction waste and demolition waste

Building rubble, demolition and construction waste is stockpiled in the designated Red area and is not currently removed from the mine.

Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.



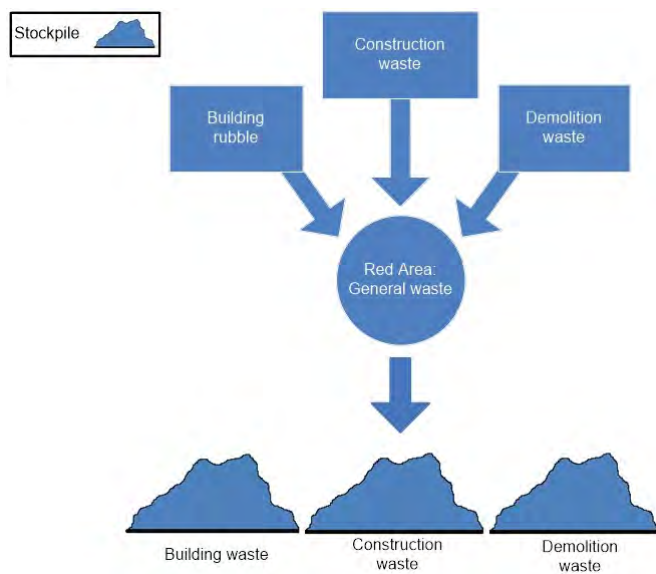


Figure 14: Current process flow for building, construction and demolition waste in the Red Area

Table 14: SWOT Analysis of building, construction and demolition waste in the Red Area

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable Industrial	Building rubble, demolition and construction waste	Unknown	Not monitored	The waste is stockpiled in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not monitored. •Not re-used. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Re-useable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

3.2.4.4 Recyclable Hazardous Solids

- Batteries (sealed or unsealed) are stored within the red area on a concrete slab;
- Used Ink cartridges are stored within the red area and are not currently removed from the mine; and
- Empty chemical containers are also accumulating in the red area.

Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.

3.2.4.5 Recyclable Hazardous Liquid

Used oil is stored in 210 litre drums within the red area and is not currently removed from the area.

Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;



- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.

3.2.4.6 Non-recyclable Hazardous Solid

- Contaminated soil is stored in the Red Area and is not removed from the Red Area or mine;
- Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers are stored in drums in the red area and is not currently removed from the mine;
- Contaminated spillsorb is stored in various containers, including 210 litre drums, in the red area and is not currently removed from the area;
- Fluorescent tubes, Mercury Vapour lamps and Sodium lamps is stored in open 210 litre drums in the red area and is not currently removed from the area;
- Containers are stacked in the chemical store and are not currently removed from the area; and
- Electronic waste is stored in the red area and is not currently removed from the area.

Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.



Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.

3.2.4.7 Non-recyclable Hazardous Liquid

Grease is stored in 210 litre drums within the red area and is not currently removed from the area; Containers are stacked in the chemical store and are not currently removed from the mine.






Current challenges however (weaknesses) entail:

- Build-up of waste;
- Inadequate, ineffective or impractical storage areas;
- The fact that the storage areas do not meet the structural requirements of GN R. 634 pertaining to the storage and management of waste; and
- The storage area is not licensed or registered for certain activities that require formal authorisation from the waste management authorities.

Improvement opportunities are in:

- Preventing a build-up of waste;
- Addressing security constraints by changing the waste removal protocol in conjunction with mine security;
- Upgrading storage areas to be within legal requirements and to handle the waste load adequately and sufficiently;
- Become legal compliant through the structural upgrades to salvage yard infrastructure in order to meet GN R. 634 requirements; and
- Obtain a waste permit in terms of the NEM:WA requirements.



<p>Recyclable hazardous solid waste:</p> <ul style="list-style-type: none"> • Used ink cartridges • Empty oil drums • Empty oil or chemical containers • Sealed and unsealed batteries • 210L oil drums • Oil rags • Oil filters • Fluorescent tubes, mercury vapour lamps and sodium lamps 	<p>Non-recyclable hazardous solid waste:</p> <ul style="list-style-type: none"> • Sanitary waste • Contaminated spillsorb • Hardened sludge • Contaminated soil (non-bioremediable) • Launder grease • Material contaminated with oil, diesel or grease • Sandblasting grit • Incinerator ash • Electronic waste • Empty chemical containers • Chemical containers with redundant chemicals • Battery acid
<p>Non-recyclable hazardous liquid waste:</p> <ul style="list-style-type: none"> • Grease • Hydrocarbon sludge • Battery acid 	<p>Recyclable hazardous liquids:</p> <ul style="list-style-type: none"> • Used cooking oil • Used oil
<p>Incinerator Ash:</p> <ul style="list-style-type: none"> • Incineration of • Paper • Cardboard • Plastics • Domestic waste • Food waste 	<p>Collect data e.g. safe disposal certificates, weigh bridge slips and logsheets</p>
<p>Skip</p> 	
<p>Drum/ container</p> 	
<p>IBC Container</p> 	
<p>Batteries</p> 	

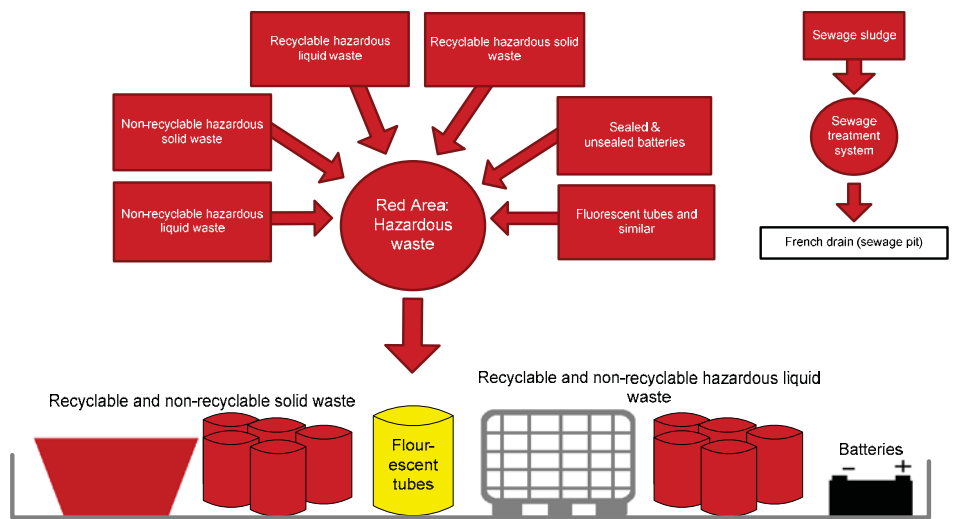


Figure 15: Current hazardous waste process flow in the Red Area

Table 15: SWOT Analysis of hazardous waste in the Red Area

Waste Type and Category	Waste stream	Volumes monthly generated /removed (maximum volume during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Recyclable hazardous solids	Batteries (sealed or unsealed)	Unknown	Not monitored	Stored within the red area on a concrete slab	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Procurement alternatives. •Return policy. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Water pollution (ground and surface water). •Soil pollution. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Hazardous - Liquid	Used oil	Unknown	Not monitored	Used oil is stored in 210 litre drums within the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Liquid	Grease	Unknown	Not monitored	Grease is stored in 210 litre drums within the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Liquid	Chemical containers with redundant chemicals - Liquid	Unknown	Not monitored	Containers are stacked in the chemical store and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Alternative disposal. •Alternative storage. •Improved monitoring. •Return policy. •Procurement alternatives. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Solid	Contaminated soil not suitable for bioremediation (due to levels of contamination)	Unknown	Not monitored	Contaminated soil is stored in the Red Area and is not removed from the Red Area or mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative treatment technology. •Alternative disposal. •Alternative storage. •Improved monitoring. •Volume reduction. •Increased collection frequency. •Effective security protocol. •Dilution of contaminants. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable Hazardous - Solid	Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers	Unknown	Not monitored	The material is stored in drums in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not recycled (oil filters and oil rags). •Not monitored. •Infrequent removal from generators and/or mine. •Not separated. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable (oil filters and oil rags). •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Solid	Contaminated spilloresorb	Unknown	Not monitored	Contaminated spilloresorb is stored in various containers, including 210 litre drums, in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Solid	Fluorescent tubes, Mercury Vapour lamps and Sodium lamps	Unknown	Not monitored	The material is stored in open 210 litre drums in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. •Volume reduced. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Risk to the environment. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. •Procurement alternatives. 	<ul style="list-style-type: none"> •Health risk. •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Hazardous - Solid	Used Ink cartridges	Unknown	Not monitored	Used Ink cartridges are stored within the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. •Return policy. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Hazardous - Solid	Empty chemical containers	Unknown	Not monitored	Containers are stacked in the chemical store and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. •No volume reduction. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Volume reduction. •Improved monitoring. •Procurement alternatives. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

Waste Type and Category	Waste stream	Volumes monthly generated (maximum volume removed during 2012)	Monitoring and Reporting	Current waste management practice	Strengths	Weaknesses	Opportunity	Threat
Non-recyclable Hazardous - Solid	Chemical containers with redundant chemicals - Solid	Unknown	Not monitored	Containers are stacked in the chemical store and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not monitored. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Alternative disposal. •Alternative storage. •Improved monitoring. •Return policy. •Procurement alternatives. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Non-recyclable Hazardous - Solid	Electronic waste	Unknown	Not monitored	Electronic waste is stored in the red area and is not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. •Separated. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •No volume reduction. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).
Recyclable Hazardous - Solid	Empty oil drums	Unknown	Not monitored	Empty drums are stored and re-used within the red area and are not currently removed from the mine.	<ul style="list-style-type: none"> •Contained storage. 	<ul style="list-style-type: none"> •Not recycled. •Not monitored. •No volume reduction. •Infrequent removal from generators and/or mine. •Inadequate, ineffective or impractical storage. 	<ul style="list-style-type: none"> •Recyclable. •Alternative disposal. •Alternative storage. •Improved monitoring. •Increased collection frequency. •Procurement alternatives. •Volume reduction. •Effective security protocol. 	<ul style="list-style-type: none"> •Accumulation of waste. •Diamond control risk - Security. •Inadequate use of waste management resources (travel, landfill air space, storage space etc.).

3.3 Current Legal Status

3.3.1 Legal Requirements

Hazardous Substances Act (Act No. 15 of 1973)

- (1) The Hazardous Substances Act (15 of 1973) is regulated by the Department of Health. The Act and its regulations regulate the transportation of defined hazardous substances (including hazardous waste) and also the disposal of containers of Group 1.

Occupation Health and Safety Act (Act No. 85 of 1993)

- (1) The Occupational Health and Safety Act (OHSA) (85 of 1993) is regulated by the Department of Labour. Sections under the act that are applicable to the industry include:
- a) The amendment GN 1179 of 25 August 1995 - regulations for hazardous chemical substances (HCS).
 - b) Regulation 15: Provisions for the recycling, safe handling and disposal of HCS waste, as well as Personal Protective Equipment (PPE) requirements and requirements for contracts with waste management service providers.
 - c) Industries need to ensure that waste activities and waste management procedures consider the requirements of this regulation as far as is reasonably practicable. Industries also need to ensure that if bulk storage tanks are stored on site, and the materials are of a hazardous nature, that they are compliant in terms of the Major Hazardous Installations Regulations within the OHS Act of 1993.

National Environmental Management: Waste Act (Act No. 59 of 2008) NEM: WA

- (1) The NEM:WA gives effect to the White Paper on Integrated Pollution Control and Waste Management. The act is regulated by the DEA and provincial environmental departments. Waste management provisions include:
- a) The licensing of waste management activities.
 - b) The act contains definitions of waste that will replace existing legislation incl. ECA.
 - c) The waste management activities will be published by the MEC that will require a waste management license.
 - d) Standards will be published for the separation, treatment, processing, transformation and disposal of waste.
 - e) The MEC may require any person/industry to prepare and submit an industry waste management plan.
 - f) Aims to provide better regulation of contaminated land matters.
 - g) Provides definitions of contaminated land - Relates to background concentrations, unlike the 'Minimum Requirements', and does not refer to 'acceptable exposure:



- i) Contaminated sites may be declared by the MEC as Investigation Areas and may issue remediation orders.
- ii) Transfer of contaminated land may require authorisation - person to whom the land is being transferred would have to be willing and able to take responsibility for the remediation of the contamination.

(2) Section 30 – the contents of Industry WMPs, the information may include:

- i) The amount of waste that is generated.
- ii) Measures to prevent pollution or ecological degradation.
- iii) Targets for waste minimisation through waste reduction, re-use, recycling and recovery.
- iv) Measures or programmes to minimise the generation of waste and the final disposal of waste.
- v) Measures or actions to be taken to manage waste.
- vi) The phasing out of specified substances.
- vii) Opportunities for reduction of waste generation through changes to packaging, product design or production processes.
- viii) Mechanisms for informing the public of the impact of the waste generating products or packaging on the environment
- ix) The extent of any financial contribution to be made to support consumer-based waste reduction programmes.
- x) The period that is required for implementation of the plan.
- xi) Methods for monitoring and reporting.
- xii) Any other matter that may be necessary to give effect to the objects of the Act.

National Environmental Management Act (2004) NEMA

(1) The National Environmental Management Act is regulated by DEA. Sections under the act that are applicable to the industry include:

- a) Section 2: National Environmental Management Principles.
- b) Section 28: Duty of care and remediation of environmental damage.
- c) Section 30: Control of emergency incidents.
- d) The amendment GN R. 385 (2006) which describes the process to obtain a waste management licence.

Norms and standards

- (GN 634, GN 635, GN 636, GN 921 and GN 926)



GNR. 634 of 23 August 2013: NEMWA: Waste Classification and Management Regulations

Regulation 4: Waste Classification

- (1) Waste listed in Annexure 1 does not require classification (see below).
- (2) Waste generators must classify waste i.t.o. SANS 10234 within 180 days of 23 August 2013.
- (3) Waste must be separated (not mixed) for purpose of classification.
- (4) Waste must be re-classified every 5 years or within 30 days if process or activity generating the waste is changed.
- (5) Waste subjected to treatment must be re-classified.

Regulation 5: Safety Data Sheets

- (1) Generators of hazardous waste must ensure that MSDS' are prepared i.t.o. SANS 10234
- (2) This doesn't apply to waste generators listed in (2)(b) of Annexure 1 provided that the MSDS' are prepared i.t.o. SANS 10234 for the product the waste originates from and reflects the details of the specific hazardous waste(s) or chemical(s) in the waste.
- (3) Is also not required for generators of waste in (2)(b)(iii) of Annexure 1.
- (4) Every holder of hazardous waste must be in possession of the MSDS' for the waste.

Regulation 6: General

- (1) Waste transporters and managers may not accept unclassified waste, except for Annexure 1 waste.
- (2) May not dilute waste to reduce the concentration of its constituents for the purpose of classification.
- (3) Containers/storage impoundments holding waste must be labelled. If not possible, the following records must be kept:
 - a) date that waste was placed into container.
 - b) last date on which waste was placed into container before being sealed/closed.
 - c) dates when and quantities of waste added and removed from container/storage impoundment.
 - d) the category or categories of waste in the container or storage impoundment.
 - e) the classification of the waste.
- (4) Must re-use, recycle, recover, treat and/or dispose waste within 18 months of generation.
- (5) Waste managers must not store waste longer than 18 months from receipt of the waste from the generator.
- (6) Re-use, recycling, recovery, treatment or disposal of waste stored in existing facilities before 23 August 2013 must commence by 23 August 2018 (5 years).

Regulation 7: Waste Treatment



- (1) May not mix or treat waste where it would:
 - a) decrease potential for re-use, recycling or recovery.
 - b) result in uncontrolled or unpermitted treatment.
- (2) Notwithstanding Regulations 6(2) and 7(1), waste may be blended or pre-treated to:
 - c) enable potential for re-use, recovery, recycling or treatment.
 - d) reduce the risk of management of the waste.

Regulation 8: Waste Disposal to Landfill

- (1) Ensure waste is assessed i.t.o the Norms and Standards for Assessment of Waste to Landfill Disposal [7(1) of NEMWA] before disposal to landfill (b) & (c) Ensure disposal of waste to landfill in accordance with the Norms and Standards of Waste to Landfill i.t.o. section 7(1) of NEMWA (applies to waste generators and managers).
- (2) & (3) This excludes:
 - a) generators of waste i.t.o. (2)(a) and (b) of Annexure 1.
 - b) generators of business waste collected by the municipality.

Regulation 10: Records of Waste Generation and Management

- (1) Must keep accurate and up to date records of waste management, including:
 - a) waste classification.
 - b) quantity of waste generated.
 - c) quantities of waste re-used, recycled, recovered, treated or disposed of.
 - d) by whom the waste was managed.
- (2) This excludes waste listed in Annexure 1.
- (3) Records must be kept for at least 5 years and provided to the Department upon request.

Regulation 11: Waste Manifest System

- (1) & (2) Every holder or generator of waste classified as hazardous i.t.o. Regulation 4(2) or listed i.t.o. item 2(b) of Annexure 1 must complete a waste management document i.t.o. (2)(a) of Annexure 2 for each consignment of waste transported to a waste management facility.
- (3) Does not apply where waste generator is also the waste manager (on the same premises).
- (4) Waste transporters may not accept hazardous waste or waste listed i.t.o. item 2(b) of Annexure 1 without a waste manifest document accompanying the waste.
- (5) Transporters of hazardous waste or waste listed i.t.o. item 2(b) of Annexure 1 must:
 - a) complete a waste manifest for each consignment of waste transported.
 - b) provide the information to the generator before removing the waste from the generator's premises.
 - c) provide the information to the waste manager upon delivery of the waste at the waste management facility.



- (6) Waste managers may not accept hazardous waste or waste listed i.t.o. item 2(b) of Annexure 1 unless a waste manifest document accompanies the waste.
- (7) All waste managers of hazardous waste or waste listed i.t.o. item 2(b) of Annexure 1 must complete the waste manifest document.
- (8) All waste generators, transporters and managers must retain copies of the manifest documentation for at least 5 years and make the documents available to the Department upon request.

Regulation 12: Implementation and Transitional Provisions

- (1) Waste classified i.t.o. the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste prior to 23 August 2013 must be:
 - a) re-classified i.t.o. Regulation (4)(2) within 3 years of commencement of these Regulations (23 August 2013).
 - b) assessed i.t.o. Regulation 8(1)(a) if the waste is to be disposed to landfill, within 3 years of commencement of these Regulations (23 August 2013).
- (2) Waste produced prior to 23 August 2013, but which has not been classified by this date must be:
 - c) classified i.t.o. Regulation (4)(2).
 - d) assessed i.t.o. Regulation 8(1)(a) if the waste is to be disposed to landfill, within 18 months of commencement of these Regulations (23 August 2013).
- (3) Regulations 4(2) and 6(1) don't apply for 3 years from 23 August 2013 provided that the waste was classified i.t.o. the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.
- (4) Regulation 4(2) doesn't apply for 18 months from 23 August 2013 provided the waste has been generated, but not classified prior to commencement of these Regulations (23 August 2013).
- (5) Subject to subregulation 6, Regulation 6(3) must be complied within 1 year from 23 August 2013.
- (6) Regulation 6(3)(e) doesn't apply for a period of:
 - a) 3 years from 23 August 2013 provided that the waste was classified i.t.o. the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste classified prior to commencement of these Regulations (23 August 2013), and the classification is shown in the labelling or records required i.t.o. Regulation 6(3).
 - b) 3 years from 23 August 2013 provided that an alternative classification of the waste was approved by the DWA or DEA prior to commencement of these Regulations (23 August 2013), and the classification is shown in the labelling or records required i.t.o. Regulation 6(3).
- (7) Regulation 6(6) doesn't apply to waste that has been or that is being treated by micro-encapsulation approved by the DWA or DEA.
- (8) Regulation 8(8) doesn't apply for a period of:
 - a) 3 years from 23 August 2013 provided that the waste was classified i.t.o. the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste classified prior to commencement of these Regulations (23 August 2013).



- b) 3 years from 23 August 2013 provided that an alternative classification of the waste was approved by the DWA or DEA prior to commencement of these Regulations (23 August 2013).
- (9) Regulations 10 & 11 take effect 1 year from commencement of these Regulations (23 August 2013).
- (10) The requirements of Regulations 10 & 11 apply to waste that was classified i.t.o. the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste classified prior to commencement of these Regulations (23 August 2013).

Regulation 13: Offences and Penalties

- 1) A person is guilty of an offence if that person:
 - a) fails to comply with Regulations 4(2), (3), (4), (5), (6), 5, 6, 7(1), 8(1), 10(1), 10(3), 11(1), (2), (4), (5), (6), (7), (8) or 12.
 - b) provides incorrect or misleading information.
- 2) A person convicted of an offence under subregulation (1)(a) is liable to a fine not exceeding R10 million or imprisonment for no longer than 10 years, or both.
- 3) A person convicted of an offence under subregulation (1)(b) is liable to a fine not exceeding R20 000 or imprisonment for no longer than 1 year, or both.

Annexure 1: Wastes that do not require Classification or Assessment

- (2) (a) General waste:
 - i) Domestic waste.
 - ii) Business waste not containing hazardous -waste or –chemicals.
 - iii) Non-infectious animal carcasses.
 - iv) Garden waste.
 - v) Waste tyres.
 - vi) Building and demolition waste not containing hazardous -waste or –chemicals.
 - vii) Excavated earth material not containing hazardous -waste or –chemicals.
- (2) (b) Hazardous waste:
 - i) Waste products: Asbestos waste; PCB waste or PCB containing waste (<50mg/kg or 50ppm); and Expired, spoilt or unusable hazardous products.
 - ii) Mixed waste: General waste, excluding domestic waste, that contains hazardous -waste or -chemicals; and Mixed, hazardous chemical wastes from analytical laboratories and laboratories from academic institutions in containers less than 100 litres.
 - iii) Other: Health Care Risk Waste (HCRW).



The current waste management operations were assessed against these legal requirements. Observations were noted in order to give direction towards improving the Mine's legal compliance.

The table below is reflective of the assessment that was done.

Table 16: Legal requirements assessment

Relevant Legislation	Legal Requirement	Observations
WASTE MANAGEMENT		
TOPIC:	Duty of Care	
RELEVANT LEGISLATION:	National Environmental Management Act (NEMA), Act 107 of 1998 National Environmental Management: Waste Act (NEMWA), Act 59 of 2008 Mineral And Petroleum Resources Development Regulations, GNR 527 OF 23 APRIL 2004	
NEMA, section 28 NEMWA, section 16	<u>General duty of care in respect of waste management</u> The mine operation as the generator and holder of waste must, within its power, take all reasonable measures to: <ul style="list-style-type: none"> • avoid the generation of waste and, where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated; • reduce, re-use, recycle and recover waste; • where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; • manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts; • prevent any employee or any person under his or her supervision from 	<u>Observation 1</u> By not abiding by the prescribed National norms and standards for waste management, it may be interpreted by external parties or governing authorities that the mine is neglecting its duty of care responsibility pertaining to waste.

	<p>contravening the NEMWA; and</p> <ul style="list-style-type: none"> • prevent the waste from being used for an unauthorised purpose. 	
TOPIC:	Waste classification	
RELEVANT LEGISLATION:	National Environmental Management: Waste Act (NEMWA), Act 59 of 2008	
<p>Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013); and</p> <p>SANS 10234</p>	<p><u>Hazard categories</u></p> <p>In terms of the Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013),</p> <p>"waste classification" means establishing-</p> <p><i>(a) whether a waste is hazardous based on the nature of its physical, health and environmental hazardous properties (hazard classes); and</i></p> <p><i>(b) the degree or severity of hazard posed (hazard categories);</i></p> <p>The regulation specify that waste must be kept separate for the purposes of classification and must not be mixed prior to classification.</p> <p>In terms of these Regulations all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation, except for wastes listed in Annexure 1 of these Regulations that do not require classification in terms of SANS 10234.</p> <p>Wastes listed in Annexure 1 of these regulations are:</p> <p><i>(2) (a) General waste-</i></p> <p><i>(i) Domestic waste;</i></p>	<p><u>Observation 2</u></p> <p>Waste streams generated at the mine has not yet been classified as per SANS 10234 as required in terms of the waste classification and management regulations (GN 634 of August 2013).</p>



	<p>(ii) Business waste not containing hazardous waste or hazardous chemicals; (iii) Non-infectious animal carcasses; (iv) Garden waste; (v) Waste packaging; (vi) Waste tyres; (vii) Building and demolition waste not containing hazardous waste or hazardous chemicals; and (viii) Excavated earth material not containing hazardous waste or hazardous chemicals.</p> <p>(2) (b) Hazardous waste-</p> <p>(i) Waste Products: Asbestos Waste; PCB waste or PCB containing waste (> 50 mg/kg or 50 ppm); and Expired, spoilt or unusable hazardous products.</p> <p>(ii) Mixed Waste: General waste, excluding domestic waste, which contains hazardous waste or hazardous chemicals; and Mixed, hazardous chemical wastes from analytical laboratories and laboratories from academic institutions in containers less than 100 litres.</p> <p>(iii) Other: Health Care Risk Waste (HCRW).</p>	
<p>Waste Classification and Management Regulations</p>	<p><u>Material Safety Data Sheets</u> Note that safety data sheets for waste listed in item (2)(b)(i) of Annexure 1 to</p>	<p><u>Observation 3</u> No SANS 10234 based Material Safety</p>

<p>(GG 36784, GN 634 of 23 August 2013) SANS 10234</p>	<p>these Regulations must be prepared in accordance with SANS 10234 for the product the waste originates from; and safety data sheets for waste listed in item (2)(b)(ii) of Annexure 1 to these Regulations must be prepared in accordance with SANS 10234 reflecting the details of the specific hazardous waste/s or hazardous chemical/s in the waste.</p> <p>Generators of waste listed in item (2)(b)(iii) of Annexure 1 to these Regulations do not have to prepare a safety data sheet for the waste.</p> <p>Every holder of hazardous waste, except waste listed in item (2)(b)(iii) of Annexure 1 to these Regulations, must be in possession of the safety data sheet/s for the waste referred to in sub-regulations (1) and (2).</p>	<p>Data Sheets have been compiled for the wastes generated at the mine and no MSDS's were compiled for wastes listed in item (2)(b)(i) in accordance with SANS 10234 for the product the waste originates from neither for waste listed in item (2)(b)(ii) reflecting the details of the specific hazardous waste/s or hazardous chemical/s in the waste.</p>
<p>Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)</p>	<p><u>Waste Manifest</u></p> <p>The above mentioned regulation also require that every holder of waste that has been classified as hazardous in terms of Regulation 4(2) of these Regulations or a waste that is listed in item (2)(b) of Annexure 1 to these Regulations, must be in possession of a waste manifest document containing the relevant information specified in Annexure 2 of the Regulations.</p>	<p><u>Observation 4</u></p> <p>No waste manifest, as per the new waste regulations (GG 36784 of 23 August 2013), is available for the mine.</p>
<p>TOPIC: Waste management</p>		
<p>RELEVANT LEGISLATION: National Environmental Management: Waste Act (NEMWA), Act 59 of 2008</p>		
<p>Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)</p>	<p><u>General</u></p> <p>(1) Waste transporters and waste managers must not accept waste that has not been classified in terms of Regulation 4 unless such waste is listed in Annexure 1 of these Regulations.</p>	<p><u>Observation 5</u></p> <p>Waste is currently collected by the waste contractor without the necessary waste classification information supposed to be provided by the waste generator (Venetia).</p>

	<p>(2) Waste must not be diluted solely to reduce the concentration of its constituents for the purposes of classification in terms of Regulation 4(2), or assessment of the waste in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act.</p> <p>(3) Any container or storage impoundment holding waste must be labelled, or where labelling is not possible, records must be kept, reflecting the following-</p> <p>(a) the date on which waste was first placed in the container;</p> <p>(b) the date on which waste was placed in the container for the last time when the container was filled, closed, sealed or covered;</p> <p>(c) the dates when, and quantities of, waste added and waste removed from containers or storage impoundments, if relevant;</p> <p>(d) the specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations, 2012; and</p> <p>(e) the classification of the waste in terms of Regulation 4 once it has been completed.</p> <p>(4) Waste generators must ensure that their waste is re-used, recycled, recovered, treated and/or disposed of within eighteen (18) months of generation.</p> <p>(5) Waste managers must not store waste for more than eighteen (18) months from the date of receipt from the waste generator.</p>	<p>Observation 6</p> <p>Waste containers are not labelled or recorded as required in terms of GN 634.</p>
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	(6) The re-use, recycling, recovery, treatment or disposal of waste stored in an existing facility prior to promulgation of these Regulations must be commenced with within five (5) years from the date of commencement of these Regulations.	
Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)	<p><u>Waste Treatment</u></p> <p>(1) Waste must not be mixed or treated where this would-</p> <p>(a) reduce the potential for re-use, recycling or recovery; or</p> <p>(b) result in treatment that is not controlled and not permanent.</p> <p>(2) Notwithstanding Regulations 6(2) and 7(1), waste may be blended or pre-treated to-</p> <p>(a) enable potential for re-use, recycling, recovery or treatment; or</p> <p>(b) reduce the risk associated with the management of the waste.</p>	
Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)	<p><u>Waste Disposal to Landfill</u></p> <p>(1) Unless otherwise directed by the Minister to ensure a better environmental outcome, or in response to an emergency so as to protect human health, property or the environment-</p> <p>(a) waste generators must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act prior to the disposal of the waste to landfill;</p> <p>(b) waste generators must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to</p>	<p><u>Observation 7</u></p> <p>Waste is currently disposed to landfill without being assessed in accordance with GN R. 635.</p>

	<p>Landfill set in terms of section 7(1) of the Act; and</p> <p>(c) waste managers disposing of waste to landfill must only do so in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act.</p> <p>(2) Subregulation (1)(a) applies to all waste generators, excluding-</p> <p>(a) generators of waste listed in items (2)(a) and (b) of Annexure 1 to these Regulations; and</p> <p>(b) generators of business waste that is collected by a municipality.</p> <p>(3) Subregulation (1)(b) applies to all waste generators, excluding-</p> <p>(a) generators of waste listed in item (2)(a) of Annexure 1 to these Regulations; and</p> <p>(b) generators of business waste that is collected by a municipality.</p>	
TOPIC:	Storage of waste	
RELEVANT LEGISLATION:	National Environmental Management: Waste Act (NEMWA), Act 59 of 2008	
National Norms and Standards for the storage of waste, GN 926 of 29 November 2013	<p><u>Registration of facility</u></p> <p>(1) A new waste storage facility must be registered with the competent authority within 90 (ninety) days prior to the construction taking place.</p> <p>(2) The applicant must provide at least the following information to be registered:</p> <p>(a) Demarcation of the area where the storage facility will be located;</p>	<p><u>Observation 8</u></p> <p>The salvage yard facility is currently not registered as per GN R. 926. and no registration form with supporting documentation have been supplied to the registration authority.</p>

	<p>(b) Name of the waste storage facility;</p> <p>(c) Name of the owner of the waste storage facility;</p> <p>(d) Types of waste to be stored at the facility;</p> <p>(e) Size of the storage facility;</p> <p>(f) Sources of waste to be stored at the facility;</p> <p>(g) Time frames for the storage of waste; and</p> <p>(h) Geographical co-ordinates of the waste storage facility.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Location of facility</u></p> <p>In locating the waste storage facility consideration must be given to the public health and environmental protection. The location of the waste storage facility must also take into consideration the requirements in respect of existing servitudes.</p> <p>(2) A new hazardous waste storage facility must be located within an industrial demarcated zone. A storage facility that is not located within the industrial demarcated zone must have a buffer zone of at least 100m unless there is a prescribed buffer zone by the relevant municipality.</p> <p>(3) A general waste storage facility may be located within a residential area and must be located such that the facility is easily accessible by the public.</p> <p>(4) A waste storage facility must be located in such a manner that it can provide optimum handling and transportation of waste material.</p> <p>(5) The location of the hazardous waste storage facility must also take into</p>	<p><u>Observation 9</u></p> <p>The salvage yard meets these requirements.</p>



	<p>consideration the hazards including the flammability and toxicity of the waste stored and applicable codes and standards.</p> <p>(6) A waste storage facility must be located in areas accessible by emergency response personnel and equipment.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Construction and Design of facility</u></p> <p>(1) Construction and development of the waste storage facility must be carried out under the supervision of a registered professional engineer and must be in accordance with the approved civil engineering designs. The plan must only be amended and approved by a registered professional engineer.</p> <p>(2) The liquid waste storage area must have firm, impermeable, chemical resistant floors and a roof. Liquid waste containers that are not stored under a roofed area must be coated to prevent direct sunlight and rain water from getting in contact with the waste.</p> <p>(3) A hazardous waste storage facility must have impermeable and chemical resistant floors.</p> <p>(4) A liquid waste storage facility must be surrounded by an interception trench with a sump for intercepting and recovering potential spills and must be lined in compliance with the requirements set out in paragraph 7(2) of these standards.</p> <p>(5) A waste storage facility must be constructed to maintain on a continuous basis a drainage and containment system capable of collecting and storing all runoff water arising from the storage facility in the event of a flood. The system must under the said rainfall event, maintain a freeboard of half a meter.</p>	<p><u>Observation 10</u></p> <p>Future alterations to the salvage yard must meet these requirements.</p>

	<p>(6) A liquid waste storage area must have a secondary containment system (e.g. bund, drip tray) of a capacity which can contain at least 110% of the maximum contents of the waste storage facility. Where more than one container or tank is stored, the bund must be capable of storing at least 110% of the largest tank or 25% of the total storage capacity, whichever is greater (in the case of drums the tray or bund size must be at least 25% of total storage capacity).</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Access Control and Notices to the facility</u></p> <p>(1) A waste storage facility must have effective access control to prevent unauthorised entry.</p> <p>Weatherproof, durable and legible signs in at least 3 (three) official languages applicable in the area must be displayed at each entrance to the facility. The signs must indicate the risks involved in entering the site, hours of operation, the name, address, telephone number and the person responsible for the operation of the facility as a minimum.</p> <p>(2) Access to a hazardous waste storage facility must be limited to employees who have been trained with respect to the operation of the hazardous waste storage facility and emergency response procedures and any other person authorised by the owner of the hazardous waste storage facility.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Operation of the facility</u></p> <p>(1) A waste storage facility must be free from odour or emissions at levels likely to cause annoyance.</p> <p>(2) Waste must be sorted at source into various categories (recyclables and</p>	<p><u>Observation 11</u></p> <p>Site signage at the salvage yard do not meet the requirements of GN R. 926.</p>

	<p>non-recyclables) and a documented procedure must be implemented to prevent any mixing of hazardous and general waste integrated waste management plan and/or Industry Waste Management Plan, if any.</p> <p>(4) A waste storage facility must be operated within its design capacity and the waste storage container must not be overfilled.</p> <p>(5) Liquid waste must be stored in leak resistant containers which must be inspected weekly for early detection of leaks.</p>	
<p>Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)</p>	<p><u>Labelling of waste containers and recording of stored waste</u></p> <p>(3) Any container or storage impoundment holding waste must be labelled, or where labelling is not possible, records must be kept, reflecting the following-</p> <p>(a) the date on which waste was first placed in the container;</p> <p>(b) the date on which waste was placed in the container for the last time when the container was filled, closed, sealed or covered;</p> <p>(c) the dates when, and quantities of, waste added and waste removed from containers or storage impoundments, if relevant;</p> <p>(d) the specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations, 2012; and</p> <p>(e) the classification of the waste in terms of Regulation 4 once it has been completed.</p> <p>(4) Waste generators must ensure that their waste is re-used, recycled, recovered, treated and/or disposed of within eighteen (18) months of</p>	<p><u>*Observation 6</u></p> <p>Waste containers are not labelled or recorded as required in terms of GN 634.</p>



	<p>generation.</p> <p>(5) Waste managers must not store waste for more than eighteen (18) months from the date of receipt from the waste generator.</p> <p>(6) The re-use, recycling, recovery, treatment or disposal of waste stored in an existing facility prior to promulgation of these Regulations must be commenced with within five (5) years from the date of commencement of these Regulations.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>General Requirements of Waste Storage Containers</u></p> <p>(1) A liquid waste container must be of sufficient strength and structural integrity to ensure that it is unlikely to burst or leak in its ordinary use.</p> <p>(2) Waste that is spilled or blown by wind during opening, handling or storage must be contained.</p> <p>(3) Hazardous waste must be stored in covered containers and only open when waste is added or emptied.</p> <p>(4) Below-ground pipes connected to the container must be protected from physical damage (e.g. excessive surface loading, ground movement or disturbance). If mechanical joints have to be used, they must be readily accessible for inspection.</p> <p>(5) A hazardous waste storage container, associated piping and equipment must be of sufficient structural strength to withstand normal handling and installed on stable foundation.</p> <p>(6) The foundation of a hazardous waste storage container must be protected from, or resistant to all forms of internal and external wear, vibration, corrosion,</p>	<p><u>Observation 12</u></p> <p>Hazardous waste skips/containers are not covered by a removable cover or lid as required in terms of GN R. 926.</p>



	<p>fire, heat, vacuum and pressure which might cause the storage tank foundation to fail.</p> <p>(7) A leak monitoring device must be installed on an underground liquid waste storage container and piping to and from the container in order to keep operating personnel informed.</p> <p>(8) If a container is lined or internally coated, the coating must be compatible with the substance stored. Furthermore the coating specification must adhere to existing engineering practices and the applicable standards or requirements.</p> <p>(9) The waste storage tank must be a closed system and pressure resistant.</p> <p>(10) In a case where a tank or vent pipe is not visible during the filling process an automatic overflow prevention device must be fitted onto the tank.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Minimum Requirements for above ground waste storage facilities</u></p> <p>(1) A hazardous waste container resting on the ground must be underlain by barriers, which will not deteriorate with permeability rate of the waste stored.</p> <p>(2) Bottoms of the container in contact with soil and are subject to corrosion must be protected from external corrosion by either ensuring that the container is made of corrosion resistant materials or the container have a cathodic protection system.</p> <p>(3) A waste storage tank must not have mechanical joints, except if it can be accessed for inspection.</p> <p>(4) The screw fitting or other fixed coupling fitted to the tank must be maintained in good condition and must only be used when filling the tank.</p>	



<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Minimum Requirements for underground waste storage containers</u></p> <p>(1) Underground waste storage container must have double walled and synthetic liners and underground vaults must be installed.</p> <p>(2) A steel underground tank and piping in contact with soil must be protected from corrosion using corrosion resistant materials or cathodic protection.</p> <p>(3) Container components that are placed underground and backfilled must be provided with a backfill material that is a non-corrosive, porous, homogeneous substance and that is installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.</p> <p>(4) If external coating is used to protect the tank from external corrosion, the coating must be fiberglass, reinforced, plastic, epoxy, or any other suitable dielectric material.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Training</u></p> <p>(1) Training must be provided continuously to all employees working with waste and to all contract workers that might be exposed to the waste.</p> <p>(2) The training programme must amongst others include the following:</p> <p>(a) Precautionary measures that need to be taken;</p> <p>(b) Procedures that the employees must apply to their particular type of work;</p> <p>(c) Procedures for dealing with spillages and accidents;</p> <p>(d) Appropriate use of protective clothing; and</p>	<p><u>Observation 13</u></p> <p>EMS training material is inadequate to address all the requirements of GN R.926</p>



	<p>(e) The risks of the hazardous substances to their health which they are likely to be exposed to.</p> <p>(3) A sufficient number of employees must receive training to cover for leave periods, absences due to illness, public holidays or any other reason.</p> <p>(4) An attendance register must be kept and signed by each employee at each training session and made available to the relevant authorities when required.</p> <p>(5) Only trained persons must be allowed to handle hazardous waste.</p>	
National Norms and Standards for the storage of waste, GN 926 of 29 November 2013	<p><u>Emergency Preparedness Plan</u></p> <p>(1) Waste can be hazardous or dangerous to the environment if not handled properly or if stored inappropriately. To minimise environmental impacts, a waste storage facility must have an emergency preparedness plan including the following:</p> <p>(a) Hazard identification;</p> <p>(b) Prevention measures;</p> <p>(c) Emergency planning;</p> <p>(d) Emergency response;</p> <p>(e) Remedial actions.</p> <p>(2) Immediate action must be taken to contain spillage and prevent it from entering storm water drains or environment.</p>	<p><u>Observation 14</u></p> <p>The emergency preparedness plan is inadequate to address all the requirements of GN R.926</p>
National Norms and	<u>Monitoring and Inspection</u>	<u>Observation 15</u>



<p>Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p>(1) Containers, tanks, valves and piping containing hazardous waste must be inspected for leaks, structural integrity and any sign of deterioration (e.g. corrosion or wearing of protective coatings) on a weekly basis.</p> <p>(2) A registered engineer must inspect tanks containing hazardous waste at least once per annum to check tank integrity, corrosion, piping, valves, bunding, and impermeability of the bund wall and bund floor.</p> <p>(3) The secondary containment system must be examined at least weekly or after each significant precipitation event to ensure that the containment is free of debris, rainwater and other materials that would compromise the capacity and integrity of the system.</p> <p>(4) Ventilation systems, sump pumps, emergency alarms, impressed current corrosion protection systems, level alarms and other mechanical systems must be inspected on a weekly basis to ensure proper functioning based on manufacturer recommendations, regulatory requirements or best practice.</p> <p>(5) Inspection must include the review of the adequacy and accessibility of spill response equipment.</p> <p>(6) If environmental pollution is suspected or is occurring from the waste storage facility, an investigation must be initiated into the cause of the problem or suspected problem and remedial action taken.</p>	<p>Weekly inspections of containers, alarms etc. as per GN R. 926. are not occurring.</p>
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Auditing</u></p> <p>Internal Audits</p> <p>(1) Internal audits must be conducted bi-annually and on each audit occasion an official report must be compiled by the relevant auditor to report the findings of</p>	<p><u>Observation 16</u></p> <p>New waste audit requirements needs to be incorporated into the EMS.</p>

	<p>the audits, which must be made available to the external auditor.</p> <p>External Audits</p> <p>(2) An independent external auditor must be appointed to audit the waste storage facility biennially and the auditor must compile an audit report documenting the findings of the audit, which must be submitted to the relevant authority.</p> <p>(3) The external audit report must-</p> <p>(a) specifically state whether conditions of these standards are adhered to;</p> <p>(b) include an interpretation of all available data and test results regarding the operation of the storage facility and all its impacts on the environment;</p> <p>(c) specify target dates for the implementation of the recommendations to achieve compliance;</p> <p>(d) contain recommendations regarding non-compliance or potential noncompliance and must specify target dates for the implementation of the recommendations and whether corrective action taken for the previous audit non conformities was adequate; and</p> <p>(e) show monitoring results graphically and conduct trend analysis.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Relevant Authority Audits and Inspections</u></p> <p>(1) The relevant authority responsible for waste management reserves the right to audit and/or inspect the waste storage facility without prior notification at any</p>	<p><u>Observation 17</u></p> <p>Any records or documentation pertaining management of the waste storage facility must be available to the relevant authorities</p>

	<p>time.</p> <p>(2) Any records or documentation pertaining management of the waste storage facility must be available to the relevant authorities upon request, as well as any other information which may be required.</p>	<p>upon request, as well as any other information which may be required.</p>
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Reporting</u></p> <p>(1) An emergency incident must be reported in accordance with section 30 of NEMA.</p> <p>(2) An action plan which includes a detailed time schedule, and resource allocation to address any incident must be signed off by the senior management of the organisation.</p> <p>(3) Complaints register and incident report must be made available to the external auditor and relevant authority.</p> <p>(4) Each external audit report must be submitted to the relevant authority within 30 days from the date on which the external auditor finalized the audit.</p>	
<p>National Norms and Standards for the storage of waste, GN 926 of 29 November 2013</p>	<p><u>Minimum Requirements during the Decommissioning Phase of storage facility</u></p> <p>(1) A waste storage facility to be discontinued, the site must be rehabilitated to the satisfaction of the relevant authority.</p> <p>(2) A rehabilitation plan for the site, including the indication of end use of the area must be developed and submitted to the DEA for approval not more than 1 (one) year prior to the intended closure of the facility.</p> <p>(3) The rehabilitation plan must indicate the following:</p>	<p><u>Observation 18</u></p> <p>Mine closure planning and associated financial provisioning needs to provide for the rehabilitation requirements as set out in GN R. 926.</p>

	<p>(a) measures for rehabilitating contaminated areas within the facility; and</p> <p>(b) manner in which the waste resulted from decommissioning activities will be managed.</p> <p>(4) The site must be rehabilitated according to such a plan.</p> <p>(5) The owner of the facility, including the subsequent owner of the facility will remain responsible for any adverse impacts on the environment, even after operations have ceased.</p>	
TOPIC:	Record keeping	
RELEVANT LEGISLATION:	National Environmental Management: Waste Act (NEMWA), Act 59 of 2008	
Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)	<p><u>Records of waste generation and management</u></p> <p>(1) Waste generators must keep accurate and up to date records of the management of the waste they generate, which records must reflect-</p> <p>(a) the classification of the wastes;</p> <p>(b) the quantity of each waste generated, expressed in tons or cubic metres per month;</p> <p>(c) the quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of; and</p> <p>(d) by whom the waste was managed.</p> <p>(2) Subregulation (1) does not apply to generators of waste listed in item (2)(a) of Annexure 1 to these Regulations.</p> <p>(3) The records contemplated in subregulation (1) must be-</p>	<p><u>Observation 19</u></p> <p>Venetia is not currently meeting the requirements in terms of waste record keeping for generated waste as per GN R.634</p>



	<p>(a) retained for a period of at least five (5) years; and</p> <p>(b) made available to the Department upon request</p> <p>Annexure 2: Waste Manifest System Information Requirements</p> <p>(1) The information specified in item 2 of this Annexure must be reflected in the waste manifest document required in terms of Regulation 11.</p> <p>(2) (a) Information to be supplied by the Waste Generator (Consignor)-</p> <p>(i) Unique consignment identification number;</p> <p>(ii) If applicable, the SAWIS Registration number in terms of the National Waste Information Regulations, 2012;</p> <p>(iii) Generator's contact details (contact person, physical & postal address, phone, fax, email);</p> <p>(iv) Physical address of the site where the waste was generated (if different from (iii));</p> <p>(v) Contact number in case of an incident or after hours;</p> <p>(vi) Origin / source of the waste (process or activity);</p> <p>(vii) Classification of the waste and Safety Data Sheet;</p> <p>(viii) Quantity of waste by volume (m3) or weight (tons);</p> <p>(ix) Date of collection / dispatch;</p> <p>(x) Intended receiver (waste manager); and</p> <p>(xi) Declaration (content of the consignment is fully and accurately described, classified, packed, marked and labelled, and in all respects in proper condition</p>	
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	for transportation in accordance with the applicable laws and regulations).	
	<p><u>Waste Manifest System</u></p> <p>11. (1) Every holder of waste that has been classified as hazardous in terms of Regulation 4(2) or a waste that is listed in item (2)(b) of Annexure 1 to these Regulations, must be in possession of a waste manifest document containing the relevant information specified in Annexure 2 to these Regulations.</p> <p>(2) Generators of waste classified as hazardous in terms of Regulation 4(2) or waste that is listed in item (2)(b) of Annexure 1 to these Regulations, must complete a waste manifest document containing the information specified in item (2)(a) of Annexure 2 to these Regulations for each consignment of waste transported to a waste manager.</p> <p>(3) Subregulations (1) and (2) do not apply to waste generators who are also the waste manager and manage the waste at the same premises where it was generated.</p> <p>(4) Waste transporters must not accept waste classified as hazardous in terms of Regulation 4(2) or waste that is listed in item (2)(b) of Annexure 1 to these Regulations for transport, unless the waste manifest document accompanies the waste.</p> <p>(5) All transporters of waste classified as hazardous in terms of Regulation 4(2) or waste that is listed in item (2)(b) of Annexure 1 to these Regulations must-</p> <p>(a) complete a waste manifest document containing the information specified in item (2)(b) of Annexure 2 to these Regulations for each consignment of waste transported;</p>	<p><u>Observation 20</u></p> <p>No waste manifest, as per the new waste regulations (GG 36784 of 23 August 2013), is available at the mine.</p>



	<p>(b) provide the information to the generator before the waste is transported from the premises of the generator; and</p> <p>(c) provide the information to the waste manager at the time of delivery of the waste to the facility for a waste management activity.</p> <p>(6) Waste managers must not accept waste classified as hazardous in terms of Regulation 4(2) or waste that is listed in item (2)(b) of Annexure 1 to these Regulations, unless the waste manifest document accompanies the waste.</p> <p>(7) All managers of waste classified as hazardous in terms of Regulation 4(2) or waste that is listed in item (2)(b) of Annexure 1 to these Regulations, must complete the waste manifest document with the information specified in item (2)(c) of Annexure 2 to these Regulations, confirming that the waste load has been accepted and that the waste has been managed.</p> <p>(8) All waste generators, transporters and managers subjected to the requirements of subregulations (1), (2), (4), (5), (6) and (7) must-</p> <p>(a) retain copies, or be able to access copies/records, of the waste manifest documentation for a period of at least five (5) years; and</p> <p>(b) make the waste manifest documentation available to the Department upon request.</p>	
	<p><u>Records of stored waste</u></p> <p>(1) Each waste storage facility must be able to provide documentation verifying the following:</p> <p>(a) number of waste storage containers or tanks within the facility;</p>	<p><u>Observation 21</u></p> <p>Venetia is not currently meeting the requirements in terms of waste record keeping for stored waste as per GN R.926</p>



	<p>(b) date of collection; and</p> <p>(c) authorised collector or collectors and proposed final point of treatment, recycling or disposal.</p> <p>(2) Any deviations from the approved integrated or industry waste management plan must be recorded.</p> <p>(3) Records must be kept for a minimum of 5 (five) years and must also be available for inspection by the relevant authority.</p>	
<p>TOPIC:</p> <p>RELEVANT LEGISLATION:</p>	<p>Collecting and transporting waste</p> <p>National Environmental Management: Waste Act (NEMWA), Act 59 of 2008</p>	
<p><u>NEMWA sections 24 and 25</u></p> <p>Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013)</p>	<p><u>Waste transporting</u></p> <p>Waste may only be collected for removal from the operation's premises by persons who are authorised by law to collect such waste. Furthermore, persons engaged in the transportation of waste must take all reasonable steps to prevent any spillage of waste or littering from a vehicle used to transport waste.</p> <p>The waste contractors must also ensure that when transporting waste for the purposes of disposal, that the facility or place, to which the waste is transported, is authorised to accept such waste.</p> <p>In terms of the Waste Classification and Management Regulations waste transporters and waste managers must not accept waste that has not been classified in terms of Regulation 4 unless such waste is listed in Annexure 1 of these Regulations.</p>	



TOPIC: Assessment of waste for disposal RELEVANT LEGISLATION: National Environmental Management: Waste Act (NEMWA), Act 59 of 2008		
NEMWA, section 26	<p><u>Assessment of waste</u></p> <p>In terms of the Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013) 8(1)(a) waste generators must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act prior to the disposal of the waste to landfill;</p> <p>(b) waste generators must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act; and</p> <p>(c) waste managers disposing of waste to landfill must only do so in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act.</p>	<p><u>Observation 22</u></p> <p>Waste contractor should be in a position to provide the mine with a safe disposal certificate for each consignment of waste leaving the property under contract for disposal.</p>
TOPIC: Disposal of waste material RELEVANT LEGISLATION: Mineral And Petroleum Resources Development Regulations, GNR 527 OF 23 APRIL 2004		
MPRDR, Regulation 63	<p><u>MPRDA requirements</u></p> <p>In accordance with applicable legislative requirements for pollution control and waste management, a holder of a mining right in terms of the MPRDA must:</p> <ul style="list-style-type: none"> • avoid the generation and production of pollution, waste and mine residue 	<p><u>Observation 23</u></p> <p>Take note of these requirements as per the update to the EMPR. Measures to comply with these requirements to be reflected with the EMPR.</p>



	<p>at source; or</p> <ul style="list-style-type: none"> where the generation and production of pollution, waste and mine residue cannot be avoided, it must be minimized, re-used or recycled; or <p>where possible, dispose pollution, waste and mine residue in a responsible and sustainable manner.</p>	
MPRDR, Regulation 69	This regulation requires that the applicable legislative requirements in respect of disposal of waste must be complied with and that waste must be managed as indicated in the EMPR.	As per above
<p>TOPIC: Licensing, registration and authorisation requirements</p> <p>RELEVANT LEGISLATION: National Environmental Management Act (NEMA), Act 107 of 1998 National Environmental Management: Waste Act (NEMWA), Act 59 of 2008 Norms and Standards</p>		
GN R. 921 National Environmental Management: Waste Act (59/2008): List of waste management activities that have, or are likely to have, a detrimental effect on the environment. 29 November 2013	Category A, No. 2: The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000m ² .	<p>Observation 24</p> <p>Activity to be applied for:</p> <p>The sorting and baling of general waste:</p> <ul style="list-style-type: none"> Cardboard; Paper; Glass; Cans; Plastic; and <p>Non-recyclable domestic waste, including</p>

		food waste.
GN R. 921	Category A, No. 3: The recycling of general waste at a facility that has an operational area in excess of 500m ² , excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.	<p><u>Observation 25</u> Activity to be applied for:</p> <p>Recycling and/or re-use of waste:</p> <p>Manual and/or mechanical sorting, dismantling, baling, stripping, shredding, crushing and compaction of any of the following wastes: Used screen panels, metals, conveyor belts, hard hats, safety boots, overalls, plastic water containers, blasting wire, electrical cabling, redundant furniture, windscreen glass, rubber and air filters.</p>
GN R. 921	Category A, No. 5: The recovery of waste including the refining, utilisation, or co-processing of waste in excess of 10 tons but less than 100 tons of general waste per day or in excess of 500kg but less than 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	<p><u>Observation 26</u> Activity to be applied for:</p> <p>Recovery of wood (chipping and hammer mill)</p>



GN R. 921	Category A, No. 12: The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).	<p><u>Observation 27</u> Activity to be applied for:</p> <p>All construction and associated activities relating to the upgrade of the WMF</p>
GN R. 921	Category A, No. 13: The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule.	<p><u>Observation 28</u> Activity to be applied for:</p> <p>All construction and associated activities relating to the upgrade of the WMF</p>
GN R. 921	Category B, No. 2: The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.	<p><u>Observation 29</u> Activity to be applied for:</p> <p>Ex situ bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge</p>
GN R. 921	Category B, No. 3: The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	<p><u>Observation 30</u> Activity to be applied for:</p> <p>Ex situ bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge</p>



GN R. 921	Category B, No. 4: The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage.	<u>Observation 31</u> Activity to be applied for: Ex situ bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge
GN R. 921	Category B, No. 10: The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	<u>Observation 32</u> Activity to be applied for: All construction and associated activities relating to the upgrade of the WMF
GN R. 921	Category B, No. 9: The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.	<u>Observation 33</u> Activity to be applied for: Disposal of inert waste (building rubble) used for levelling and building (infilling)
GN R. 921	GN R. 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste	<u>Observation 34</u> Activity to be applied for: Registration for Storage of waste tyres under Category C of GN R. 921.



4. WM IMPROVEMENT OBJECTIVES AND TARGETS

4.1 Waste Management Key Components

Five key waste management components were identified that would determine the overall effectiveness of the waste management system. The performance of each of these components and their interdependence provide the foundation for an effective waste management system.

These components are:

- Adequate waste management awareness and training;
- Functional waste management system procedures;
- Optimal waste management operations:
 - Separation;
 - Minimisation (reduce, re-use, recycle);
 - Storage;
 - Transfer; and
 - Disposal.
- Meeting legal requirements; and
- Ensuring natural- and socio-economic viability.

By weighing information gathered during the status quo assessment against these key components, improvement objectives were established and formulated that would give effect to short, medium and long-term waste management improvements.

Targets were set by the mine's Environmental Management Department, led by Mr. Gavin Anderson. It was decided that each of the identified targets, are to be met within a specific timeframe. For each of these targets, a target project was developed to ensure the realisation of the set objectives. Target project plans was formulated to include the project scope and timeframe for completion. Collectively these project plans form the backbone of a Waste Management Improvement Programme (WMP) that will be rolled out with immediate effect.



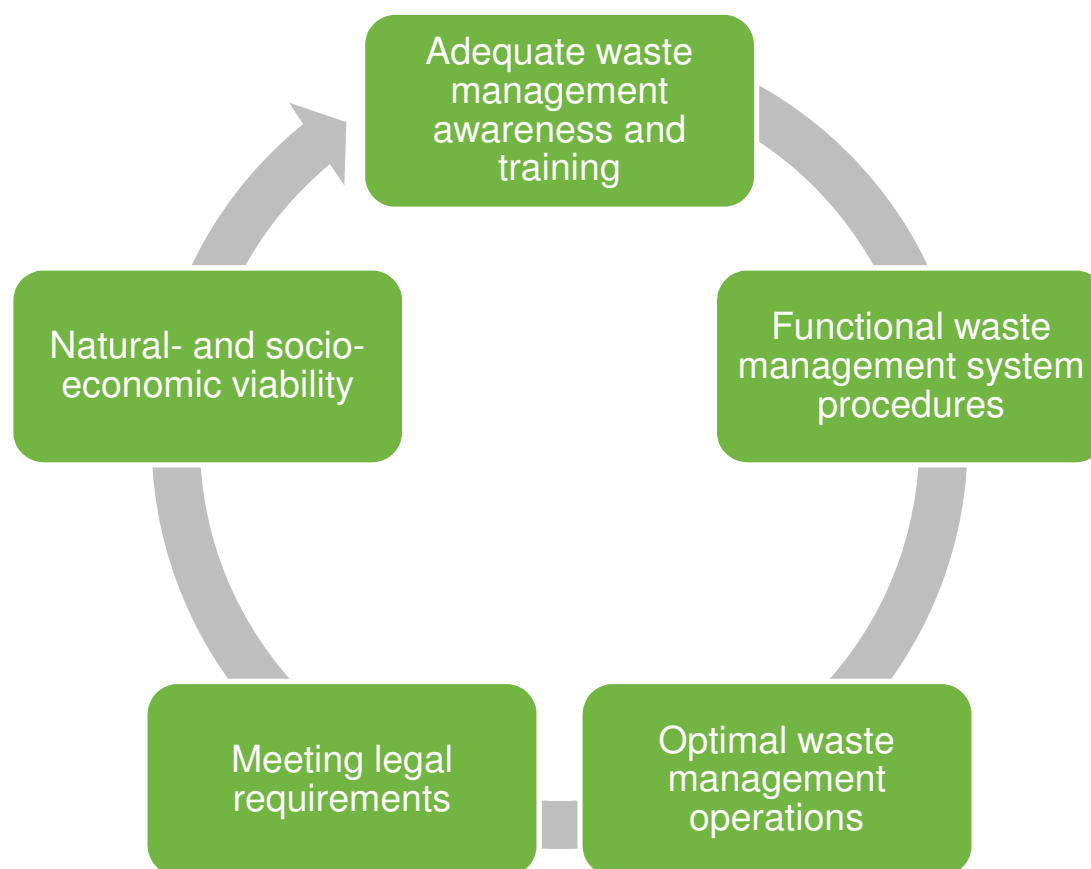


Figure 16: Waste Management Key Components

4.1.1 Adequate waste management awareness and training

In order to ensure the overall effective management of waste on the mine it is of utmost importance that every individual on the mine takes ownership of his/her responsibility in this regard.

Once the waste management strategy is implemented there are certain changes that will occur in terms of:

- The classification of waste;
- The separation of waste;
- The handling, transportation and storage of waste;
- The treatment of waste;
- The reduction, re-use, recycling and/or disposal of the waste; and
- The monitoring and reporting in terms of waste management performance.

Training needs to be given to all stakeholders on the mine as each and every staff member contributes to the success of effective waste management on the mine. A training needs assessment



will need to be undertaken, once the new Waste Management System components and associated Procedures are put in place.

Training will typically need to include aspects such as:

- Principles and concepts related to waste management and their application in practice;
- Improved procedural training;
- Correct waste segregation;
- Correct storage and containment of waste according to the type and character of the waste;
- Correct transportation of waste on and off site;
- Importance of and the method of access control and monitoring of waste material movement on and from the mine;
- How to recognise and report threats or damage (incidents) to health, safety or the environment;
- Applying the appropriate disposal method for each category of waste;
- Correct spillage procedures;
- Monitoring and reporting on waste management;
- Introduction to the reduction, re-use and recycling initiatives adopted by the mine; and
- Introduced PPP (Public Private Partnership) initiatives entered into by the mine.

4.1.2 Functional waste management system procedures

The success of the adopted waste management system depends solely on the actual implementation of adopted management measures.

The roadmap to each management measure is the associated operational procedure and this should be clear and functional and correlated with the overall management strategy of the mine.

Find attached under Appendix B the relevant waste management procedures.

4.1.3 Optimal waste management operations

Waste is generated at various locations on the mine and needs to be fed into the waste management facility at an adequate rate to prevent the buildup of unwanted and uncontainable volumes of waste in operational areas. Key aspects that should be properly managed in order to ensure optimal waste flow are:

4.1.3.1 Storage and containment

Waste needs to be held or stored in a contained manner for a temporary period of time prior to the waste being treated, disposed of, or stored elsewhere. Common storage equipment and or infrastructure at the mine include:



4.1.3.2 Containers

A waste container is any portable device in which a waste is stored, transported, treated, disposed of, or otherwise handled. The most common waste containers at the mine are 6m³ skips for bulk storage and transport, 240L wheelie bins, mainly for storage and distribution of segregated waste, and IBCs for storage of liquid waste. Other examples of containers are litterbags and bale bags, 250L drums, buckets and liquid waste tanker trucks.

Tanks

Tanks are stationary devices constructed of non-earthen materials, usually used to store or treat hazardous waste. Tanks can be open-topped or completely enclosed and are constructed of a wide variety of materials including steel, plastic, fiberglass, and concrete. An example of a concrete tank onsite is the Drizit – an oil separator sump.

Drip Trays

A drip tray is a mobile, open-topped steel or plastic pans, used by workshop and mobile mechanics to collect excess drippage from serviced and or faulty equipment.

Containment Buildings

Containment buildings are completely enclosed, self-supporting structures (i.e., they have four walls, a roof, and an impermeable floor) used to store or treat contained and non-contained hazardous waste.

Waste Piles

A waste pile is an open, uncontained pile used for treating or storing waste. Hazardous waste piles must be placed on impermeable and bunded floor areas to ensure leachate from the waste does not contaminate surface and or ground water supplies.

4.1.3.3 Separation and Segregation

Waste separation means dividing waste into manageable components based on the different waste categories, types and the recyclability of these wastes.

4.1.3.4 Re-use

It is often possible to utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.

4.1.3.5 Reduction

Any waste that can be generated should be re-assessed back to its generating source in order to understand what can be done to minimise that specific waste stream. This exercise can be applied for any waste stream generated at the mine.



4.1.3.6 Recycling

It is often possible to utilise articles from the waste stream again for a different purpose by changing the form or properties of the articles.

4.1.3.7 Monitoring and Reporting

The monitoring of waste at the mine is the act of observing all waste related activities and keeping a record of these observations. Monitoring have the special purpose of keeping track of all the waste management KPIs. Monitoring should be:

- Systematic;
- Regular;
- Planned;
- Organised; and
- Standardised.

Standardised reports needs to be compiled on a regular basis in order to conveyed monitoring results to management, authorities, stakeholders and/or the public. The scope of the reports is determined by company policies and/or procedures, department guidelines and/or other legal requirements. Without monitoring, reporting is not possible.

4.1.4 Meeting legal requirements

One of De Beers Venetia's key objectives is to comply with all national and provincial legislation relating to their mining operations. The current and future waste management activities at the mine require authorisations, licenses and/or permits. In future, any alterations to these authorised activities will need to be monitored in terms of legal compliance as a measure of legal compliance assurance.

4.1.5 Natural- and socio-economic viability

A committed, responsible approach towards waste management at the mine contributes significantly towards the way in which Interested and Affected Parties, such as Government Departments, neighbours, investors and the general public perceive the mine, as well as the De Beers Group of Companies.

Opportunity lies within a proactive approach towards Public Private Partnership (PPP) initiatives where waste can be converted into a commodity for local, financially constraint communities and thereby stimulates or activates the local green industry.

The possibility of linking these initiatives into the Social Labour Plan of the mine needs to be further investigated.



4.2 Best Practical Waste Management Option (BPWMO) consideration

A methodology was formulated in order to enable a structured evaluation of reduction, re-use, recycling, and disposal options for all related waste streams at the mine. This methodology is called the Best Practicable Waste Management Option (BPWMO).

Waste management options for a particular waste stream are best considered according to the Waste Management Hierarchical approach (see figure below) which reflects the relative sustainability of each of the options. One of the key principles underlying the waste management hierarchy is to ensure that waste is dealt with as high up the hierarchy as possible. Since all waste management options have some impact on the environment, the only way to avoid an impact is not to produce waste in the first place, and waste prevention/avoidance and reduction is therefore at the top of the hierarchy. Informed and selective procurement of products (raw material) used at the mine plays a significant role in this regard as it can reduce or even prevent the generation of waste at the mine.

Minimisation of waste through re-use and recycling followed by recovery techniques (treatment, composting and generating energy from waste) follow, while disposal to landfill (the least favourable option) is at the bottom of the hierarchy.

Although the hierarchy holds true in general terms, there are certain wastes for which the waste management options are limited or for which the BPWMO (i.e. the option causing least environmental impact) lies towards the bottom of the hierarchy. In deciding on the most appropriate waste management/disposal option, both environmental and socio-economic costs and benefits need to be considered. Determining the best acceptable BPWMO for a particular waste stream was done by taking into account impacts associated from raw material input to waste disposal (cradle to grave), including those associated with the movement of waste.



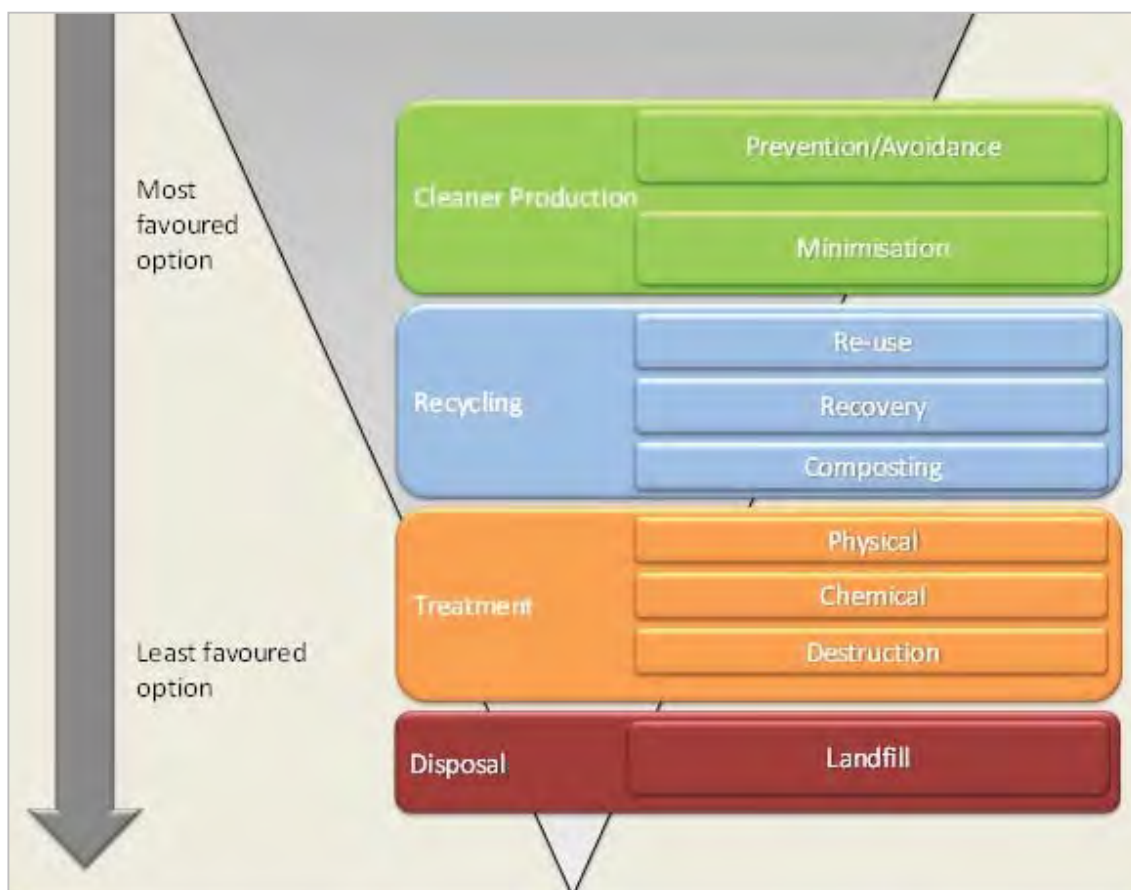


Figure 17: Waste Management Hierarchy

4.2.1 BPWMO application and adjusted waste streams process flows

The process flow of each identified waste stream is individually interrogated and altered through the application of the BPWMO. Refer to the tables below for the BPWMO matrices followed by the altered waste streams process flows that will be adopted in future as part of the Waste Management Optimisation Strategy and Programme.



Blue Area: General Waste

Table 17: BPWMO - Blue Area: General Waste: Recyclable General Waste

No.	Waste stream	Reduce	Re-use	Recycle	Dispose	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)			
1	Paper	X				<u>Procurement:</u> Use recycled paper.		<ul style="list-style-type: none"> • Procurement: monitor quantity and type of paper bought per month. 	X					
						<u>Behavioural change:</u> Printing: do not print unnecessarily, only print what you need, print double-sided, edit draft documents electronically, update mailing lists regularly to reduce wasted mail and use fax-to-email instead of conventional fax. Education: Waste reduction and recycling guide.	Waste reduction and recycling guide.	<ul style="list-style-type: none"> • Procurement: monitor quantity and type of paper bought per month. 	X					
						<u>Physical reduction:</u> Baling of paper.	Multi-purpose baler with correct specifications - buy or rent the baler.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of waste entering WMF per day and origin. • Number of bales made per day. 	X					
						<u>Behavioural change:</u> use one-sided scrap paper for informal notes or scratch paper. Bin for one-sided scrap paper - use when making informal copies.	Paper re-use bin.	<ul style="list-style-type: none"> • Procurement: monitor quantity and type of paper bought per month. 	X					
						<u>PPP/recycling contractor:</u> Recycling of baled paper. Use colour coded recycling bins.	Colour coded recycling bins for paper.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of paper bales exiting WMF per day and destination. 	X					
2	Plastic	X				<u>Procurement:</u> The purchase of water dispensers and re-usable plastic bottles. Remove polystyrene water cups.	Water dispensers and re-usable plastic bottles.	<ul style="list-style-type: none"> • Procurement: number of polystyrene water cups purchased per month. 	X	X				
						<u>Physical reduction:</u> Baling of plastic.	Multi-purpose baler with correct specifications - buy or rent the baler.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of waste entering WMF per day and origin. • Number of bales made per day. 	X					
						<u>Behavioural change:</u> Re-use of water bottles at water dispensers.	Water dispensers and re-usable plastic bottles.		X	X				
						<u>Procurement:</u> Agreements to have the water dispenser bottles collected, refilled and supplied back to the mine.	Water dispensers.	<ul style="list-style-type: none"> • Procurement: number of water dispenser bottles removed from the mine per month and destination. 	X					
						<u>PPP/recycling contractor:</u> Recycling of baled plastic. Colour coded recycling bins.	Colour coded recycling bins for plastic.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Number of bales made per day. • Weight of bales exiting WMF per day and destination. 	X					
3	Plastic pallets				X	Any plastic that is not separated out for recycling, for example, plastic contaminated by food waste, must be disposed of at the closest licensed landfill site as general waste. Use a licensed/permitted waste contractor.	Colour coded bins for other domestic waste.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of plastic exiting WMF per day and destination. • Safe disposal certificates. 	X					

No.	Waste stream	Reduce	Re-use	Recycle	Dispose	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
				X		Plastic pallets should be recycled.	Storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of plastic pallets exiting WMF per day and destination. 	X	X	
4	Card-board	X				<p><u>Procurement</u>: Buy in bulk to avoid generation of many small cardboard containers.</p> <p><u>Physical reduction</u>: Baling of cardboard.</p>	Multi-purpose baler with correct specifications - buy or rent the baler.	<ul style="list-style-type: none"> Waste manifest. Weight of waste entering WMF per day and origin. Monitoring and Measurements sheet. Waste manifest. Number of bales made per day. 	X	X	
				X		PPP/recycling contractor: Recycling of cardboard bales. Colour coded recycling bins.	Colour coded recycling bins for cardboard.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of bales exiting WMF per day and destination. 	X		
					X	Any cardboard that is not separated out for recycling, for example cardboard contaminated by food waste, must be disposed of at the closest licensed landfill site as general waste. Use a licensed/permited waste contractor.	Colour coded bins for other domestic waste.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of cardboard exiting WMF per day and destination. Safe disposal certificates. 	X		
5	Cans	X				<u>Physical reduction</u> : Baling of cans.	Multi-purpose baler with correct specifications - buy or rent the baler.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day. Number of bales made per day. 	X		
				X		PPP/recycling: recycling of can bales. Colour coded recycling bins.	Colour coded recycling bins for cans.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of bales exiting WMF per day and destination. 	X		
6	Glass	X				<u>Physical reduction</u> : Crush and place into re-usable storage containers prior to removal for recycling.	<ul style="list-style-type: none"> Glass Crusher with correct specifications - buy or rent the crusher. Storage containers for glass, e.g. skips. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day. 	X	X	
				X		Crushed glass should be removal by a local recycler or Consol Glass.	Storage containers for glass, e.g. Skips.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of glass exiting WMF per day and destination. 	X	X	

Table 18: BPWMO - Blue Area: General Waste: Non-Recyclable General Waste

No.	Waste stream	Reduce	Re-use	Recycle	Dispose	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Non-recyclable general waste	X				<p><u>Behavioural change</u>: Proper waste segregation.</p> <p><u>Physical reduction</u>: Utilisation of a rear-end loader mobile compactor vehicle (by the waste contractor) when collecting waste.</p>	<p>Colour coded bins for non-recyclable domestic waste.</p> <p>Contractors' rear-end loader mobile compactor vehicle.</p>	<ul style="list-style-type: none"> Waste manifest. Weight of waste entering WMF per day and origin. Monitoring and Measurements sheet. Waste manifest. Weight of domestic waste exiting WMF per day and destination. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Dispose	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Dispose as general waste at the closest licensed landfill site to the mine. Make use of a licensed/permitted waste contractor.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of domestic waste exiting WMF per day and destination. Safe disposal certificates. 	X		
2	Food waste	X				<p><u>Procurement:</u> Check expiry dates prior to purchasing. Consider shelf-life of products. Investigate optimal portion sizes.</p> <p><u>Physical reduction:</u> Utilisation of a rear end loader mobile compactor vehicle (by the waste contractor) when collecting waste.</p>		<ul style="list-style-type: none"> Waste manifest. Weight of food waste entering WMF per day and origin. 	X	X	
							Contractors' rear-end loader mobile compactor vehicle.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of food waste exiting WMF per day and destination. 	X	X	
					X	Dispose as general waste at the closest licensed landfill site to the mine. Make use of a licensed/permitted waste contractor.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of food waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Table 19: BPWMO - Blue Area: General Waste: Recyclable Green Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Green waste	X				<p><u>Physical reduction:</u> Shredding of plant material.</p>	Shredder / chipper	<ul style="list-style-type: none"> Waste manifest. Weight of waste entering WMF per day and origin. 	X		
				X		<p>Composting of green waste: Step 1: shredding/chipping of plant material from alien invasive eradication programme. Eradication must occur during the pollination phase of the alien plant species. Step 2: Windrow composting/mulching of shredded material. Step 3: Application of compost/mulch in rehabilitation process to supplement purchased compost/manure.</p>	Shredder / chipper; Windrow turner or tractor; Temperature probe; Compost activator enzymes.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of compost/mulch exiting WMF per day and destination. 	X	X	

Table 20: BPWMO - Blue Area: General Waste: Non-Recyclable Green Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Green waste	X				<p><u>Physical reduction:</u> Shredding of plant material.</p>	Shredder / chipper	<ul style="list-style-type: none"> Waste manifest. Weight of waste entering WMF per day and origin. 	X	X	
					X	Remove off site and take to the closest licensed landfill site or burial of green waste under the waste rock dump.	Storage skip/container	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

<p>Paper and cardboard:</p> <ul style="list-style-type: none"> All paper - shredded or sheets Small cardboard Milk boxes Newspaper Magazines Small boxes 	<p>Cans:</p> <ul style="list-style-type: none"> Cooldrink cans Rinsed foodstuff cans Coffee cans No aerosol cans
<p>Wet waste (food):</p> <ul style="list-style-type: none"> Left over food Meat Vegetables and fruit Bread Tea bags 	<p>Other domestic:</p> <ul style="list-style-type: none"> Foil Polystyrene Black bags Redundant stationary General waste not included in the recyclable bins Non-recyclable green waste
<p>Glass:</p> <ul style="list-style-type: none"> Glass bottles Glass containers Glasses <p>Excludes:</p> <ul style="list-style-type: none"> Windscreens Window glass 	<p>Wood waste:</p> <ul style="list-style-type: none"> Pallets Wooden boxes Crates
<p>All plastics:</p> <ul style="list-style-type: none"> Plastic bottles Plastic containers Plastic bags Plastic container caps and lids Plastic pallets <p>Excludes:</p> <ul style="list-style-type: none"> Black bags 	<p>Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets</p> <p>Skip </p> <p>Drum/ container </p> <p>Bale </p> <p>Stockpile </p>
<p>Changes i.t.o. management</p>	

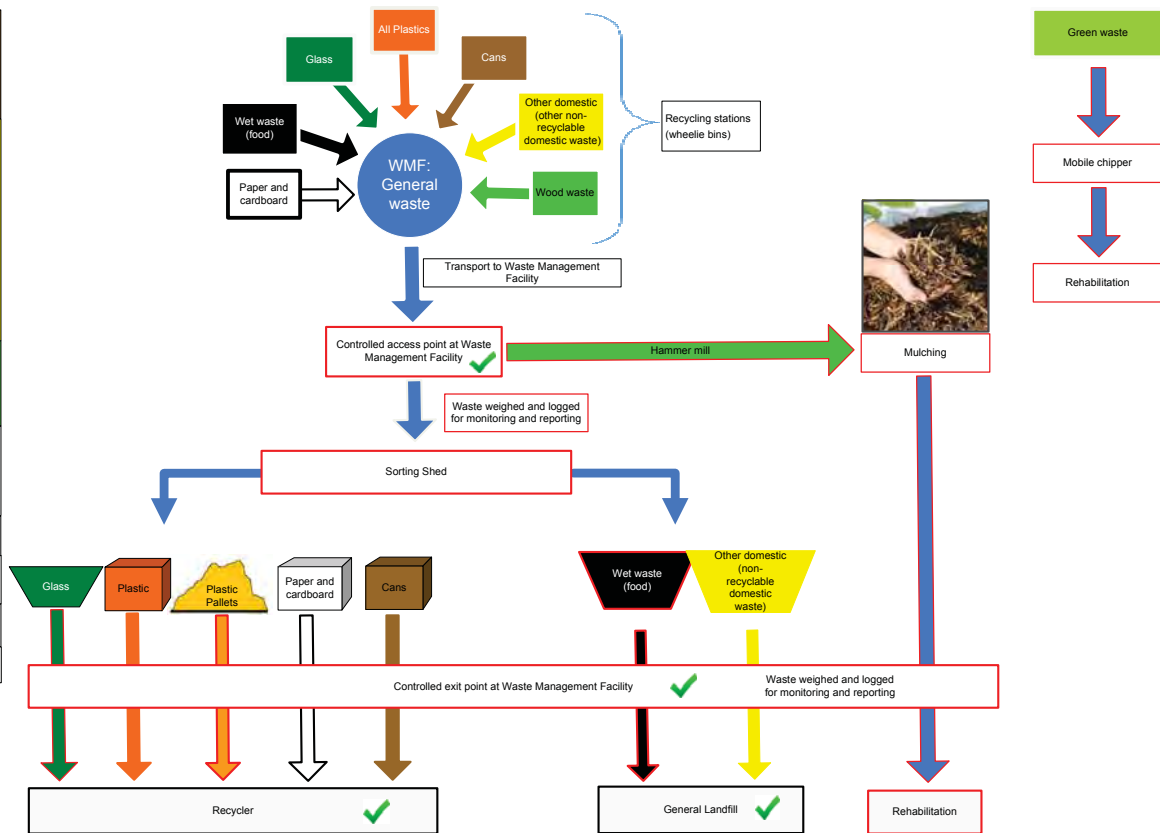


Figure 18: Proposed general waste process flow in the Blue Area

Blue Area: Industrial Waste and Waste Tyres

Table 21: BPWMO - Blue Area: Industrial Waste: Recyclable Industrial Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used Screen Panels	-	-	X	-	The used screen panels must be removed off site by Multotec (contractor) for recycling.	Storage container(s).	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of screen panels exiting WMF per day and destination. 	X	X	
2	Ferrous and non-ferrous metals	X	-	-	-	<p>Behavioural change: Steel should only be stored/stockpiled in the designated steel laydown area within the WMF.</p> <p>Physical reduction: An employee should be trained in hot work or a contractor should be appointed to cut the large steel structures into smaller pieces that can be easily removed by the recycling contractor.</p>	Blow torch/cutting torch and PPE.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X	X	
		-	-	X	-	Existing contract with recycling company must be continued.	Skips for storage of steel.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of steel waste exiting WMF per day and destination. 	X		
3	Wood (pallets and boxes)	X	-	-	-	<p>Procurement: The use of wooden pallets must be phased out completely. Plastic pallets must be bought instead.</p> <p>Behavioural change: Where logistically possible, equipment and machinery entering the mine in wooden boxes or similar wooden packaging should be removed from the packaging in the freight yard and then taken into the mine. The wooden packaging should be stored in the freight yard prior to removal off site for re-use, recycling or disposal. Wood waste within the mine should be sent to the WMF.</p> <p>Behavioural change: Employees should be educated on the correct use of pallets, in conjunction with forklifts and other machinery, to maximise the life span of wooden pallets already present on the mine.</p> <p>Physical reduction: Broken wooden pallets should be dismantled and stored prior to removal from the WMF.</p>	<p>Storage containers for wood e.g. Skips.</p> <p>Skip for wood storage.</p>	<ul style="list-style-type: none"> Procurement: number of wooden pallets bought per month. Monitoring and Measurements sheet. Waste manifest. Weight of wood exiting WMF per day and destination. 	X	X	
		-	-	-	X	Burial under WRD or disposal at a general landfill site.	Skip for wood storage.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of wood exiting WMF per day and destination. Safe disposal certificates. 	X	X	
4	Conveyor belting	X	-	-	-	Physical reduction: Conveyor belts less than 50m in length must be rolled up and stored for sale at a later stage. Local farmers can be targeted. Conveyor belts longer than 50m should be taken back by Dunlop for recycling.	<ul style="list-style-type: none"> Conveyor belt winding machine. Storage skip. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of conveyor belts exiting WMF per day and destination. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)	
5	Hard hats	X				<u>Behavioural change</u> : All hard hats must be taken to the WMF.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X			
						<u>Physical reduction</u> : Hard hats must be dismantled in the sorting area. The pieces must be stored in a designated plastic storage area within the WMF.	Bale storage bags.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of plastic exiting WMF per day and destination. 	X	X	
					X		PPP/recycling contractor: The dismantled hard hats must be removed from the WMF for recycling.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of plastic exiting WMF per day and destination. 	X	X	
6	Safety boots	X				<u>Procurement</u> : The use of safety shoes with steel toe caps must be discontinued in favour of safety shoes with composite toe caps (e.g. carbon fibre). Shoes with composite toe caps can be scanned by security.		<ul style="list-style-type: none"> Procurement: number of safety boots with steel toe caps bought per month. Procurement: number of safety boots with composite toe caps bought per month. 	X	X		
				X			Social upliftment programmes should be investigated whereby used shoes that are still in good condition can be donated to communities surrounding the mine. The used shoes could also be sold on auction.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of safety boots exiting WMF per day and destination. 	X	X	
						X	If the used safety shoes cannot be donated, they should be disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of safety boots exiting WMF per day and destination. Safe disposal certificates. 	X		
7	Overalls	X				<u>Physical reduction</u> : Cut up overalls to re-use as oil rags.	Scissors.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of cut up overalls exiting WMF per day for use as oil rags. 	X			
				X			<u>Procurement</u> : Used overalls should be used as oil rags instead of purchasing oil rags.		<ul style="list-style-type: none"> Procurement: number of oil rags bought per month. 	X		
							Social upliftment programmes should be investigated whereby used overalls that are still in good condition can be donated to communities surrounding the mine.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of overalls exiting WMF per day and destination. 	X	X	
						X	Used overalls that cannot be donated or re-used must be disposed of as general waste at the closest licensed facility. Overalls that have been used as oil rags must be disposed of as hazardous waste at a licensed facility. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Bale storage bags for overalls that cannot be donated or re-used. Skip for used oil rags (used overalls). 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of overalls exiting WMF per day and destination. Safe disposal certificates. 	X		
8	Plastic water											

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
	containers			X		Recycling by waste recycling contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
9	Blasting wire										
				X		Recycle - scrap metal dealer.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
					X	Dispose of at a general landfill site.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
10	All cabling	X				Physical reduction; Strip cables and wind into rolls e.g. copper wires.	Cable stripper.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X	X	
				X		Auction stripped cable parts or recycle with a metal recycling contractor (e.g. copper).	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. 	X	X	
					X	Disposal of stripped parts that cannot be recycled at the closest licensed landfill site. Use a licensed/permittid waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Table 22: BPWMO - Blue Area: Industrial Waste: Non-Recyclable Industrial Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Wind-screen glass										
					X	Windscreen glass should be removed off site as general waste and disposed of at the closest licensed landfill site. Use a licensed/permittid waste contractor.	Skip for storage of windscreen glass.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
2	LDV tyres	X				Procurement: Removal of used tyres by tyre contactor when bringing new tyres to the mine.	Storage skip/area.	<ul style="list-style-type: none"> • Tyre abatement plan. • Inclusion of the waste tyre storage area in the Waste Management License for the mine. • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. 	X	X	
			X			Tyres can be painted white and used as demarcation where necessary.	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. 	X		
				X		Legacy waste LDV tyres should be placed in a demarcated, excavated storage area on the Waste Rock Dump and covered with a layer of soil as fire prevention until an economical recycling option becomes available, at which time they should be removed from the storage area.	-	<ul style="list-style-type: none"> • Tyre abatement plan. • Inclusion of the waste tyre storage area in the Waste Management License for the mine. • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. • Number of tyres placed into the storage area. 	X		
					X	Waste LDV tyres should be stored in a designated area at the Mining Engineering Workshops and should be removed by the tyre supplier.	-	<ul style="list-style-type: none"> • Tyre abatement plan. • Inclusion of the waste tyre storage area in the Waste Management License for the mine. • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. 	X	X	
3	EMV tyres	X				As a result of change in mining method to underground, the use of earth moving vehicles will decrease drastically, thereby decreasing the number of EMV waste tyres generated at the mine.	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. 			X
			X			Tyres can be painted white and used as demarcation where necessary.	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. 	X		
				X		Waste EMV tyres should be placed in a demarcated, excavated storage area on the Waste Rock Dump and covered with a layer of soil as fire prevention. The evolution of EMV recycling technology, such as tyre pyrolysis, should be followed closely. Once the recycling technologies become financially feasible, the stored EMV tyres should be removed from the storage area and utilised towards the chosen recycling technology.	-	<ul style="list-style-type: none"> • Tyre abatement plan. • Inclusion of the waste tyre storage area in the Waste Management License for the mine. • Monitoring and Measurements sheet. • Waste manifest. • Number of tyres exiting Mining Engineering Workshops and destination. • Number of tyres placed in the storage area. 	X		
4	Rubber										
				X		Rubber should be recycled wherever possible.	Skip for storage of rubber.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination. 	X		

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Rubber should be removed off site as general waste and disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Skip for storage of rubber.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
5	Air filters	X				Physical reduction: A press should be used to squash the air filters. People using the press should wear appropriate PPE, e.g. a dusk mask at all times.	<ul style="list-style-type: none"> Drum press. PPE. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X		
					X	Crushed air filters should be removed off site as general waste and disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
6	Redundant furniture	X				Physical reduction: Furniture must be dismantled in the sorting area.	Dismantling tools.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X	X	
				X		Material from dismantled furniture can be re-used as oil rags or absorbent material for spills.	-	<ul style="list-style-type: none"> Procurement: number of oil rags purchased per month. Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. 	X		
					X	Broken furniture should be removed off site as general waste and disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Steel:	Wood
<ul style="list-style-type: none"> Scrap steel Steel waste 	<ul style="list-style-type: none"> Other industrial waste: Hard hats Used screen panels Water containers Furniture Cables Safety boots Overalls
Electronic waste:	<ul style="list-style-type: none"> Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets ✓ Changes i.t.o. management
<ul style="list-style-type: none"> Redundant computer components Radios ICs 	
Windscreen glass	
<ul style="list-style-type: none"> Conveyor belts Rubber Rubber lined steel 	
Rubber:	
<ul style="list-style-type: none"> Skip Bale bag 	

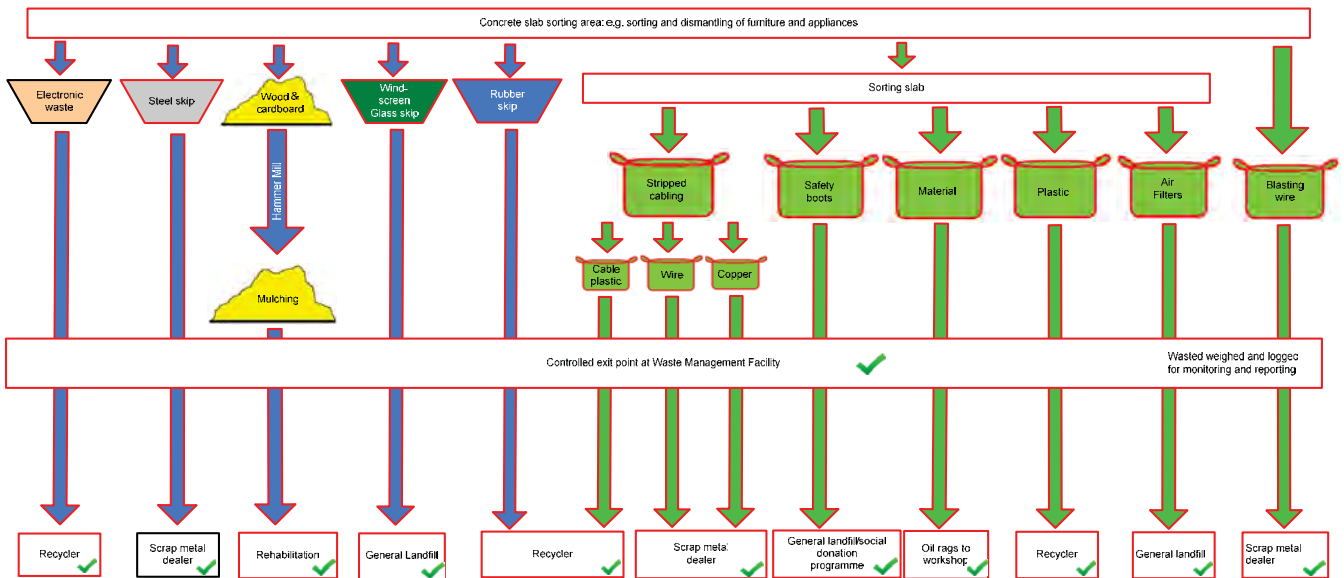
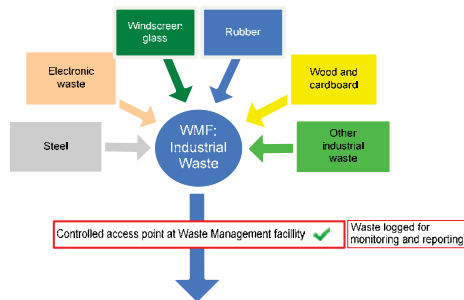


Figure 19: Proposed industrial waste process flow in the Blue Area

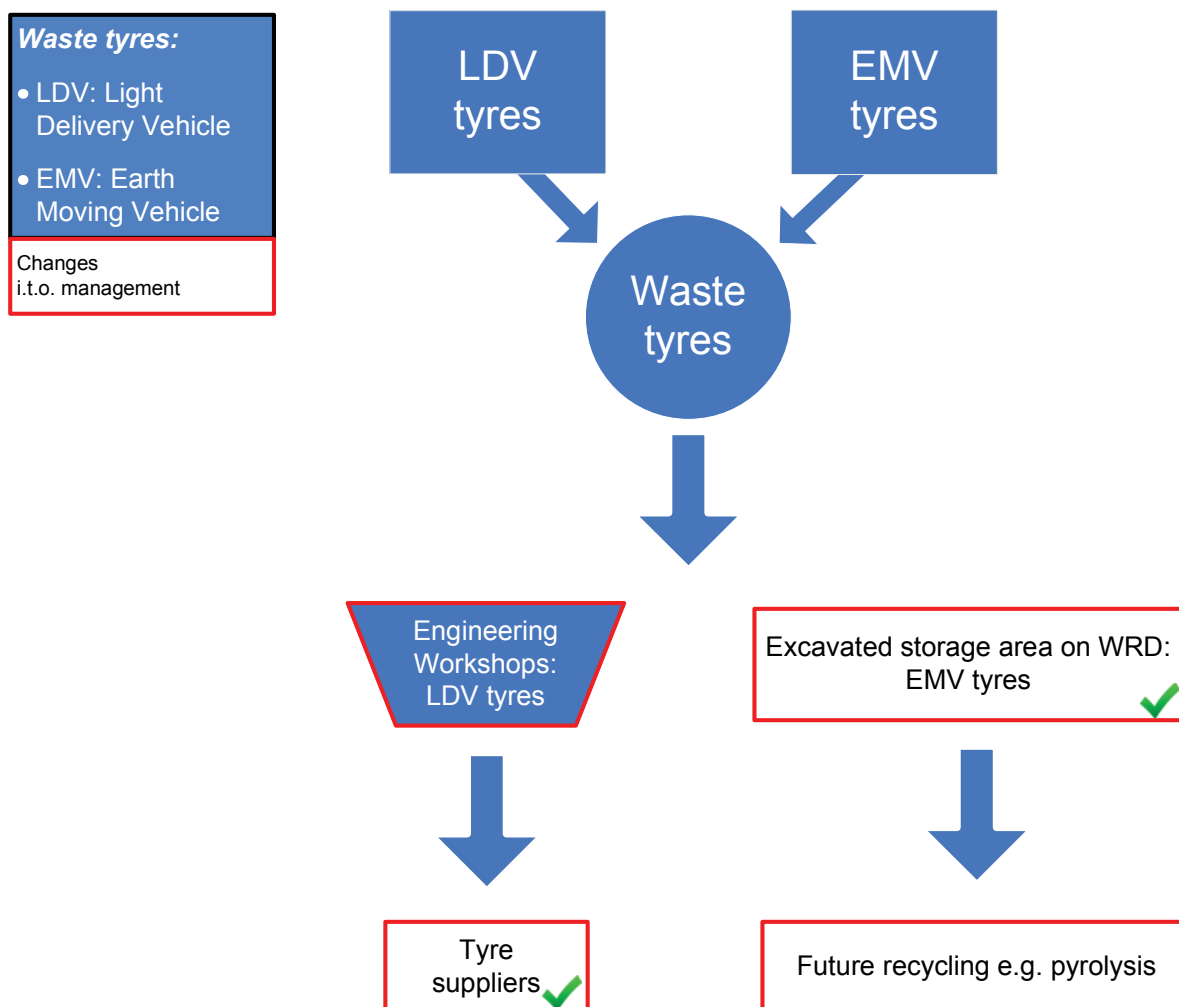


Figure 20: Proposed waste tyre process flow in the Blue Area



Blue Area: Building and Demolition Waste

Table 23: BPWMO - Blue Area: Building, construction and demolition waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Building rubble, demolition and construction waste	-				Use building rubble, demolition and construction waste as filling, building foundations or compaction material.	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
			X			Legacy waste: Burial of building rubble, demolition and construction waste on the waste rock dump.	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Authorisation (waste management license) or approval letter from LEDET. 	X		
						X	Building rubble, demolition waste and construction waste must be stored in a designated area within the WMF. It must be removed as general waste to the closest licensed landfill site. Use a licensed/permitted waste contractor.	Skips to store the building rubble, demolition waste and construction waste.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X

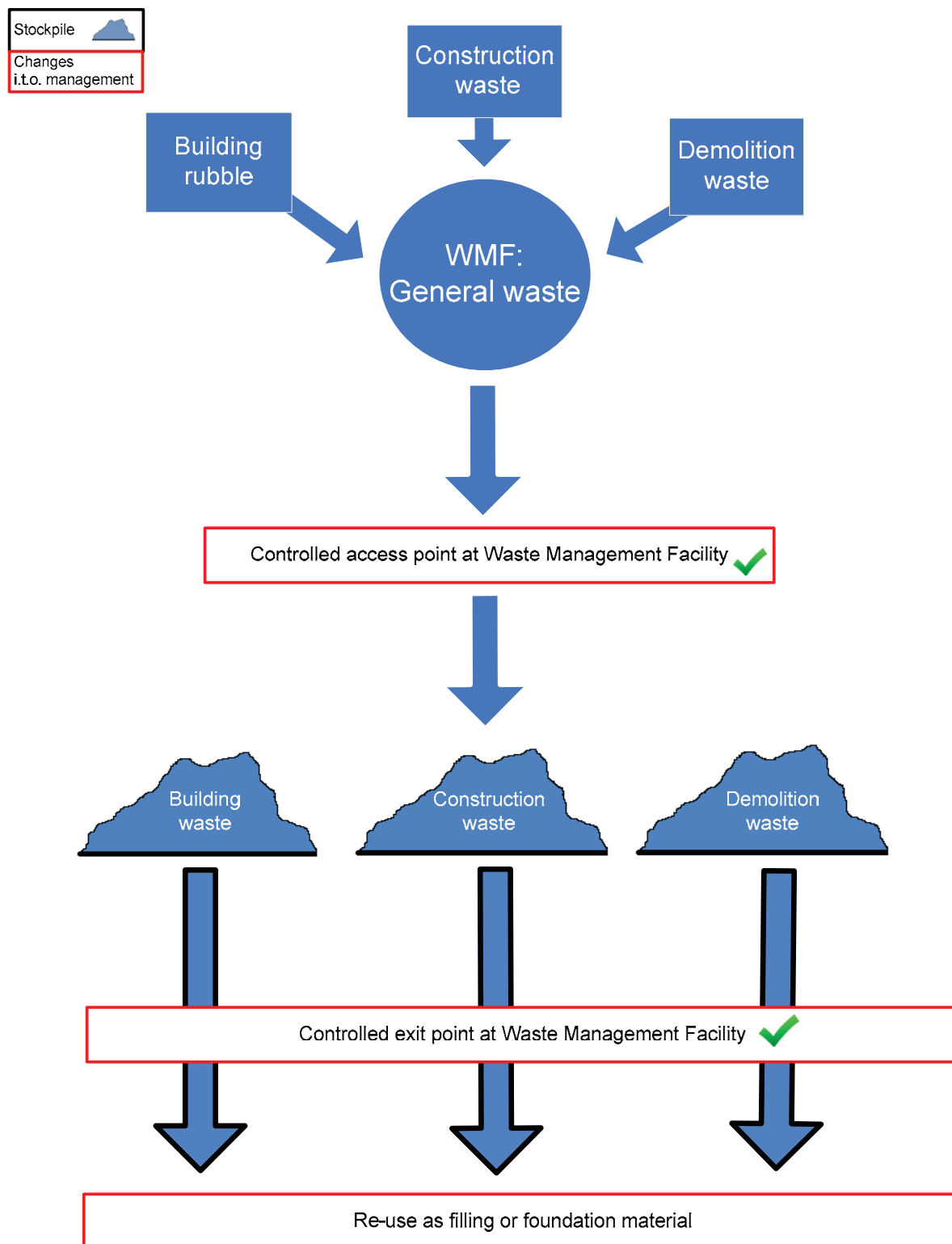


Figure 21: Proposed process flow for building, construction and demolition waste in the Blue Area



Blue Area: Hazardous Waste

Table 24: BPWMO - Blue Area: Recyclable hazardous liquids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used oil	X				Behavioural change. Prevent contamination of oil with water and engine coolant, this decreases the volumes that can be recycled.	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of oil exiting Mining Engineering Workshops per day and destination. 	X		
						Different storage containers must be provided for the following: oils, anti-freeze, oil rags and oil filters. Oil must be passed through a diamond trap prior to removal off-site by an oil recycling contractor.	Storage containers e.g. Tanks/bullets.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of oil exiting Mining Engineering Workshops per day and destination. 	X		

Table 25: BPWMO - Blue Area: Non-Recyclable hazardous liquids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Grease				X	Remove grease to the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	Storage container for grease.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of grease exiting Mining Engineering Workshops per day and destination. 	X		
2	Contaminated diesel			X		Recycling of contaminated diesel by a recycling contractor.	<ul style="list-style-type: none"> Storage container for engine coolant e.g. bullet. Diamond trap. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of contaminated diesel exiting Mining Engineering Workshops per day and destination. Volume of contaminated diesel exiting WMF per day and destination. 	X		
						Diesel that cannot be recycled, for example if it is mixed with engine coolant, must be removed as hazardous waste to the closest licensed hazardous landfill site, after passing through a diamond trap. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage container for contaminated diesel e.g. bullet. Diamond trap. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of contaminated diesel exiting Mining Engineering Workshops per day and destination. Volume of contaminated diesel exiting WMF per day and destination. 	X		
3	Engine coolant			X		Recycling of engine coolant by a recycling contractor.	<ul style="list-style-type: none"> Storage container for engine coolant e.g. bullet. Diamond trap. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of coolant exiting Mining Engineering Workshops per day and destination. Volume of coolant exiting WMF per day and destination. 	X		
						Engine coolant that cannot be recycled must be removed as hazardous waste to the closest licensed hazardous landfill site, after passing through a diamond trap. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage container for engine coolant e.g. bullet. Diamond trap. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of coolant exiting Mining Engineering Workshops per day and destination. Volume of coolant exiting WMF per day and destination. 	X		

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
4	Hydro-carbon sludge	X				<u>Behavioural change:</u> Service sumps on a regular basis.	Contractor's supersucker.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sludge exiting Mining Engineering Workshops per day and destination. Volume of sludge exiting WMF per day and destination. 	X		
					X	Disposal of hydrocarbon sludge at the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	Contractor's supersucker.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sludge exiting Mining Engineering Workshops per day and destination. Volume of sludge exiting WMF per day and destination. Safe disposal certificates. 	X		
5	Old cooking oil										
				X		Storage of used cooking oil in IBC containers prior to removal from the mine for recycling.	IBC containers.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
6	Battery Acid	X				<u>Behavioural change:</u> Do not drain batteries.			X		
					X	Removal to the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	Storage container.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
7	Chemical containers with redundant chemicals - Liquid										
					X	Removal to the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers entering WMF per day and origin. Weight and number of containers exiting WMF per day and destination. 	X		

Table 26: BPWMO - Blue Area: Recyclable hazardous solids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used Ink cartridges										
				X		Recycling of used ink cartridges by supplier.	<ul style="list-style-type: none"> Skips or other storage containers. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of cartridges entering WMF per day and origin. Weight and number of cartridges exiting WMF per day and destination. 	X		
2	Sealed										

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
	batteries			X		Recycling of batteries by supplier.	Banded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of sealed batteries entering WMF per day and origin. Weight and number of sealed batteries exiting WMF per day and destination. 	X		
3	Un-sealed batteries	X				Procurement; Phase out un-sealed batteries and only use sealed batteries at the mine.		<ul style="list-style-type: none"> Procurement: number of unsealed batteries bought per month. Monitoring and Measurements sheet. Waste manifest. Weight and number of un-sealed batteries entering WMF per day and origin. 	X		
				X		Recycling of batteries by supplier.	Banded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of un-sealed batteries exiting WMF per day and destination. 	X		
4	Empty (mostly 25) chemical containers	X				Physical reduction; Compact/compress empty containers.	Compactor/drum press.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers entering WMF per day and origin. 	X	X	
				X		Recycling of plastic containers by a waste recycling contractor.	Banded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers exiting WMF per day and destination. 	X		
5	Empty 210l oil drums	X				Physical reduction; Compact/compress empty oil drums.	Compactor/drum press.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of drums entering WMF per day and origin. 	X	X	
				X		Recycling of metal oil drums by scrap metal recycler.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of drums exiting WMF per day and destination. 	X		
6	Oily rags and oil filters			X		Separate storage containers, such as drums provided by the oil recycling contractor, must be available for the storage of oily rags and oil filters. The rags and filters should then be removed from site by the oil recycling contractor.	<ul style="list-style-type: none"> Storage containers. Banded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight oil rags and oil filters exiting Mining Engineering Workshops per day and destination. 	X		
7	Contaminated										



No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
	soil			X		Hydrocarbon contaminated soil (large spillages) must be bioremediated and the soil then used for rehabilitation purposes. Bioremediation must occur <i>ex situ</i> in the designated bioremediation area within the WMF.	Bioremediation technology and specialists.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Waste Management License for the bioremediation of hydrocarbon contaminated soil. Weight of waste entering WMF per day and origin. Weight of bioremediated soil exiting WMF per day and destination. Procurement: amount of compost/manure bought per month. 		X	
					X	Hydrocarbon contaminated soil that cannot be bioremediated must be disposed of as hazardous waste at the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Skips or other storage containers. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificate. 	X		
8	Sewage treatment plant sludge	X				<u>Physical reduction</u> : Allow sludge to dry out in drying bed with impermeable surface.	Impermeable drying bed (e.g. slab or bunker).	-	X		
				X		Add dried sludge to composting/mulching windrows in WMF and use for rehabilitation together with bought in compost/manure.	Windrow turner/tractor.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of sludge added to composting/mulching windrows. Weight of compost/mulch exiting WMF per day and destination. Procurement: amount of compost/manure bought per month. 		X	
9	Fluorescent tubes, mercury vapour lamps and sodium lamps	X				<u>Physical reduction</u> : Crushing of lamps must occur in a drum-top crusher. Crushed lamps must then be stored in weather-proof containers at the WMF. Employees must wear the necessary PPE when crushing the lamps. <u>Procurement</u> : The use of fluorescent tubes should be phased out and LED (light-emitting diodes) used throughout the mine.	<ul style="list-style-type: none"> Drum-top crusher. Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. 	X		
				X		The crushed, used lamps must be collected by- or sent to- a mercury recycling contractor.	<ul style="list-style-type: none"> Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Destruction and Recycling Certificate. 	X	X	
					X	Remove by a licensed/permitted waste contractor for disposal at the closest licensed hazardous landfill site - must cease before 23 August 2016 .	<ul style="list-style-type: none"> Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		X

Table 27: BPWMO - Blue Area: Non-Recyclable hazardous solids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Material	-									

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
	contaminated with oil, diesel or grease, empty oil chemical containers				X	The waste should be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the licensed/permitted waste management contractor and disposal of at the closest licensed hazardous landfill site.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
2	Contaminated spillsorb				X	Contaminated spillsorb should be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the licensed/permitted waste management contractor and disposal of at the closest licensed hazardous landfill site.	Additional storage skips need to be placed at strategic areas at the mine for the storage of hazardous waste, including contaminated spillsorb.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
3	Hardened Sludge	X				<u>Behavioural change:</u> The generation of hardened sludge must be prevented by ensuring that sludge from the drit sumps is removed by a contractor on a regular basis, prior to excessive sludge build up.	Contractor's supersucker.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sludge exiting Mining Engineering Workshops per day and destination. 	X		
					X	Should hardened sludge be generated, this must be stored in the WMF in hazardous waste skips and should be removed as hazardous waste for disposal at the closest licensed hazardous landfill site by the waste management contractor. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
4	Contaminated soil not suitable for bioremediation (due to levels of contamination)				X	Contaminated soil that cannot be bioremediated must be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the licensed/permitted waste management contractor and disposal of at the closest licensed hazardous landfill site.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
5	Launder grease				X	Launder grease must be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the licensed/permitted waste management contractor and disposal of at the closest licensed hazardous landfill site.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
6	Expired medicines										

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Expired medicines must be stored in suitable containers at the Wellness Centre and must be removed by the waste management contractor for incineration at a licensed facility.	Storage containers specifically designed for medical waste.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting Wellness Centre per day and destination. Safe incineration certificates. 	X		
7	Medical waste				X	Medical waste must be stored in the containers provided at the Wellness Centre. The waste must be collected by the waste management contractor and incinerated off site at a licensed facility.	Storage containers specifically designed for medical waste.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting Wellness Centre per day and destination. Safe incineration certificates. 	X		
8	Sanitary waste generated in bathrooms and 'SHE' bins				X	Sanitary waste must be stored in the containers provided. The waste must be collected by the waste management contractor and incinerated off site at a licensed facility.	SHE bins in ladies toilets.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting mine per day and destination. Safe incineration certificates. 	X		
9	Empty chemical containers	X				<p><u>Procurement:</u> Buy chemicals in bulk wherever possible. For example, IBC containers should be purchased instead of many small containers, e.g. 25 litre containers.</p> <p><u>Physical reduction:</u> Compact/compress empty containers.</p>	Compactor/drum press.	<ul style="list-style-type: none"> Procurement: number of small chemical containers bought and number of IBC chemical containers bought per month. Monitoring and Measurements sheet. Waste manifest. Weight and number of containers entering WMF per day and origin. 	X	X	
					X	Remove for disposal at the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	Banded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers exiting WMF per day and destination. Safe disposal certificates. 	X		
10	Chemical containers with redundant chemicals	X				<p><u>Procurement:</u> Keep a list of chemicals stored and their expiry dates. Send chemicals back with suppliers before the expiry dates are surpassed. The quantity chemicals bought in should be compared to the amount of expired chemicals produced to determine if chemicals should be bought less often or in smaller quantities.</p>	Chemicals register.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers entering WMF per day and origin. 	X		
					X	Chemical containers with expired/redundant chemicals must be stored in a banded area in WMF or within a Ro-Ro bin before being removed to the closest licensed hazardous landfill by the waste contractor. The compatibility of chemicals must be checked before different chemicals are stored together. For example, Nitric acid is incompatible with flammable liquids and flammable gases, amongst others.	<ul style="list-style-type: none"> Banded storage area. Ro-Ro bins. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight and number of containers exiting WMF per day and destination. 	X		
11	Electronic waste										

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Remove by a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
12	Sand-blasting grit										
					X	Sandblasting grit must be taken to the WMF. Remove by a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
13	Incinerat or ash										
					X	Incinerator ash must be taken to the WMF. Remove by a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permited waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

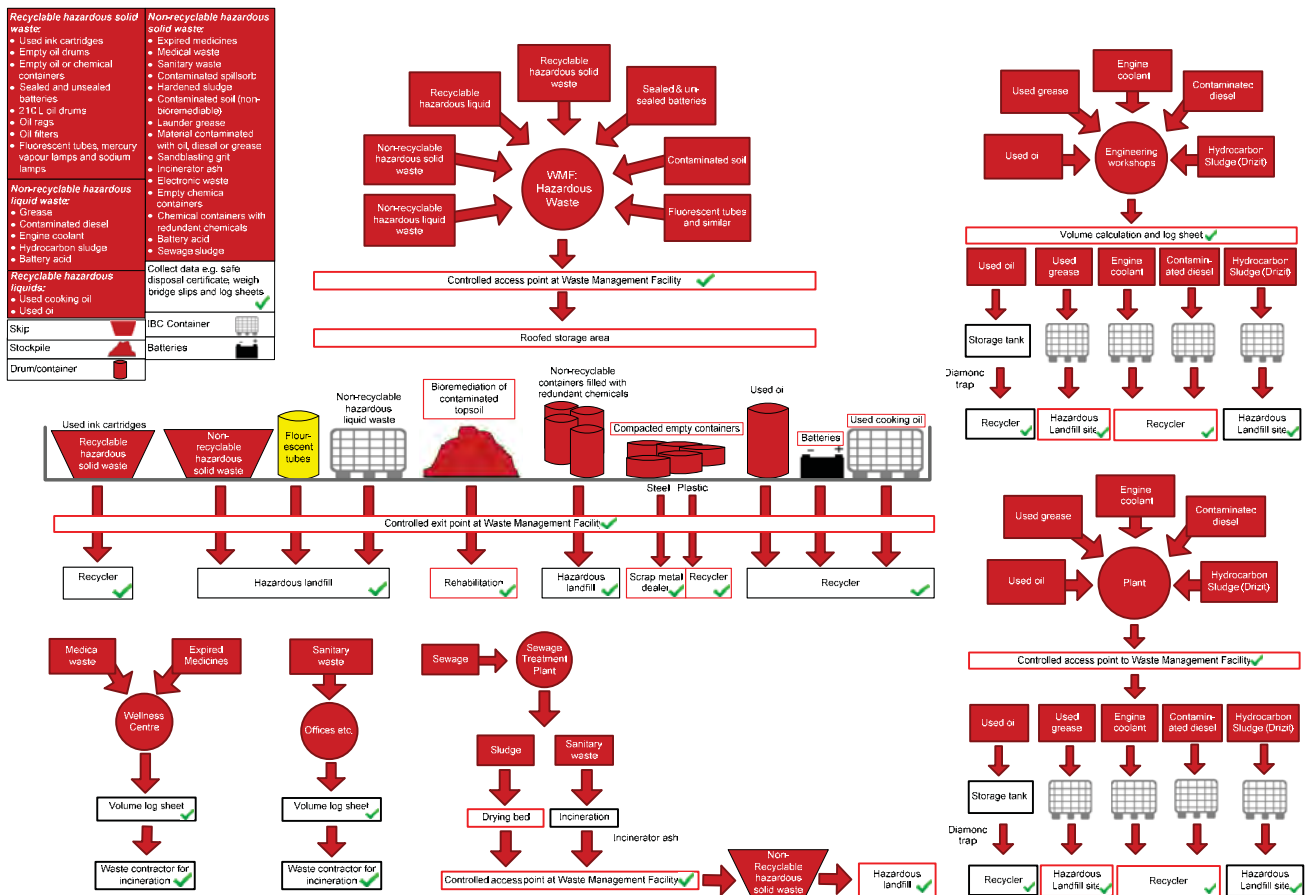


Figure 22: Proposed hazardous waste process flow in the Blue Area

Red Area: General Waste

Table 28: BPWMO - Red Area: General Waste: Recyclable General Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Paper	X				Procurement: Use recycled paper.	-	• Procurement: monitor quantity and type of paper bought per month.	X		
						Behavioural change: Printing: do not print unnecessarily, only print what you need, print double-sided, edit draft documents electronically, update mailing lists regularly to reduce wasted mail, use fax-to-email instead of conventional fax. Education: Waste reduction and recycling guide.	Waste reduction and recycling guide.	• Procurement: monitor quantity and type of paper bought per month.	X		
						Paper should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	-	X		
						Behavioural change: use one-sided scrap paper for informal notes or scratch paper. Bin for one-sided scrap paper - use when making informal copies.	Paper re-use bin.	• Procurement: monitor quantity and type of paper bought per month.	X		
						Paper should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	-	X		
2	Plastic	X				Plastic should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	-	X		
						Plastic should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	-	X		
3	Plastic pallets			X		Plastic pallets should exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF the pallets should be stored in a designated storage area prior to removal from the mine by a waste contractor for recycling.	Storage area	• Monitoring and measurement sheet. • Waste manifest. • Weight of waste exiting Red Area per day and destination. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination.	X	X	
4	Cardboard	X			X	Cardboard should be incinerated in the Red Area.	• Storage drums. • Existing incinerator.	-	X		
						Cardboard should be incinerated in the Red Area.	• Storage drums. • Existing incinerator.	-	X		
5	Cans	X				Physical reduction: Cans should exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF the cans should be baled.	Multi-purpose baler with correct specifications - buy or rent the baler.	• Monitoring and measurement sheet. • Waste manifest. • Weight of waste exiting Red Area per day and destination. • Weight of waste entering WMF per day and origin.	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
				X		Cans should exit the Red Area after security clearance and be taken to the Waste Management Facility. Baled cans (as described above) should be stored in a designated area prior to removal from the mine by a waste contractor for recycling (PPP/recycling contractor).	Storage area for can bales.	<ul style="list-style-type: none"> Monitoring and measurement sheet. Waste manifest. Weight of waste exiting Red Area per day and destination. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
6	Glass	X				Physical reduction; Glass should exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF, the glass should be crushed and placed into re-usable storage containers prior to removal for recycling.	<ul style="list-style-type: none"> Glass Crusher with correct specifications - buy or rent the crusher. Storage containers for glass, e.g. skips. 	<ul style="list-style-type: none"> Monitoring and measurement sheet. Waste manifest. Weight of waste exiting Red Area per day and destination. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
				X		Glass should exit the Red Area after security clearance and be taken to the Waste Management Facility. Crushed glass (as described above) should be removed by a local recycler or Consol Glass.	Storage containers for glass, e.g. Skips.	<ul style="list-style-type: none"> Monitoring and measurement sheet. Waste manifest. Weight of waste exiting Red Area per day and destination. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
7	Food waste	X				Food waste should be incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	-	X		
					X	Food waste should be incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	-	X		

Table 29: BPWMO - Red Area: General Waste: Non-Recyclable General Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Food waste	X				Food waste should be incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	-	X		
					X	Food waste should be incinerated in the Red Area incinerator.	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	-	X		




Table 30: BPWMO - Red Area: General Waste: Recyclable Green Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Green waste	X				Physical reduction; Green waste should exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF, the plant material should be shredded.	Shredder / chipper.	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
				X		Eradication must occur during the pollination phase of the alien plant species. Green waste should exit the Red Area after security clearance and be taken to the Waste Management Facility. Shredded plant material (as described above) should be composted/mulched. Composting of green waste: Windrow composting of shredded material and application of compost in rehabilitation process to supplement purchased compost/manure.	<ul style="list-style-type: none"> Shredder / chipper. Windrow turner or tractor. 	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of compost/mulch exiting WMF per day and destination. 	X	X	

Table 31: BPWMO - Red Area: General Waste: Non-Recyclable Green Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Green waste	X				<u>Physical reduction:</u> Green waste should exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF, the plant material should be shredded.	Shredder / chipper.	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		
				X		Green waste should exit the Red Area after security clearance and be taken to the Waste Management Facility. The plant material should be removed off site and taken to the closest licensed landfill site or buried under the waste rock dump.	Storage area.	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Paper and cardboard:	Cans:
<ul style="list-style-type: none"> All paper- shredded or sheets Small cardboard Milk boxes Newspaper Magazines Small boxes 	<ul style="list-style-type: none"> Cooldrink cans Rinsed foodstuff cans Coffee cans No aerosol cans
Wet waste (food):	Other domestic:
<ul style="list-style-type: none"> Left over food Meat Vegetables and fruit Bread Tea bags 	<ul style="list-style-type: none"> Foil Polystyrene Black bags Redundant stationary General waste not included in the recyclable bins Non-recyclable green waste Plastic Pallets
Glass:	Green waste:
<ul style="list-style-type: none"> Glass bottles Glass containers Glasses Window glass 	<ul style="list-style-type: none"> Grass Branches Stems
All plastics:	Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets ✓
<ul style="list-style-type: none"> Plastic bottles Plastic containers Plastic bags Plastic container caps and lids Black bags 	Skip 
Changes to management	Drum/ container  Bale 

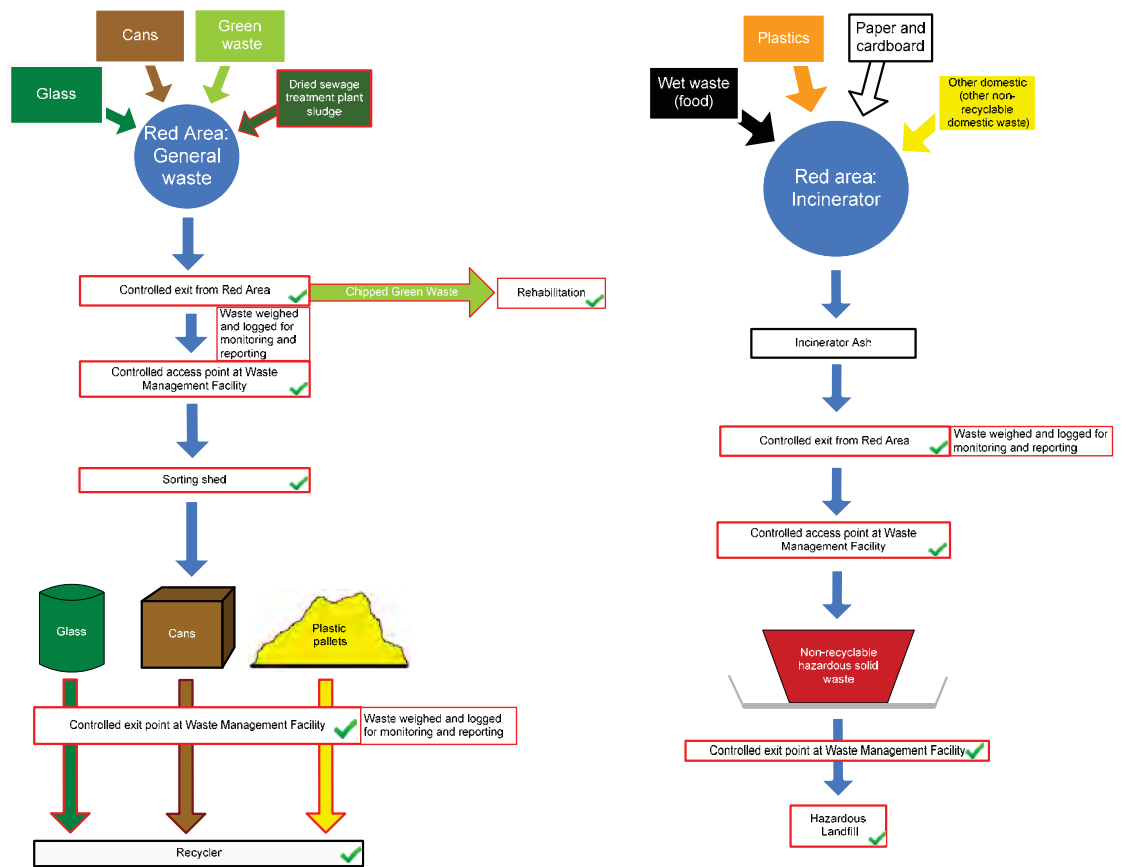


Figure 23: Proposed general waste process flow in the Red Area

Red Area: Industrial Waste

Table 32: BPWMO - Red Area: General Waste: Recyclable Industrial Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used Screen Panels			X		Used screen panels must exit the Red Area after security clearance and be taken to the Waste Management Facility. The screen panels must be removed off site by Multotec (contractor) for recycling.	Storage container(s)	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
2	Ferrous and non-ferrous metals	X				Behavioural change: Steel must exit the Red Area after security clearance and be taken to the Waste Management Facility. An employee should be trained in hot work or a contractor should be appointed to cut the large steel structures into smaller pieces that can be easily removed by the recycling contractor.		<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		
						Physical reduction: Steel must exit the Red Area after security clearance and be taken to the Waste Management Facility. An employee should be trained in hot work or a contractor should be appointed to cut the large steel structures into smaller pieces that can be easily removed by the recycling contractor.	Blow torch/cutting torch and PPE	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X	X	
						Steel must exit the Red Area after security clearance and be taken to the Waste Management Facility. Existing contract with recycling company must be continued.	Skips for storage of steel	<ul style="list-style-type: none"> Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
3	Wood (pallets and boxes)					Procurement: The use of wooden pallets must be phased out completely. Plastic pallets must be bought instead.		Procurement: number of wooden pallets bought per month.	X	X	
						Behavioural change: Where logistically possible, equipment and machinery entering the mine in wooden boxes or similar wooden packaging should be removed from the packaging in the freight yard and then taken into the mine. The wooden packaging should then be stored in the freight yard prior to removal off site for re-use, recycling or disposal.	Storage containers for wood e.g. Skips		X		
						Behavioural change: Employees should be educated on the correct use of pallets, in conjunction with forklifts and other machinery, to maximise the life span of wooden pallets already present on the mine.			X		
						Physical reduction: Broken pallets must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF they should be dismantled and stored prior to removal from the WMF.	Skip for wood storage	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Broken wooden pallets must exit the Red Area after security clearance and be taken to the Waste Management Facility. Dismantled pallets should be banded under the WHD or disposed of at the closest licensed general landfill site.	Storage skip.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
4	Convey or belting	X				Physical reduction: Conveyor belts must exit the Red Area after security clearance and be taken to the Waste Management Facility. Conveyor belts less than 50m in length must be rolled up for sale at a later stage. Local farmers can be targeted. Conveyor belts longer than 50m should be taken back by Dunlop for recycling.	<ul style="list-style-type: none"> Conveyor belt winding machine. Storage skip. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
5	Hard hats	X				Behavioural change: Hard hats must exit the Red Area after security clearance and be taken to the Waste Management Facility.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		
						Physical reduction: Hard hats must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, the hats must be dismantled in the sorting area. The pieces must be stored in a designated plastic storage area within the WMF.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		
				X		Hard hats must exit the Red Area after security clearance and be taken to the Waste Management Facility. The dismantled hard hats must be removed from the WMF for recycling (PPP/recycling contractor).	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
6	Safety boots	X				Procurement: The use of safety shoes with steel toe caps must be discontinued in favour of safety shoes with composite toe caps (e.g. carbon fibre). Shoes with composite toe caps can be scanned by security.		<ul style="list-style-type: none"> Procurement: number of safety boots with steel toe caps bought per month. Procurement: number of safety boots with composite toe caps bought per month. 	X	X	
			X			Safety boots must exit the Red Area after security clearance and be taken to the Waste Management Facility. Social upliftment programmes should be investigated whereby used shoes that are still in good condition can be donated to communities surrounding the mine. The used shoes could also be sold on auction.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Safety boots must exit the Red Area after security clearance and be taken to the Waste Management Facility. If the shoes cannot be donated, they should be disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
7	Overalls	X				Physical reduction: Overalls must exit the Red Area after security clearance and be taken to the Waste Management Facility. Cut up overalls to use as oil rags.	Scissors.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of cut up overalls exiting WMF per day for use as oil rags. 	X		
						Procurement: Used overalls should be used as oil rags instead of purchasing oil rags.	-	<ul style="list-style-type: none"> Procurement: number of oil rags bought per month. 	X		
			X			Overalls must exit the Red Area after security clearance and be taken to the Waste Management Facility. Social upliftment programmes should be investigated whereby used overalls that are still in good condition can be donated to communities surrounding the mine.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	
					X	Overalls must exit the Red Area after security clearance and be taken to the Waste Management Facility. Used overalls that cannot be donated or re-used must be disposed of as general waste at the closest licensed landfill site. Overalls that have been used as oil rags must be disposed of as hazardous waste at a licensed facility. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Bale storage bags for overalls that cannot be donated or re-used. Skip for used oil rags (used overalls). 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
8	All cabling	X				Physical reduction: All cabling must exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF, strip cables and wind into rolls e.g. copper wires.	Cable stripper.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X	X	
				X		All cabling must exit the Red Area after security clearance and be taken to the Waste Management Facility. Auction stripped cable parts or recycle with a metal recycling contractor (e.g. copper).	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	All cabling must exit the Red Area after security clearance and be taken to the Waste Management Facility. Disposal of stripped parts that cannot be recycled at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Table 33: BPWMO - Red Area: General Waste: Non-Recyclable Industrial Waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)	
1	Redundant furniture	X				<u>Physical reduction:</u> Furniture must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, it must be dismantled in the sorting area.	Dismantling tools.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X	X		
			X			Furniture must exit the Red Area after security clearance and be taken to the Waste Management Facility.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X			
					X		Furniture must exit the Red Area after security clearance and be taken to the Waste Management Facility. Material from dismantled furniture can be re-used as oil rags or absorbent material for spills.		<ul style="list-style-type: none"> Procurement: number of oil rags purchased per month. Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
						X	Furniture must exit the Red Area after security clearance and be taken to the Waste Management Facility. Broken furniture should be removed off site as general waste and disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Steel:	Wood and Cardboard
<ul style="list-style-type: none"> Scrap steel Steel waste 	<ul style="list-style-type: none"> Pallets Wooden crates Non-recyclable cardboard
Electronic waste:	Other industrial waste:
<ul style="list-style-type: none"> Redundant computer components Radios ICs 	<ul style="list-style-type: none"> Hard hats Used screen panels Water containers Furniture Cables Safety boots Overalls
Windscreen glass	Collect data e.g. safe disposal certificates, weigh bridge slips and log sheets
Rubber:	Changes i.t.o. management
<ul style="list-style-type: none"> Conveyor belts Rubber Rubber lined steel 	
Skip	
Bale bag	

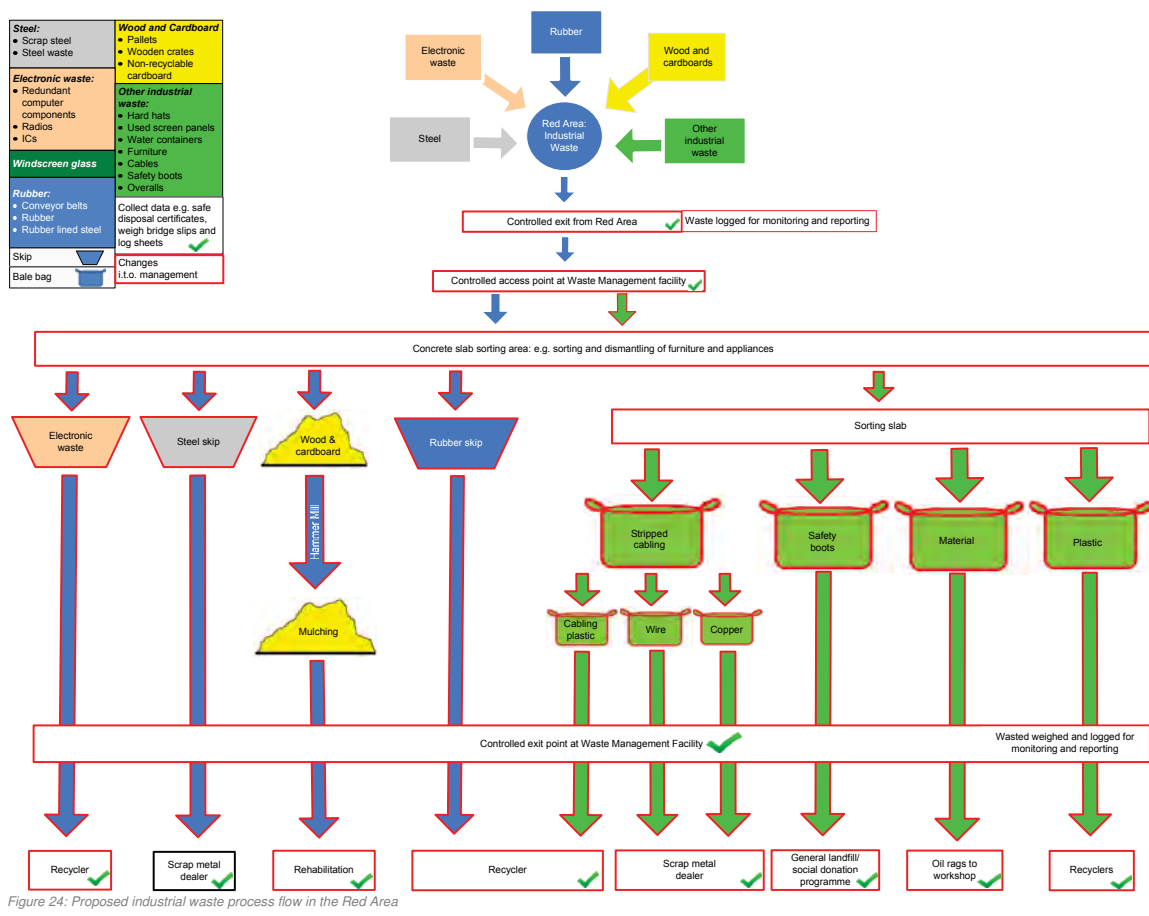


Figure 24: Proposed industrial waste process flow in the Red Area

Red Area: Building, construction and demolition waste

Table 34: BPWMO - Red Area: General Waste: Building, construction and demolition waste

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Building rubble, demolition and construction waste	-	X	-	-	Use building rubble, demolition and construction waste as filling, building foundations or compaction material.	-	-	X	X	
					X	Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the Waste Management Facility. Burial of building rubble, demolition and construction waste on the waste rock dump.	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Authorisation (waste management license) or approval letter from LEDET. 	X		
						Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the Waste Management Facility. Building rubble, demolition waste and construction waste must be stored in a designated area within the WMF. It must be disposed of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Skip to store the building rubble, demolition waste and construction waste.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X	X	

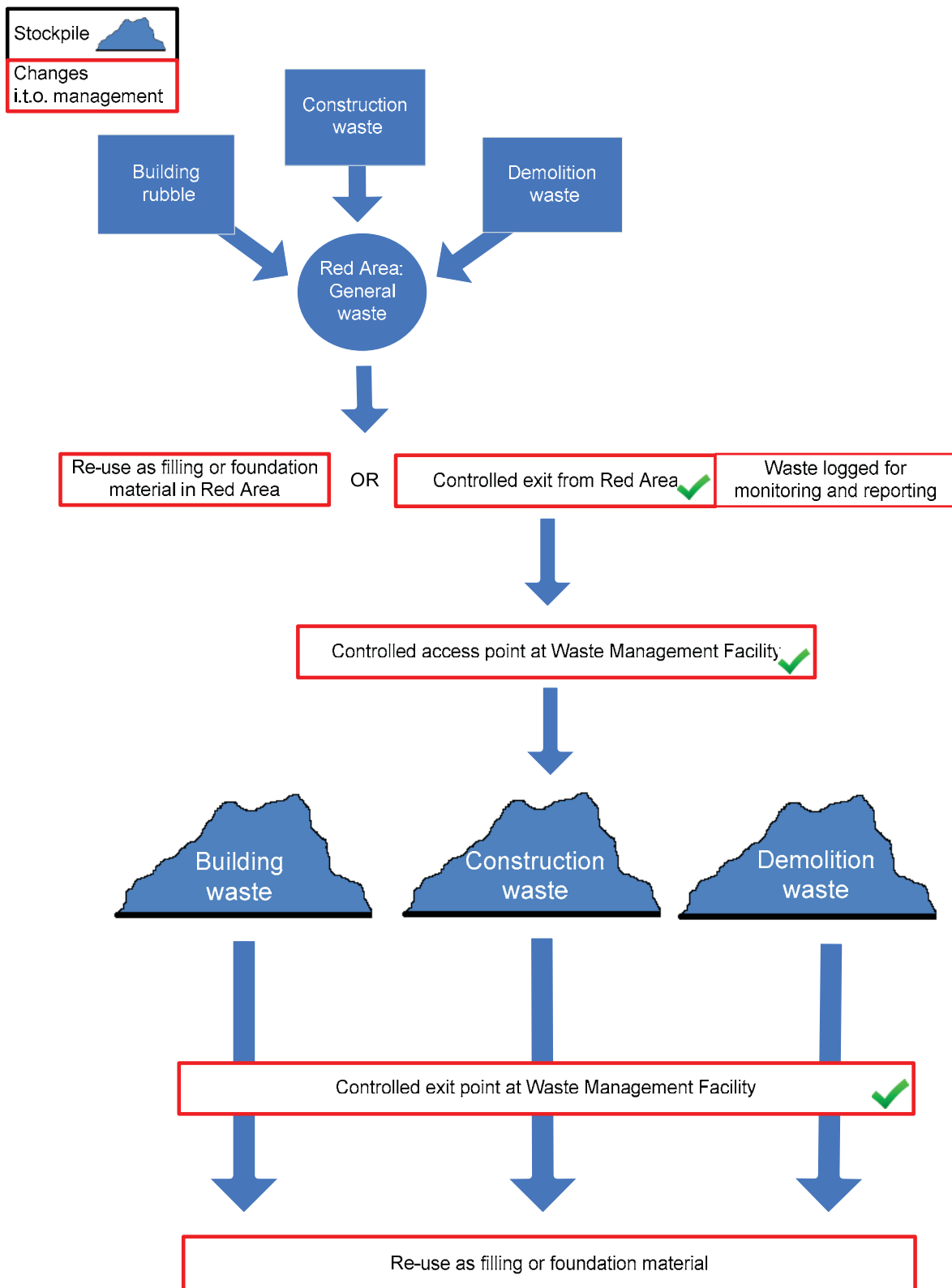


Figure 25: Proposed process flow for building, construction and demolition waste in the Red Area



Red Area: Hazardous Waste

Table 35: BPWMO - Red Area: Hazardous Waste: Recyclable Hazardous Liquids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used oil	X				Behavioural change: Prevent contamination of oil with water and engine coolant as it decreases the volume that can be recycled.			X		
				X		Different storage containers must be provided for the following: oils, oil rags and oil filters. Used oil must exit the Red Area after security clearance and be taken to the WMF. From there, oil must be passed through a diamond trap prior to removal off-site by an oil recycling contractor.	Storage containers e.g. Tanks/bullets.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		

Table 36: BPWMO - Red Area: Hazardous Waste: Non-Recyclable Hazardous Liquids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Grease										
					X	Grease must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove grease from the WMF by way of a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	Storage container for grease.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
2	Battery Acid										
					X	Battery acid must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove grease from the WMF by way of a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	Storage container	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
3	Chemical containers with redundant chemicals - Liquid										
					X	Containers must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove by a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/permitted waste contractor.	Bunded storage area	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

Table 37: BPWMO - Red Area: Hazardous Waste: Recyclable Hazardous Solids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/ Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Used Ink cartridges	-	-								
				X		Used ink cartridges must exit the Red Area after security clearance and be taken to the Waste Management Facility. Recycling of used ink cartridges by supplier.	<ul style="list-style-type: none"> • Skips or other storage containers. • Bundled storage area. 	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination. 	X		
2	Sealed batteries	-	-								
				X		Sealed batteries must exit the Red Area after security clearance and be taken to the Waste Management Facility. Recycling of batteries by supplier.	Bundled storage area.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination. 	X		
3	Un-sealed batteries	X				<u>Procurement</u> : Phase out un-sealed batteries and only use sealed batteries at the mine.	-	<ul style="list-style-type: none"> • Procurement: number of unsealed batteries bought per month. 	X		
				X		Un-sealed batteries must exit the Red Area after security clearance and be taken to the Waste Management Facility. Recycling of batteries by supplier.	Bundled storage area.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination. 	X		
4	Empty (mostly 25l) chemical containers	X				<u>Physical reduction</u> : Containers must exit the Red Area after security clearance and be taken to the Waste Management Facility. At the WMF, compact/compress empty containers.	Compactor/drum press.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. 	X	X	
				X		Containers must exit the Red Area after security clearance and be taken to the Waste Management Facility. Recycling of compressed plastic containers by a waste recycling contractor.	Bundled storage area.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. • Weight of waste exiting WMF per day and destination. 	X		
5	Empty 210l oil drums	X				<u>Physical reduction</u> : Drums must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, compact/compress empty oil drums.	Compactor/drum press	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Recording of type of waste and quantity of containers exiting Red Area per day. • Weight of waste entering WMF per day and origin. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/ Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
				X		Drums must exit the Red Area after security clearance and be taken to the Waste Management Facility. Recycling of metal oil drums by scrap metal recycler.		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		
6	Fluorescent tubes, mercury vapour lamps and sodium lamps	X				<p>Physical reduction: Crushing of lamps must occur in a drum-top crusher. Crushed lamps must exit the Red Area after security clearance and be taken to the Waste Management Facility. They must then be stored in weather-proof containers at the WMF. Employees must wear the necessary PPE when crushing the lamps.</p> <p>Procurement: The use of fluorescent tubes should be phased out and LED (light-emitting diodes) used throughout the mine.</p>	<ul style="list-style-type: none"> Drum-top crusher Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X		
				X		Crushed lamps must exit the Red Area after security clearance and be taken to the Waste Management Facility. The crushed, used lamps must be collected by- or sent to- a mercury recycling contractor.	<ul style="list-style-type: none"> Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Destruction and Recycling Certificate. 	X	X	
					X	Crushed lamps must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove by a waste contractor for disposal at the closest hazardous landfill site - must cease before 23 August 2016 . Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage containers. Bunded area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
7	Oil rags and oil filters			X		Oil rags and oil filters must exit the Red Area after security clearance and be taken to the Waste Management Facility. The oil rags and filters must be removed by the oil recycling contractor.	<ul style="list-style-type: none"> Storage containers. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. 	X		

Table 38: BPWMO - Red Area: Hazardous Waste: Non-Recyclable Hazardous Solids

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
1	Material contaminated with oil,										

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
	diesel or grease, empty oil/chemical containers				X	The waste must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, it should be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the waste management contractor and disposal of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
2	Contaminated spillsorb				X	The waste must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, it should be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the waste management contractor and disposal of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Additional storage skips need to be placed at strategic areas at the mine for the storage of hazardous waste, including contaminated spillsorb. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
3	Contaminated soil not suitable for bioremediation (due to levels of contamination)				X	The waste must exit the Red Area after security clearance and be taken to the Waste Management Facility. In the WMF, it should be placed into hazardous waste skips. It should then be removed together with other hazardous waste by the waste management contractor and disposal of at the closest licensed landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
4	Sanitary waste generated in bathrooms and 'SHE' bins				X	Sanitary waste must be stored in the containers provided. The waste must be collected by the waste management contractor (via security clearance) and incinerated off site at a licensed facility.	SHE bins in ladies toilets.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Safe incineration certificates. 	X		
5	Empty chemical containers	X				<p><u>Procurement:</u> Buy chemicals in bulk wherever possible. For example, IBC containers should be purchased instead of many small containers, e.g. 25 litre containers.</p> <p><u>Physical reduction:</u> Containers must exit the Red Area after security clearance and be taken to the Waste Management Facility. Compact/compress empty containers in the WMF.</p>	<ul style="list-style-type: none"> Compactor/drum press. 	<ul style="list-style-type: none"> Procurement: number of small chemical containers bought and number of IBC chemical containers bought per month. Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. 	X	X	

No.	Waste stream	Reduce	Re-use	Recycle	Disposal	Best Practicable Waste Management Option	Equipment/Technology	Monitoring	Short term priority (< 1 yrs)	Medium term priority (2-5 yrs)	Long term priority (> 5 yrs)
					X	Containers must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove by a waste contractor from WMF for disposal at the closest licensed landfill site. Use a licensed/permitted waste contractor.	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
6	Chemical containers with redundant chemicals - Solid	X				<u>Procurement:</u> Keep a list of chemicals stored and their expiry dates. Send chemicals back with suppliers before the expiry dates are surpassed (after security clearance to exit the Red Area). The quantity chemicals bought in should be compared to the amount of expired chemicals produced to determine if chemicals should be bought less often or in smaller quantities.	Chemicals register.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. 	X		
					X	Chemical containers with expired/redundant chemicals must exit the Red Area after security clearance and be taken to the Waste Management Facility. They must be stored in a bunded area or within a Ro-Ro bin in the WMF before being removed to the closest licensed hazardous landfill site by a licensed/permitted waste contractor. The compatibility of chemicals must be checked before different chemicals are stored together. For example, Nitric acid is incompatible with flammable liquids and flammable gases, amongst others.	<ul style="list-style-type: none"> Bunded storage area. Ro-Ro bins. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
7	Electronic waste				X	Electronic waste must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove by a waste contractor for disposal at the closest licensed landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		
8	Incinerator ash				X	Incinerator ash must exit the Red Area after security clearance and be taken to the Waste Management Facility. Remove by a waste contractor for disposal at the closest licensed landfill site. Use a licensed/permitted waste contractor.	<ul style="list-style-type: none"> Storage skip. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Recording of type of waste and quantity of containers exiting Red Area per day. Weight of waste entering WMF per day and origin. Weight of waste exiting WMF per day and destination. Safe disposal certificates. 	X		

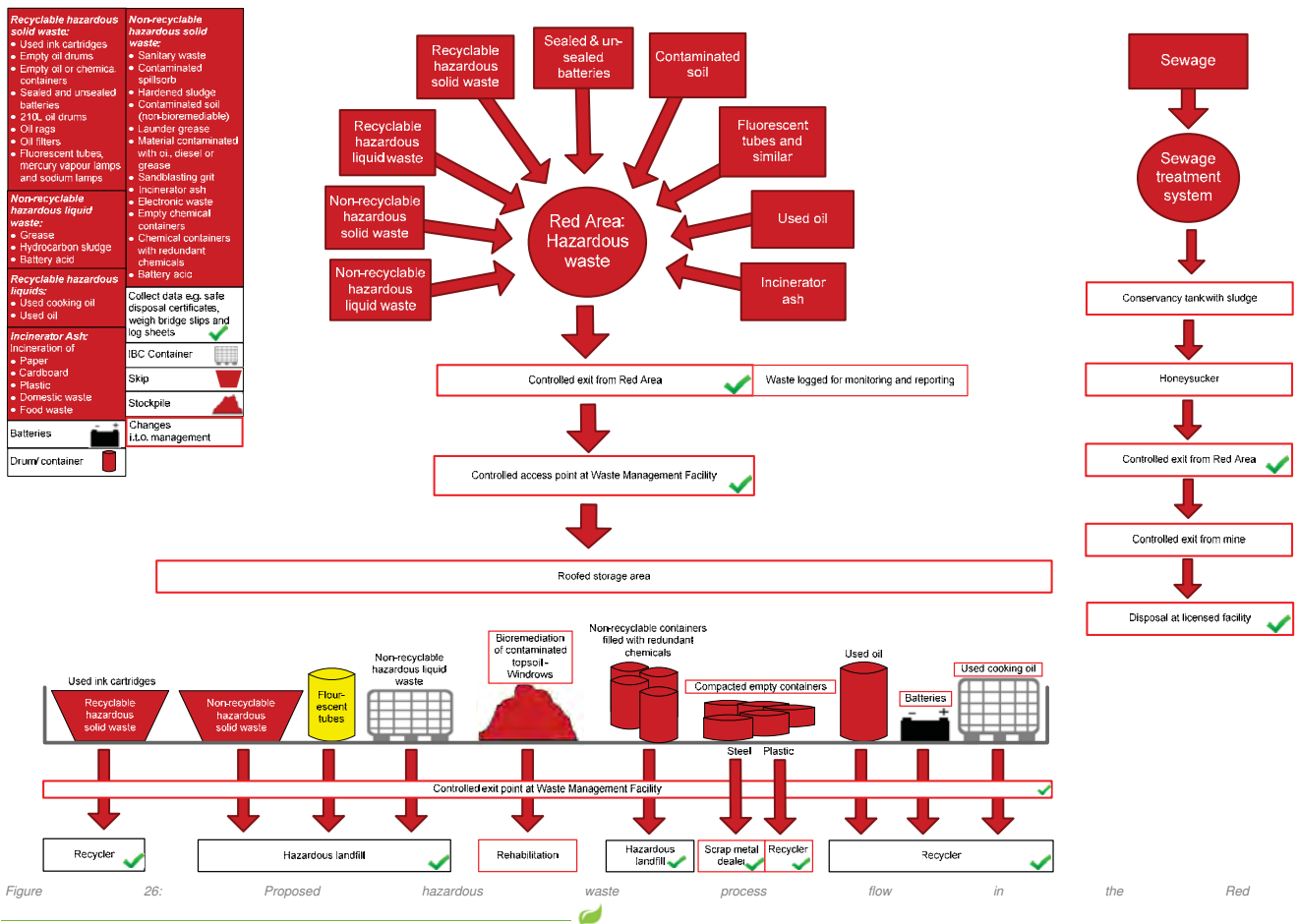


Figure 26: Proposed hazardous waste process flow in the Red Area

5. WASTE MANAGEMENT PROGRAMME IMPLEMENTATION

In order to give effect to the chosen BPWMO's for the different waste streams, target projects were identified and agreed upon by the Venetia Environmental Management Department. The combination of these target projects make up a Conceptual WMP for the Mine.

The aim of the WMP is to achieve the identified goals, objectives, targets and activities with defined budget provisions and organisational responsibilities. Once the Conceptual WMP has been populated and agreed upon by Management it becomes an actual working document known as the WMP. The Programme can then be implemented according to a specific schedule and responsibilities that can be tracked and monitored.

Timeframes for the roll-out of the entire WMP will be depended on licensing period, financial provision, planning, design and civil work requirements.

Refer to Appendix A for the Conceptual Waste Management Programme.

6. CONCLUSION AND RECOMMENDATION

The EMS is the mechanism that was introduced by the mine in order to meet its overall environmental duty of care requirements. It is also the mechanism used to maintain legal compliance with regards to relevant environmental legislation.

This strategy report identified areas of improvement with regards to waste management at the mine, but more than that it identified system (EMS) based mechanisms that would correct and align gaps with regards to all aspects of waste management at the mine.

Therefore, by utilising the management tool (EMS) accordingly, the set objectives and targets will be met.

The following EMS updates are recommended:

- The update of the legal register with specific reference to the requirements as per the National norms and standards (GN 634, GN 635, GN 636, GN 921 and GN 926);
- All waste management related procedures needs to be updated;
- Compile a waste manifest as required by GN 634 (Waste classification and management regulations);



APPENDIX A - CONCEPTUAL WMP

The aim of this conceptual WMP is to achieve the identified goals, objectives, targets and activities with defined budget provisions and organisational responsibilities.

Target projects

Project A1: Implementation of new waste management process flow

Project B1: Upgrade of Waste Management Facility

Project B2: Upgrade of Operations Workshops (Plant)

Project B3: Upgrade of Mining workshops

Project B4: Upgrade of Sewage Treatment Plant

Project B5: Establishment of EMV tyre storage area

Project B6: Development of Waste Infrastructure for Shaft Construction Site

Project B7: Installation of numerous package plant systems

Project B8: Upgrade of Red Area Waste Infrastructure

Project C1: Registration of historic EMV stockpile on WRD and compilation of tyre abatement plant

Project C2: Application for atmospheric emission license for incineration of waste in Red Area

Project C3: Waste Management License Application

Project D1: Partnering project with local municipality (Musina/Alldays/Bochum) to optimise municipal waste management on landfill sites

Project E1: Once-off disposal of historic waste (wooden pallets, windscreens and building rubble) on Venetia waste rock dump

Project F1: Development of a Waste Manifest

Project G1: Classify all waste streams according to RN 634 requirements

1. Target project A: Implementation of new waste management process flows

The SWOT analysis and BPWMO exercise that was carried out for each of the waste streams, enabled the mine's Environmental Management Department, to challenge the current waste management practice at the mine.

Better alternatives were investigated and considered based on the applied methodology resulting in the development of new process flows for each of the identified waste streams and associated waste stream management areas.

Better mitigation alternatives were also proposed for each of the waste streams that were captured in the BPWMO matrices.

In order to meet the overall objective of improved waste management at the mine, the new waste management process flows for the blue and red areas need to be rolled out with immediate effect.

As a starting point, the rollout will require the update of the current waste management system documentation (e.g. waste management procedures, monitoring and reporting procedures etc.) and therefore forms **Target Project A1**.

2. Target project B: Upgrade of all Waste Handling Facilities

The Status Quo Analysis unveiled gaps that exist with regards to waste handling infrastructure. Current facilities do not conform to the requirements of GN R. 634,635, 636, 921 and 926.

Therefore, during the process, possible interventions were identified that are dependent on certain physical or structural changes that would need to be made in order to achieve the set objectives, one being the aspect of legal compliance.

As legal compliance forms an integral part of the mine's overall objectives, much care was taken to incorporate the underlying philosophy and requirements of related or relevant environmental legislation.

Key waste areas were identified and certain improvement targets were set. It may, however, be difficult to implement all of the new waste area upgrades simultaneously. A rational and systematic approach was followed to prioritise the various implementation stages into short, medium and long-term projects. Important aspects considered during the prioritisation were:

- Environmental Criteria: what environmental costs and benefits will the preferred project / initiative address? Will it lead to improved compliance with environmental regulatory requirements?
- Economic and Financial Criteria: what expenditure will be required and how much income will the initiative generate? Will the capital spend be reclaimed by the revenue generated or by the savings on waste management costs?
- Technical Criteria: is there technical know how available?

In order to achieve the set targets, management actions for each prioritised waste stream needed to be clearly defined. These involved proposed actions on waste minimisation, re-use, recycling, recovery and disposal. The measures may be initiated and implemented in a specific order to ensure that the best results are achieved. Key personnel and other resources and scheduling issues need to be resolved to the point that management is aware of the timing and scope of all the proposed actions. The proposed improvement activities are measured against target dates in line with the set goals and objectives.

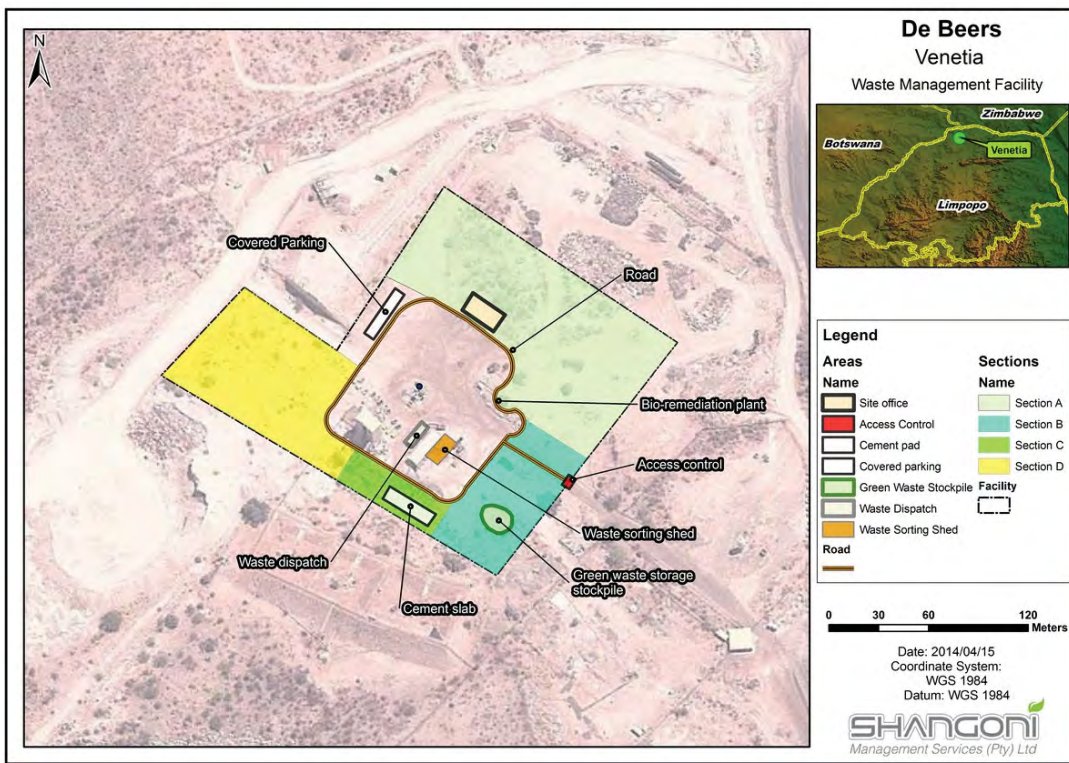


Figure 1: Proposed conceptual layout of the WMF

Table 6: B5 - Establishment of EMV tyre storage area

Project B5: Establishment of EMV tyre storage area														
Tasks/Activities	Dimensions/ size	Budget	Timeframe											
			May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15
1. Spacing of EMV tyres for fire control														
2. Collection and transport of scattered EMV tyres to storage area														
3. Establish fire brakes														
4. Installation of demarcation signage														

Table 7: B6 - Development of Waste Infrastructure for Shaft Construction Site

Project B6: Development of Waste Infrastructure for Shaft Construction Site														
Tasks/Activities	Dimensions/ size	Budget	Timeframe											
			May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15
1. Construction of roofed, bunded storage area														
2. Purchase of and installation of colour coded wheelie bins and skips														

Table 8: B7 - Installation of numerous package plant systems

3. Target project C: Improve Legal Compliance Status

From the compliance assessment undertaken on the current waste management areas and associated activities relating to them it was clear that the mine currently faces the risk of legal prosecution that can have an unwanted financial and reputational impact on the company.

It is therefore a high priority project for the mine to address this issue as soon as possible through following the necessary environmental authorisation and associated waste licensing/permitting processes.

The mine is already in continual discussion with both the provincial as well national waste regulating departments in order to remedy the situation.

Some of the other target projects have a direct influence on the legal compliance status as it addresses issues such as waste classification, waste handling, monitoring and reporting requirements governed by the related waste regulations.

Listed Activities to be applied for i.t.o. NEM:WA GN 921 of 29 November 2013

Table 13: Waste Management Activities: Waste Management Facility

Waste Management Activity	Related Listed Activity (i.t.o. NEM:WA)
<p>The sorting and baling of general waste:</p> <ul style="list-style-type: none"> • Cardboard; • Paper; • Glass; • Cans; • Plastic; and • Non-recyclable domestic waste, including food waste. 	<p>Category A, No. 2: The sorting, shredding, grinding, crushing, screening or baling of general waste at a facility that has an operational area in excess of 1000m².</p>
<p>Recycling and/or re-use of waste:</p> <p>Manual and/or mechanical sorting, dismantling, baling, stripping, shredding, crushing and compaction of any of the following wastes: Used screen panels, metals, conveyor belts, hard hats, safety boots, overalls, plastic water containers, blasting wire, electrical cabling, redundant furniture, windscreen glass, rubber and air filters.</p>	<p>Category A, No. 3: The recycling of general waste at a facility that has an operational area in excess of 500m², excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.</p>
<p>Recovery of wood (chipping and hammer mill)</p>	<p>Category A, No. 5: The recovery of waste including the refining, utilisation, or co-processing of waste in excess of 10 tons but less than 100 tons of general waste per day or in excess of 500kg but less than 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.</p>
<p>All construction and associated activities relating to the upgrade of the WMF</p>	<p>Category A, No. 12: The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).</p>
<p>All construction and associated activities relating to the upgrade of the WMF</p>	<p>Category A, No. 13: The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule.</p>
<p>Ex situ bio-remediation of hydrocarbon</p>	<p>Category B, No. 2: The reuse or recycling of</p>

Waste Management Activity	Related Listed Activity (i.t.o. NEM:WA)
contaminated soil, with the potential addition of sewage sludge	hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.
Ex situ bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge	Category B, No. 3: The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
Ex situ bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge	Category B, No. 4: The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage.
All construction and associated activities relating to the upgrade of the WMF	Category B, No. 10: The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).

Table 14: Waste Activities: Mine wide and waste rock dump

Waste Management Activity	Related Listed Activity (i.t.o. NEM:WA)
Disposal of inert waste (building rubble) used for levelling and building (infilling)	Category B, No. 9: The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.

4. Target project D: Social Upliftment through Public Private Partnership (PPP)

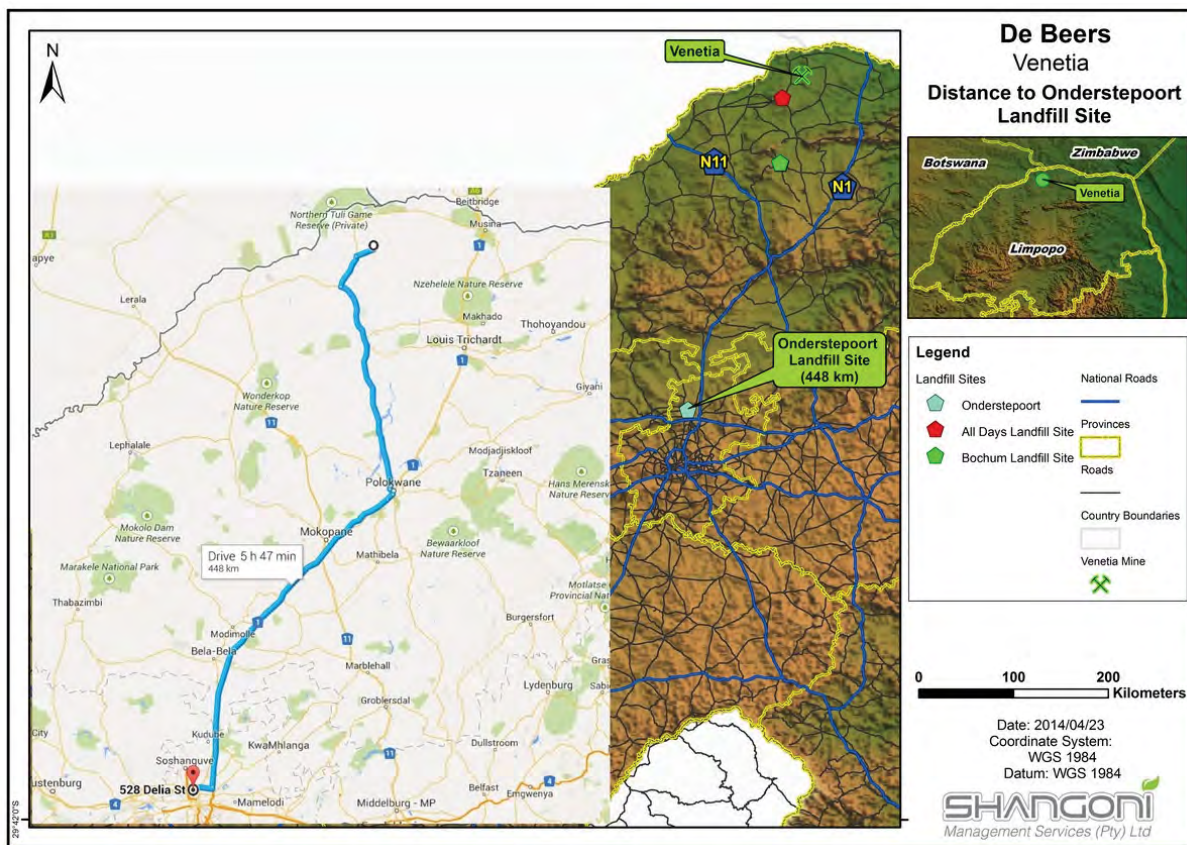
Initiatives

Venetia will have to take the initiative to engage in a public private partnership with one or more local municipalities, such as Alldays, Musina or Bochum. The main focus area should be specifically with regards to providing better waste management services in the chosen area and to contribute financially and or through the sharing of knowledge in this regard.

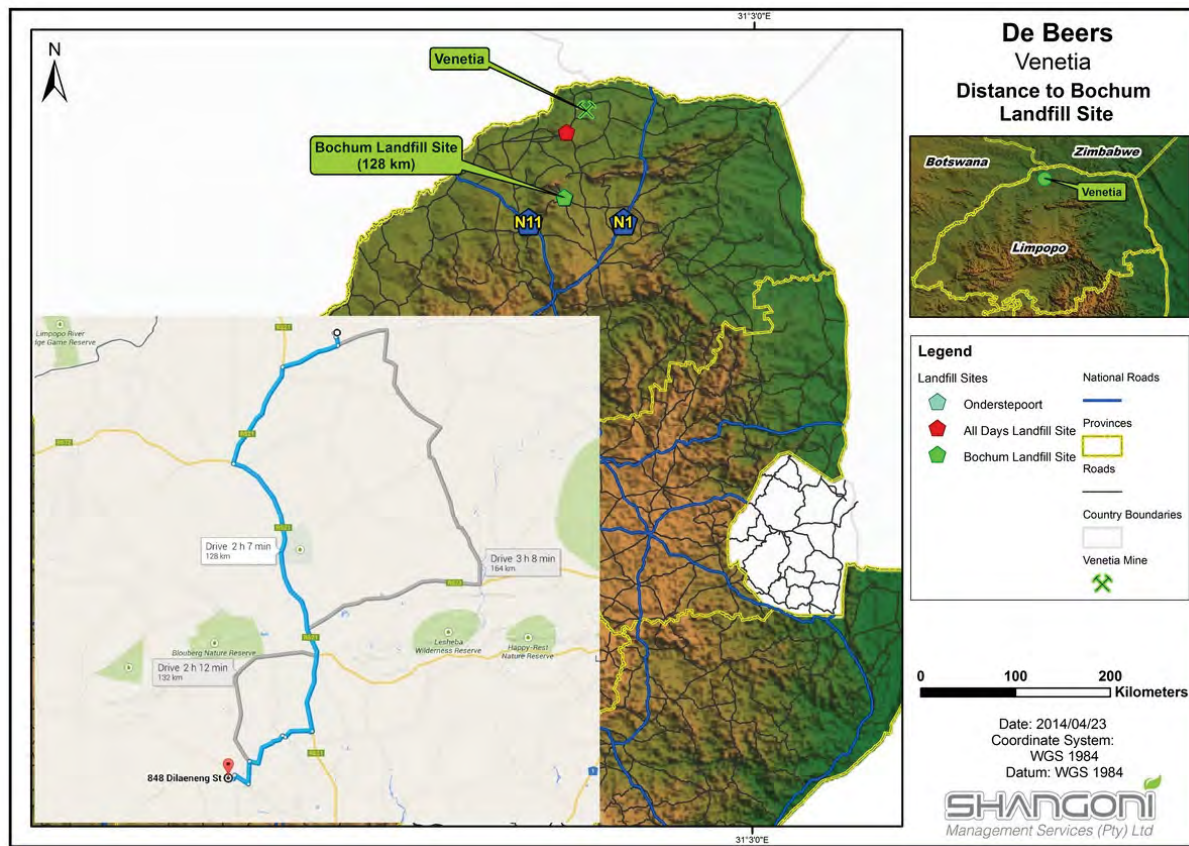
Poor public sector performance as a result of inefficiencies, wastefulness, carelessness and the

overall weakness in service delivery affects all of these towns and related industries.

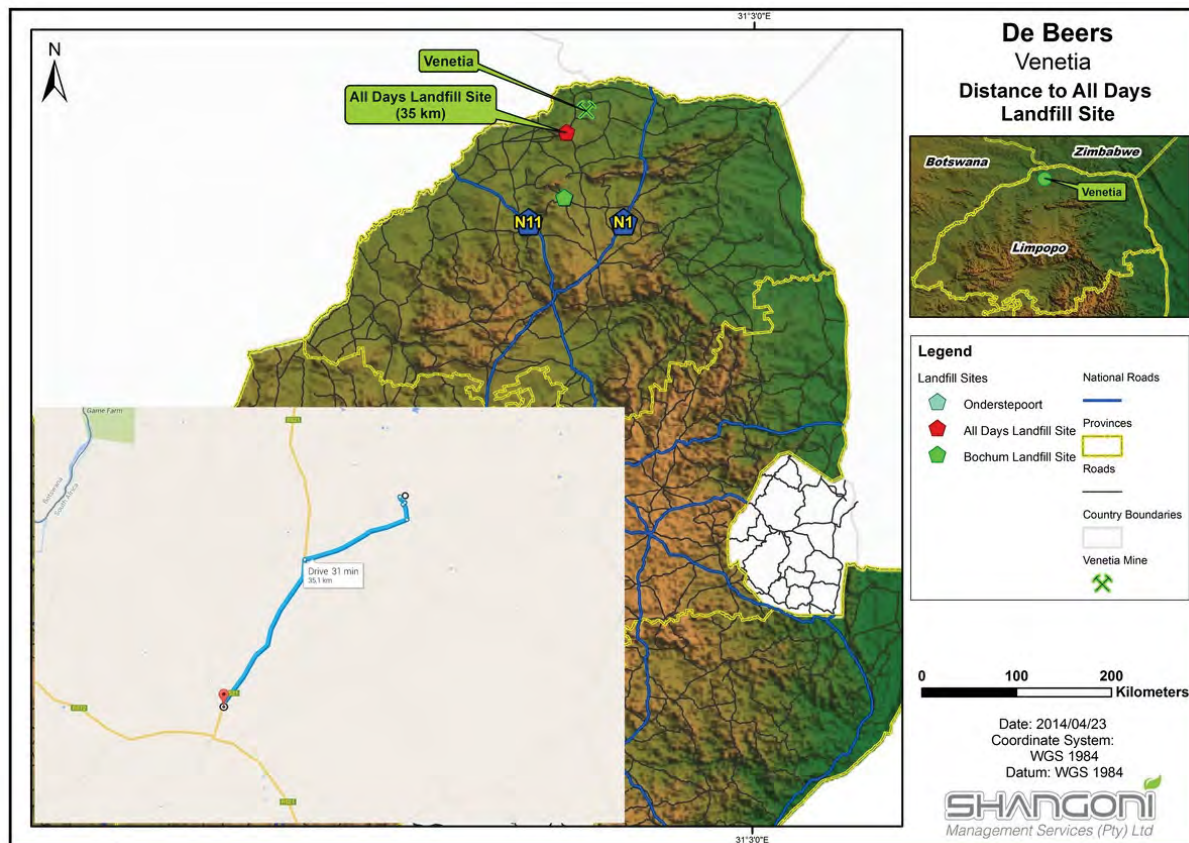
A clear example of the way in which Venetia was affected by these inefficiencies was due to the legal non-compliance of these towns in terms of the lack of licensed waste disposal facilities (unlicensed landfill sites). This resulted in the transport and disposal of general waste from the mine to the Onderstepoort licensed landfill site in Pretoria, situated approximately 448kms from the mine.



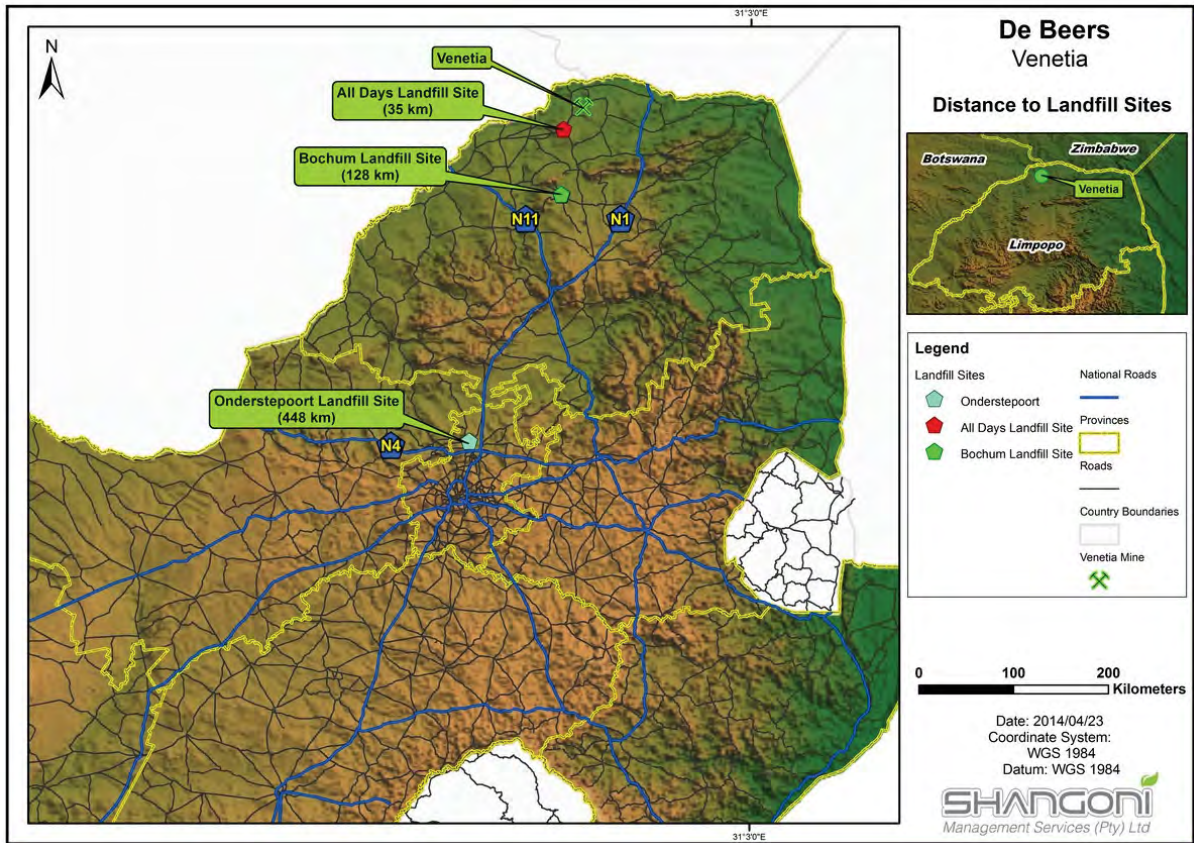
Fortunately, Bochum landfill site obtained a disposal license from the regulatory authority during 2012 and thus as an interim measure, provides an alternative for Venetia to dispose of their general waste at a facility almost four times closer than in the past.



A longer term option would be to assist a town such as Alldays to obtain a waste disposal permit whereby Venetia will also benefit from the shorter travel distance for waste disposal. Alldays is only 35km's from Venetia.



At present PPP is considered by all spheres of government as an important model for urban development. It has been found that privatisation or partnership can be used as a good policy to improve economic growth in future. PPPs also enhance social infrastructure in a sustainable manner.



5. Target project E1: Once-off disposal of historic non-hazardous waste (wooden pallets, windscreen glass, PPE and building rubble) on Venetia waste rock dump

Written approval should be attained prior to the roll-out of the proposed disposal of historic non-hazardous waste as well as un-contaminated building rubble on the waste rock dump at Venetia.

Because of the difficulty in scanning the wood and rubble for potential diamond contents, these wastes have accumulated over the past years without getting security clearance to leave the mining area.

In future wood waste will be shredded and used as mulching in the rehabilitation process and building rubble will be utilised as filling material as and when needed. These activities will both be applied for along with all other related listed activities in terms of the National Environmental Management: Waste Act, Act 59 of 2008 for formal authorisation prior to commencement.

6. Target project F1: Development of a Waste Manifest

Waste generators must keep accurate and up to date records of the waste that they generate. Records must reflect:

- Specific types of waste generated;
- Quantity of each type of waste generated, expressed in tons/m³ per month; and
- Quantities of each type of waste that has either been re-used, recycled, recovered, treated or disposed of in tons/m³ per month.

In terms of the National Norms and Standards for Waste Classification and Management, RN 634 of 23 August 2013, information to be supplied by the Waste Generator (Venetia) in the form of a manifest include the following:

- Unique consignment identification number (bar code);
- Generator's contact details (contact person, physical and postal address, phone number (land-line and/or cell phone), fax number email address);
- Physical address of the site where the waste was generated (if different from above);
- Emergency contact number;
- Origin or source of the waste (process or activity);
- Description of the waste (waste classification and waste category; waste risk profile if relevant for disposal);
- Chemical composition of the waste;
- Physical nature or consistency of the waste (liquid, solid, sludge; pump-able, non-pump-able);
- Quantity of waste;
- Packaging (bulk, small containers, tank);
- Transport type (tanker, truck, container);

- Special handling instructions;
- Date of collection or dispatch;
- Intended receiver (facility or waste manager); and
- Declaration (content of the consignment is fully and accurately described, classified, packed, marked and labelled, and in all respects, in proper condition for transportation in accordance with the applicable laws and regulations).

7. Target project G1: Classify all waste streams according to Norms and Standards requirements

In terms of the Waste Classification and Management Regulations (GG 36784, GN 634 of 23 August 2013),

"waste classification" means establishing-

- (a) whether a waste is hazardous based on the nature of its physical, health and environmental hazardous properties (hazard classes); and
- (b) the degree or severity of hazard posed (hazard categories);

The regulation specify that waste must be kept separate for the purposes of classification and must not be mixed prior to classification.

In terms of these Regulations all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation, except for wastes listed in Annexure 1 of these Regulations that do not require classification in terms of SANS 10234.

Wastes listed in Annexure 1 of these regulations are:

(2) (a) General waste-

- (i) Domestic waste;
- (ii) Business waste not containing hazardous waste or hazardous chemicals;
- (iii) Non-infectious animal carcasses;
- (iv) Garden waste;
- (v) Waste packaging;
- (vi) Waste tyres;
- (vii) Building and demolition waste not containing hazardous waste or hazardous chemicals; and
- (viii) Excavated earth material not containing hazardous waste or hazardous chemicals.

(2) (b) Hazardous waste-

(i) Waste Products:

Asbestos Waste;

PCB waste or PCB containing waste (> 50 mg/kg or 50 ppm); and

Expired, spoilt or unusable hazardous products.

(ii) Mixed Waste:

General waste, excluding domestic waste, which contains hazardous waste or hazardous chemicals;
and

Mixed, hazardous chemical wastes from analytical laboratories and laboratories from academic institutions in containers less than 100 litres.

(iii) Other:

Health Care Risk Waste (HCRW).

Waste Management Programme Implementation Plan and Review

WMP Plan and Schedule

Once the Final WMP has been adopted and the implementation phase commenced, activities must be monitored to check progress against implementation plan and schedule.

As a starting point, the target projects needs to be checked for progress. Progress with regards to improved waste management practice not only allow for better legal compliance status but provides momentum and follow through on achieving the set objectives.

Table 16: Implementation Plan

Objective	Target Project	Section	Responsibilities	Funding Needs	Due date	Checked by
A	A1					
B	B1					
	B2					
	B3					
	B4					
	B5					
	B6					
	B7					
	B8					
C	C1					
	C2					
	C3					
D	D1					
E	E1					
F	F1					
G	G1					

Table 17: Implementation Schedule

Monitoring of Implementation Schedule	On Schedule?	If Not, Why?	Actions	Responsible Person	Next Review
Target Project A1					
Target Project B1					
Target Project B2					
Target Project B3					
Target Project B4					

Monitoring of Implementation Schedule	On Schedule?	If Not, Why?	Actions	Responsible Person	Next Review
Target Project B5					
Target Project B6					
Target Project B7					
Target Project B8					
Target Project C1					
Target Project C2					
Target Project C3					
Target Project D1					
Target Project E1					
Target Project F1					
Target Project G1					

Although this WMP is voluntary, the recommendation is that some form of monitoring and reviewing of the Programme should be considered, conducted and reported within the annual sustainability report of the mine.

With regards to monitoring and reporting, it is proposed that existing internal monitoring and reporting mechanisms be utilised and where they do not exist, new ones should be established. For best monitoring to take place, any objectives that are qualitative in nature, may need to be transformed into quantitative targets to make them operational and measurable. In order to monitor the achievement of such objectives, pre-conditions may be identified and these can be used as a control system against which progress can be measured. The idea is to use the measurable indicator(s) to monitor if the objectives are met.

Records and/or reports should be kept for submission to the authorities, when the need arises or on request by the departments. The monitoring and reporting methods may include, amongst others, the following:

- Regular internal environmental audits, with WMP compliance included in the audit schedule;
- External surveillance audits (with WMP compliance included in the schedule);
- Reporting of key performance indicators;
- Reporting in sustainability reports; and
- Conforming to the reporting requirements as may be detailed in waste management licenses (permits) or as prescribed by the Minister or MEC. WMP compliance may be included in the legal register.

The WMP should be a living document, with the review process being an ongoing activity. The WMP must therefore be reviewed and revised periodically whenever new information on waste management practices, standards, legislation etc. becomes available or if there are any changes that must be made to the plan. The plan should be reviewed on a yearly basis.

A procedure to review and update the WMP should be established and practices modified to reflect changing technologies and regulations and possible changes to mining operations. Such procedures may stipulate, for example, the interval at which waste management audits will be undertaken, as well as the interval at which reporting on waste issues will be carried out.

Review Scheduling

The table below indicates the review of the WMP. This is to ensure that all aspects of the monitoring plan are still relevant or which aspects need to be renewed. These aspects should be reviewed as required, annually during implementation.

Table 18: Review schedule

Review	Are These Still Relevant?	Amendments Required?	If Yes, Provide Details	Responsible Person	Next Review
Objectives and Target Activities					
Implementation schedule					
Best Practical Waste Management options					
Legislative developments					
Training of personnel					

- Update monitoring and reporting procedure to include new legal requirements pertaining to waste monitoring and reporting;
- Register waste storage areas as required by GN 926 (National norms and standards for the storage of waste); and
- MSDS's needs to be compiled for different waste streams as well as for hazardous chemicals contributing to hazardous (mixed).

