

DE BEERS
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De Beers Consolidated Mines Ltd

**Environmental Impact
Assessment & Environmental
Management Programme:
Waste Management at the
Venetia Mine, Limpopo Province**

August 2015

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De Beers Consolidated Mines Limited



July 2015

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ERM Reference: 0212120

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For and on behalf of
Environmental Resources Management

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Date: August 2015

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EXECUTIVE SUMMARY

Locality

The De Beers Consolidated Mines Limited (DBCM) Venetia Mine (Venetia) is situated on the farm Venetia 103MS, which lies approximately 80km west of Musina and 40km north-east of Alldays in the Limpopo Province. The mine is located within the Musina Local Municipality of the Vhembe District Municipality in the Limpopo Province of South Africa.

Mining Rights

The mining rights extent of the Venetia Mine is approximately 3,000ha. Adjacent to the mine, to the north, east and west is the 36,000ha DBCM owned Venetia Limpopo Nature Reserve (VLNR) whilst the Gotha Farm which conducts stock and game farming lies to the south of the Mine .

Existing Environmental Approvals

The Environmental Management Programme (EMP) for the existing operations (open pit and underground operations), was issued by the Department of Mineral Resources (DMR) Ref: LP 30/5/1/3/2/1 (58) EM) on 1 October 2012 under the Mineral and Petroleum Resources Development Act (MPRDA). The Environmental Authorisation was granted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET on 13 July 2012 (Ref: 12/1/9-7/2-V49-W109).

A Water Use Licence was issued by the Department of Water Affairs on 21 November 2011 - Licence No 16/2/7/A600/C23/3 for all existing water uses on site. A Water Use License Application (WULA) was submitted on 11 September 2014 and the approval process is currently underway. This application included all additional activities as part of the life of mine operations that have yet to be authorised by the Department of Water and Sanitation (DWS).

Project Background

Venetia consists of both open pit and underground operations. The open pit operations will cease between 2020 and 2023 from where mining will continue in the underground operations. Mining and associated infrastructure is located within the main security area of the mine referred to as the Blue Area. Once the ore has been processed through the main treatment plant, the run of mine goes to the Red Area, a secured area within the Blue Area, where diamond sorting is undertaken. Waste generated at the Red Area, Bus Depot and the Wellness Centre is directly removed from these areas by outside contractors. Waste generated at all other mining areas are transported to the existing Salvage Yard.

The existing Salvage Yard acts as a waste storage area prior to waste being removed off-site. The upgrade of the existing salvage yard to a more formalised waste management facility will be undertaken over a period of four years pending capital approval.

Included into this application is the storage of waste tyres in a demarcated area next to the Barlow Workshop Area and a demarcated area on the Waste Rock Dump. Venetia will also dispose of inert waste such as building rubble and demolition waste (inclusive of wood) within a demarcated area onto the Waste Rock Dump for use as infilling and levelling.

Overview of the Existing Environment

Climate

Venetia mine is located in the Limpopo Province which experiences a sub-tropical climate in most of the province. The high average temperatures together with the high evaporation rate make this a water deficit area. The prevailing winds observed during the day and night are similar and are largely from the east, with an occurrence of winds from the east-northeast, east-southeast and north.

Topography

The local topography consists of low hills and wide valleys varying in elevation from 600 metres above mean sea level (mamsl) at the valley bottom to 710 mamsl at the hill peaks in the south. The surface topography and associated landscape has been and will further be altered by the mining activities.

Geology

The mine area itself contains kimberlites, dolerite sills and rocks belonging to Malala Drift and Gumbu groups of the Beit Bridge Complex. One large fault (Tina Fault) and splay (Lezel Shear) is displaced along its length from 150 to 200m.

Soils and Pre-Mining land Capability

Four different soil classification units were identified in the total mining area including Mispah (Ms) form, two Hutton forms of varying depth (Hu1500mm+ and Hu400mm) and the Clovelly form (Cv450 mm).

The pre-mining land capability of the Venetia Mine Area is classified as extensive grazing land. However, due to the erratic and unpredictable rainfall the land is considered most suited to conservation. The waste management areas applied for in this WMLA are already disturbed and operational in the mining footprint and the land use is categorised as mining.

Surface Water

Venetia is located in the A63E (Mogalakwena) quaternary catchment of the Limpopo Water Management Area. The local catchment area consists of the Kolope River which flows to the west of the mine and the Matotwane River to

the east. The waste management areas applied for in this WMLA is situated within the Venetia mining area and these areas form part of the overall Venetia Water Balance.

Groundwater

The Limpopo River is shared by numerous surface and groundwater users in South Africa as well as with Zimbabwe, Botswana and Mozambique. The Mogalakwena A63E catchment is water stressed and although the aquifers are considered minor, it is the sole source of water for local farmers and communities using the groundwater for domestic use and livestock watering. Water for Venetia Mine is obtained from two well fields, Schroda and Greefswald, located in alluvial deposits along the banks of the Limpopo River.

Vegetation

The regional area corresponds to the Savanna Biome and more particularly to the Mopane Bioregion. Natural vegetation on the mine consists of two ecological types: Limpopo Ridge Bushveld and Musina Mopane Bushveld. Due to large sections of the site having been cleared for mining there is very little natural vegetation present on the mine site itself and the waste management areas applied for in this WMLA is stripped of all natural vegetation.

Fauna

Venetia Mine is surrounded by the Venetia Limpopo Nature Reserve (VLNR) which has a higher species richness than the mine site. There are, however, some fauna species which are found on the site which include birds, small mammals (e.g. rodents), large mammals (e.g. kudu) and various reptiles and amphibians.

Air Quality

The project area and surrounding land can be described as being rural with no other large scale industrial or mining activity in the area.

Noise

The environment in which Venetia Mine is located has an undulating topography interspersed with some hills. This in addition to numerous dumps provides significant screening against the propagation of noise. The nearest noise sensitive receptors to Venetia Mine are Corea (to the southwest); Abend Ruhe Gotha and Santer (to the south); and Ostrolenka and Coila (to the north east).

Archaeology

A Middle Stone Age (MSA) site, two Iron Age sites (villages), and stone walls which may be part of an Iron Age village; and a historical graveyard belonging to the Venter family is present in the mining area. The iron and stone age sites were of low significance and although all graveyards and graves can be considered to be of high significance, the graveyard is fenced and is outside the mine area. The waste management activities applied for in this WMLA will be conducted on areas already disturbed, these areas have

been surveyed and a Heritage 2 risk assessment has been conducted for these areas.

Regional Socio-Economic Structures

Venetia Mine falls into the Limpopo province of South Africa and shares borders with Botswana, Mozambique and Zimbabwe. The province is predominantly rural, and the primary economic activities include electricity production, water and agriculture. Venetia Mine is located in the Musina Local Municipality of the Vhembe District Municipality.

Waste Licence - Environmental Impact Assessment

Environmental Resources Management Southern Africa (Pty) Ltd (ERM) has been appointed by Venetia Mine as the independent environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) process and compile the Environmental Management Programme (EMP) for the WML.

The purpose of the EIA process is to identify and assess potential environmental and social impacts associated with construction, operation, and decommissioning of the Project so that they can be appropriately managed.

The environmental impact assessment forms the basis for the EMP. The main purpose of the EMP is to ensure that effective management measures are tabled, that will ensure, through the implementation thereof, that all potential impacts are either avoided, successfully managed or mitigated so that it does not result in environmental degradation or contamination.

This Environmental Impact Report (EIR) and the Environmental Management Programme Report (EMPr) has been compiled as part of the EIA process in accordance with regulatory requirements stipulated in the EIA Regulations promulgated in terms of Section 24(5) of the National Environmental Management Act (Act No. 107 of 1998), (NEMA) as amended.

In March 2014, Venetia initiated the application process for a Waste Licence for certain listed activities as per Government Notice 921 dated 29 November 2013. Due to the fact that the application included the management of certain hazardous waste streams, the Department of Environmental Affairs (DEA) became the competent authority and awarded the following Reference No 12/9/11/L43049/5.

The Draft Scoping Report was made available for the stipulated 40 day comment period to the Regulatory Authorities and Interested and Affected parties from 26 September to 05 November 2014. The Final Scoping Report included comments received from I&APs and responses provided thereto; which was submitted to the Department of Environmental Affairs (DEA) and acknowledged on 26 January 2015.

Throughout the EIA Process potential impacts were identified. These impacts were then assessed and specific mitigation measures put in place to ameliorate these impacts. Based on the principles of ISO 14001, Venetia continuously seeks improvement with regards to all its activities on site. This continuous process has allowed Venetia to investigate and implement improved waste management practices on site which resulted in less waste being stored than originally anticipated. As a result, certain volumes of waste were reduced below the original thresholds as specified in the listed activities. Based on the mitigation measures, an EMP have been compiled and will be implemented.

Following the Scoping Phase, the Draft Environmental Impact Assessment (EIA) Report together with the EMP is placed in the public domain for a period of 40 days for comment. Once the comment period ends, the EIA and EMP will be updated and submitted to the DEA for decision.

Summary of impact assessment

Various Specialist Studies were conducted to identify the potential impacts of the development and proposed mitigation measures to manage these impacts. The Impact Assessment forms the foundation for the EMP commitments to managing the potential impacts.

The summary of the potential impacts of the Venetia Mine is listed in the tables below.

Potential Impacts during Operational Phase

Potential Operational Phase Environmental Impact	Activity	Environmental Significance before Mitigation	Environmental Significance after Mitigation
TOPOGRAPHY			
Alteration of local topography	Change in topography due to the height and visibility of structures.	L	L
SOILS			
Soil Contamination	Spillage, leakage, incorrect storage and handling of chemicals, oils, lubricants, fuel and other general and hazardous material in the WMF.	L	L
Soil Erosion	Exposed soil surfaces may be eroded during high rainfall events.	L	L
LAND USE			
Change in Land Use	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint.	L	L
LAND CAPABILITY			
Change in Land Capability	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint.	L	L
VEGETATION			
Loss of vegetation and habitat	Removal of vegetation as to allow for the various storage areas within the WMF.	L	L
Propagation of alien invasive species	Natural re-growth of alien and invasive plant species on open soil areas and in between the various storage areas	M	L
FAUNA			
Disturbance of fauna	Operational activities in the WMF relating to the handling, storage and removal of general and hazardous waste streams. Storage of waste tyres. Disposal of building rubble and demolition waste.	L	L
Introduction of Nuisance Vectors (Pests) during Operation	Pests such as insects, rodents, baboons and bird species may be found on site and specifically drawn to the WMF and disposal/ storage areas.	M	L
SURFACE WATER			
Contamination of surface water	Dirty storm water run-off. Spills/ leaks associated with the storage of general, hazardous and industrial waste on the WMF.	M	L

Potential Operational Phase Environmental Impact	Activity	Environmental Significance before Mitigation	Environmental Significance after Mitigation
	Incorrect storage and handling of general, hazardous and industrial waste on the WMF. Spills/ leaks associated with vehicles		
GROUND WATER			
Contamination of groundwater	Spillage, leakage, incorrect storage and handling of general, hazardous and industrial waste in the WMF. Disposal of building rubble and demolition waste on the waste rock dump	M	L
AIR QUALITY			
Fall-out dust	Fugitive dust will be generated from the tipping of material and the Hammer Milling (shredding and mulching of wood). Dust generation due to vehicular movement. Windblown dust	L	L
Odour	Smells that emanate from waste storage areas	L	L
Emissions	Emissions generated due to vehicular movement.	L	L
NOISE			
Noise	Noise generated from vehicular movement. Noise generated from the tipping of material and the shredding and mulching of wood at the WMF. Noise generated from the tipping of building rubble and demolition waste.	L	L
VISUAL			
Aesthetic	Wind-blown litter.	L	L
	Visibility of tyre storage area on the waste rock dump	L	L
	Disposal of demolition and building rubble on the waste rock dump	L	L
HERITAGE			
Loss of cultural and heritage resources	Operational activities in the WMF relating to the handling, storage and removal of general and hazardous waste streams. Storage of waste tyres. Disposal of building rubble and demolition waste.	M	L

Potential Impacts during Closure Phase

Potential Closure Phase Environmental Impact	Activity	Environmental Significance before Mitigation	Environmental Significance after Mitigation
TOPOGRAPHY			
Alteration of local topography	Change in topography due to the height and visibility of structures.	L	L
SOILS			
Soil Contamination	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolishing activities.	L	L
Soil Erosion	Exposed soil surfaces may be eroded during high rainfall events.	L	L
LAND USE			
Change in Land Use	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint.	L	L
LAND CAPABILITY			
Change in Land Capability	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint.	L	L
VEGETATION			
Loss of vegetation and habitat	Removal of vegetation as to allow for the various storage areas within the WMF.	L	L
Propagation of alien invasive species	Natural re-growth of alien and invasive plant species on open soil areas and in between the various storage areas	M	L
FAUNA			
Disturbance of fauna	Removal of all remaining general and hazardous waste material from the WMF.	L	L
SURFACE WATER			
Contamination of surface water	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolition activities.	M	L
GROUND WATER			
Contamination of groundwater	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and	M	L

Potential Closure Phase Environmental Impact	Activity	Environmental Significance before Mitigation	Environmental Significance after Mitigation
	demolishing activities.		
AIR QUALITY			
Fall-out dust	Fugitive dust will be generated from the tipping of material and the Hammer Milling (shredding and mulching of wood). Dust generation due to vehicular movement. Windblown dust	L	L
Emissions	Emissions generated due to vehicular movement during rehabilitation.	L	L
NOISE			
Noise	Noise generated from vehicular movement during demolition and rehabilitation.	L	L
VISUAL			
Aesthetic	Wind-blown litter.	L	L
	Disposal of demolition and building rubble on the waste rock dump	L	L
HERITAGE			
Loss of cultural and heritage resources	Demolition activities associated with the rehabilitation of the WMF. Removal of the remaining waste tyres. Rehabilitation of building rubble and demolition waste disposal area on the waste rock dump.	L	L

This EIA and EMP has been compiled according to the applicable regulations and is in line with the National Environmental Management Act (Act No 107 of 1998) as amended and the National Environmental Management: Waste Act (Act No. 59 of 2008) as amended. Due to the fact that the activities are already taking place on site, the EIA and EMP consists of the impacts associated with the operational and closure phases of the mine.

Monitoring

Monitoring at the Waste management facility will include the following:

- Monitoring and Measurements sheets.
- Waste manifest.
- Weight of waste exiting WMF per day and destination.
- Safe disposal certificates.

Emergency Procedure

Environmental emergencies will be controlled as per the Emergency Preparedness and Response systems procedure (ENV-SP-09). Records required by this procedure will be controlled as per the Records and Control of Records procedure (ENV-SP-12).

Conclusion

This EIA and EMP comprehensively addresses potential impacts on all relevant aspects related to waste management activities on the Waste Management Facility, the storage of waste tyres and the management of building rubble and demolition waste on site and allows for continuous improvement through regular monitoring and reporting.

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B2 – Site Notices and Registration

B3 – Newspaper Advertisements

B4 – Notifications– Scoping Phase

B5 – Public Meeting Notification

B6 – Public Meeting Attendance Register

B7 – Scoping Phase Comments

B8 – Minutes of Public Meeting

B9 – Stakeholder Database & Comments and Responses Report

B10 - EIA Phase Notification Letters and Disclosure

B11 – EIA Phase Comments

Annexure C: Correspondence with Regulatory Authority

C1 – DEA Acceptance of Application

C2 – Clarification letter to the DEA

C3 – DEA Acceptance of Final Scoping Report

C4 – Minutes of meeting held with authorities (2 meetings and minutes)

Annexure D: Site Photo-log

GLOSSARY OF TERMINOLOGY

Alternative

A possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

Building and Demolition Waste

Building and demolition 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.

Composting

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.

Construction

Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a waste management activity, but excludes any modification, expansion, alteration or upgrading of such facility, structure or infrastructure that does not result in a change to the nature of the activity being undertaken or an increase in the range of outputs for the facility.

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.

Demarcation

Demarcation is defined as a limit or boundary, separating space by any form of material.

Demolition & Building Waste (inclusive of wood)

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.

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.

EMV Tyres

Earth Moving Vehicles (EMV) tyres refer to tyres not authorised for road use (off high-way tyres).

Environment

The surroundings 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 well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

Environmental Impact Assessment

An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the environment. The EIA includes an evaluation of alternatives. As well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures enhancing the positive aspects of the proposal and environmental management and monitoring measures.

Facility

Facility means a place, infrastructure, structure or containment of any kind including associated structures or infrastructure, wherein, upon or at, a waste management activity takes place and includes a waste transfer facility, a waste storage facility, container yard, waste disposal facility, incinerators, lagoons, recycling, co-processing or composting facilities.

General Waste

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

- i. domestic waste;
- ii. building and demolition waste;
- iii. business waste;
- iv. inert waste; or
- v. any waste classified as non-hazardous waste in terms of the regulations made under section 69;

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

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.

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 and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles.

Industrial Waste

Waste that emanates from commercial activities, commercial agricultural activities, mining activities and the operation of power stations.

Incineration

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

Inert Waste

Means waste that:

- i. does not undergo any significant physical, chemical or biological transformation after disposal;
- ii. does not burn, react physically or chemically biodegrade or otherwise adversely affect any other matter or environment with which it may come into contact; and
- iii. does not impact negatively on the environment, because of its pollutant content and because the toxicity of its leachate is insignificant.

According to NEMWAA inert waste includes:

- i. discarded concrete, bricks, tiles and ceramics;
- ii. discarded glass; and
- iii. discarded soil, stones and dredging spoil.

Interested and Affected Parties

Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

Light Duty Vehicle Tyres

Light Duty Vehicle (LDV) tyres are light delivery vehicle tyres which are authorised for road use.

Mitigate

The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

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.

Public Participation Process

A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific matters.

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.

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.

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.

Storage

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

Waste

Includes:

- i. any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
- ii. any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette.

Waste Classification

Means establishing-

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

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.

ACRONYMS

I&AP'S	Interested and Affected Parties
BID	Background Information Document
DBCM	De Beers Consolidated Mines Ltd
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
EMS	Environmental Management System
EMV	Earth Moving Vehicles
ERM	Environmental Resources Management (Pty) Ltd
GN	General Notice
GNR	General Notice Regulation
IDP	Integrated Development Plan
IRR	Issues and Responses Report
IWULA	Integrated Water Use Licence Application
LDV	Light Duty Vehicle
LEDET	Limpopo Department of Economic Development, Environment and Tourism
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
mamsl	Metres above mean sea level
mbgl	Metres below ground level
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
m ³	Cubic Metres
m ²	Square metres
NEMA	National Environmental Management Act 107 of 1998
NEMWA	National Environmental Management: Waste Act 59 of 2008
NWA	National Water Act 36 of 1998
WMF	Waste Management Facility

The De Beers Consolidated Mines Limited (DBCM) Venetia Mine (Venetia) is situated on the farm Venetia 103MS, which lies approximately 80km west of Musina and 40km north-east of Alldays in the Limpopo Province. The mine is located within the Musina Local Municipality of the Vhembe District Municipality in the Limpopo Province of South Africa.

The mining rights extent of the Venetia Mine is approximately 3,000ha. Adjacent to the mine, to the north, east and west is the 36,000ha DBCM owned Venetia Limpopo Nature Reserve (VLNR) whilst the Gotha Farm which conducts stock and game farming lies to the south of the Mine.

The Environmental Management Programme (EMP) for the existing operations (open pit and underground operations), was issued by the Department of Mineral Resources (DMR) Ref: LP 30/5/1/3/2/1 (58) EM) on 1 October 2012 under the Mineral and Petroleum Resources Development Act (MPRDA). The Environmental Authorisation was granted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET on 13 July 2012 (Ref: 12/1/9-7/2-V49-W109). The authorisation was amended on 5 February 2015 as to align the conditions of the licence to Venetia Mine.

A Water Use Licence was issued by the Department of Water Affairs on 21 November 2011 - Licence No 16/2/7/A600/C23/3 for all existing water uses on site. A Water Use License Application (WULA) was submitted on 11 September 2014 and the approval process is currently underway. This application included all additional water use activities as part of the life of mine operations that have yet to be authorised by the Department of Water and Sanitation (DWS).

In March 2014, Venetia initiated the application process for a Waste Licence for certain listed activities as per Government Notice 921 dated 29 November 2013. Due to the fact that the application included the management of certain hazardous waste streams, the Department of Environmental Affairs (DEA) became the competent authority and assigned the following Reference No 12/9/11/L43049/5. Since submission, the waste optimisation initiatives have resulted in a significant number of waste streams being moved off site which has reduced the waste volumes below threshold limits.

The revised list of trigger activities was submitted to the DEA (refer to Clarification Letter submitted to the DEA- Annex C2) on 21 May 2015. Although the revised list of activities triggered set a requirement for a Basic Assessment process, the DEA accepted the Scoping Report in a letter dated 26 June 2015 (refer to Annex C3).

1.1

BACKGROUND TO VENETIA MINE WASTE ACTIVITIES

Venetia consists of both open pit and underground operations. The open pit operations will cease between 2020 and 2023 from where mining will continue in the underground operations. Mining and associated infrastructure is located within the main security area of the mine referred to as the Blue Area. Once the ore has been processed through the main treatment plant, the run of mine goes to the Red Area, a secured area within the Blue Area, where diamond sorting is being undertaken.

Waste generated at the Red Area, Bus Deport and the Wellness Centre is below threshold levels and are directly removed from these areas by outside contractors. Wastes generated at all other mining areas are transported to the existing Salvage Yard.

The existing Salvage Yard is currently used as a waste storage area prior to waste being removed off-site. The upgrade of the existing salvage yard to a more formalised waste management facility will be undertaken over a period of four years pending capital approval.

Included into this application is the storage of waste tyres in a demarcated area next to the Barloworld Workshop Area and a demarcated area on the Waste Rock Dump. Venetia will also dispose of inert waste such as building rubble and demolition waste (inclusive of wood) within a demarcated area onto the Waste Rock Dump.

1.2

PROPERTY DETAILS

Table 1.1 provides to details with regards to the proclaimed mining area.

Table 1.1 *Proclaimed mining area*

Farm and Portion	Title Deed Number
Mining and surface rights	
Portion 1 of the farm Venetia 103MS	MS T2209/1981
Portion 2 of the farm Venetia 103MS	MS T17958/1981
Portion 3 of the farm Venetia 103MS	MS T15902/1981
Portion 4 of the farm Venetia 103MS	MS T15902/1981
Portion 5 of the farm Venetia 103MS	MS T15902/1981
Remaining extent of Venetia 103MS	MS T15902/1981
Portion 1 of the farm Krone 104MS	MS T7038/1983
Remaining extent of Krone 104MS	MS T 17958/1981
Remaining extent of Rugen 105MS	MS T34207/1989
The farm Drumsheugh 99MS	MS T73117/1990
Farms of which De Beers holds the surface rights - not proclaimed mining area (utilised for mine water supply)	
The farm Schroda 46MS	T37654/90, T25629/90 and T47452/90
The farm Greefswald 37MS	T3538/1993

Figure 1.1 Locality Map

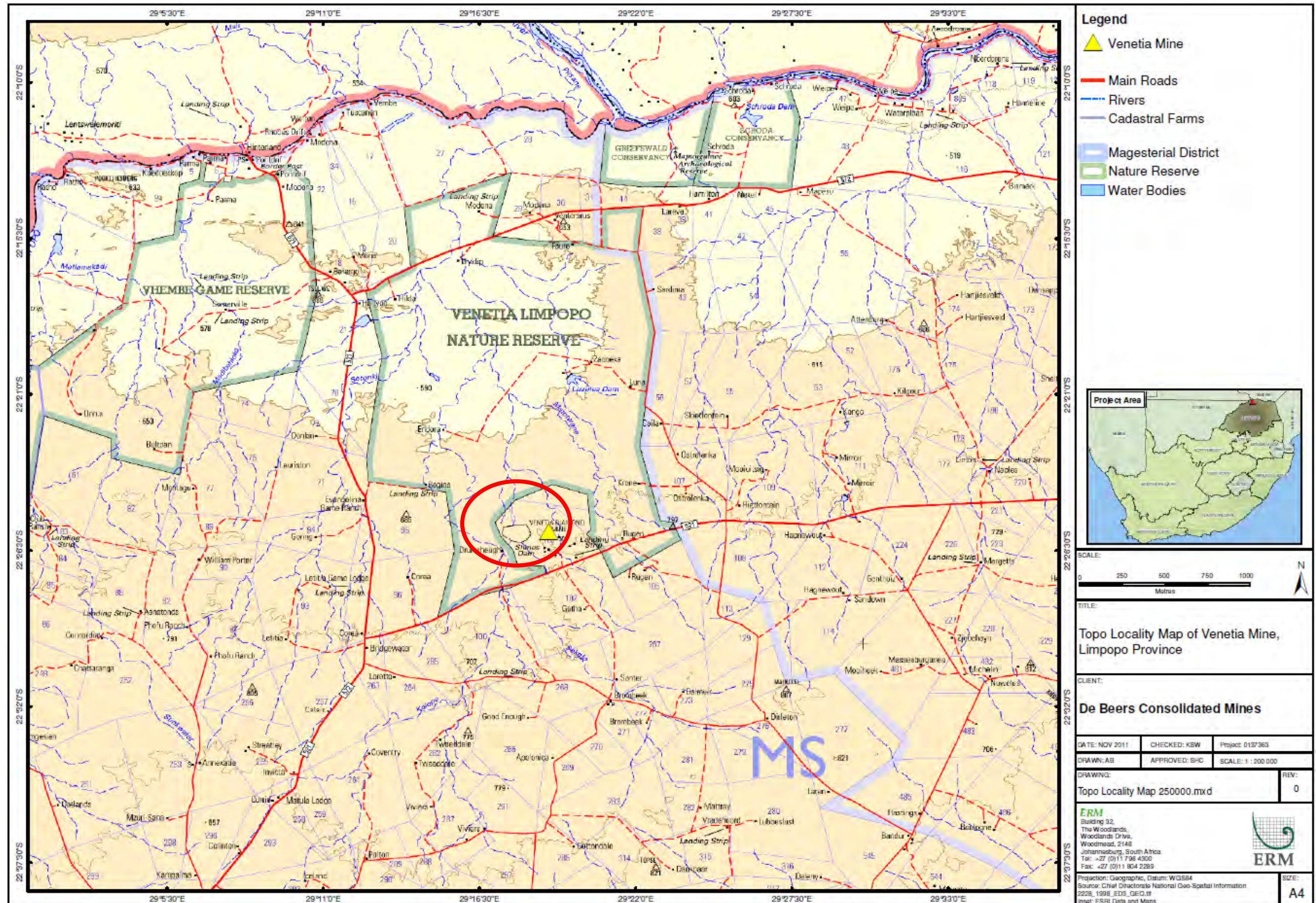
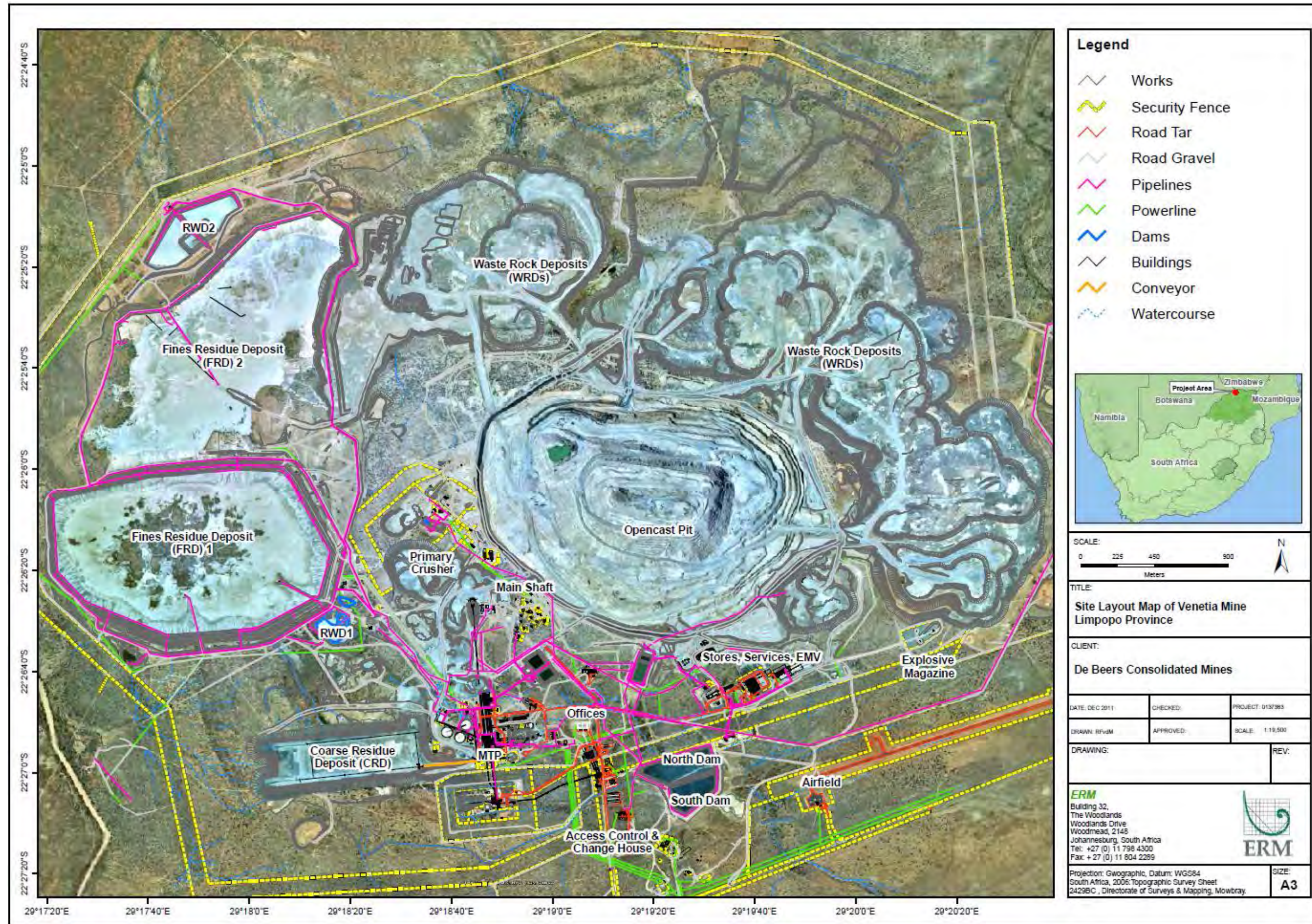


Figure 1.2 Site Layout



Source: Environmental Management Programme for Proposed Underground Operations and EMP Consolidation for Existing Operations at De Beers Consolidated Mines, Venetia Mine, Limpopo Province (2012)

1.3

THE PROJECT PROPONENT

The project proponent is De Beers Consolidated Mines Limited (DBCM) (registration number 1888/000007/06) who has an existing mining right in the area. The contact details for the applicant are as follows:

Name and address of operation, operation's owner and responsible person

Name and address of operation:

General Manager: Ludwig von Maltitz

De Beers Consolidated Mines Limited - Venetia

P O Box 668

Musina

0900

Tel: (015) 575 2004

Fax: (015) 534 2019

Name and address of owner:

De Beers Consolidated Mines Limited

P O Box 616

Kimberley

8300

Tel: (053) 838 4111

Fax: (053) 839 4210

1.4

DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

1.4.1

ERM Southern Africa

ERM is a global environmental consulting organisation employing over 5,000 people with 150 offices in 40 countries worldwide. Founded in 1971, ERM has built an organisation based on the supply of a full range of environmental and social policy, scientific, technical, and regulatory expertise. ERM's primary focus is to provide quality work and service to our clients in these areas.

From a regional perspective, ERM has been involved in numerous projects in Africa over the past 30 years and in 2003 established a permanent presence in Southern Africa to meet the growing needs of our clients. The Southern African ERM offices are based in Cape Town, Johannesburg and Durban. ERM Southern Africa has a staff complement of 160 comprising dedicated

environmental professionals offering expert skills in EIA, EMP, EMS, risk assessment, EHS management and auditing, corporate social responsibility and socio-economic impact assessment, climate change services, specialist groundwater services as well as contaminated site management.

1.4.2 *EIA Project Team*

The project team includes ERM consultants, support staff and external specialists. A list of the key EIA project team is provided in *Table 1.2* below, together with the associated qualifications and experience.

ERM have no financial ties to, nor are they a subsidiary, legally or financially, of DBCM. Remuneration for the services by the applicant in relation to this EIA is not linked to an approval by the decision-making authority. Furthermore, ERM has no secondary or downstream interest in the development.

Table 1.2 ERM Core Project Team

Name	Max Clark
Role	Partner in Charge
Highest qualification	PhD, University of Cape Town, 1989
Years of Experience	25 years
Summary	Max Clark, a Partner and the lead of ERM's Impact Assessment and Planning practice in South Africa, is based in the Johannesburg office. Max has more than 25 years of broad-ranging experience in the environmental sector. For much of the period he has focused on environmental planning and assessment of major capital projects. He has been involved in projects in the infrastructure, mining and power sectors where he has directed or managed major environmental projects, scoping and feasibility studies; environmental and social impact assessment (ESIA); environmental management plan (EMPs); stakeholder engagement; and due diligence, compliance, monitoring and auditing.

Name	Stephanie Gopaul
Role	Project Manager
Highest qualification	Masters in Environmental Management
Years of Experience	7 years
Summary	Stephanie Gopaul is an Environmental Consultant based in Durban, South Africa. Upon obtaining a science degree in engineering and environmental geology, she was employed by the eThekweni Municipality. Thereafter she served at GCS (Pty) Ltd as an environmental scientist for five (5) years before joining ERM as a senior environmental consultant. Stephanie has several years of experience in the field of Environmental Management. Fields of competence include basic assessments, environmental impact assessments, environmental management plans, water use licenses, water and waste management plans, environmental auditing, public consultation, environmental site assessments, feasibility studies, and monitoring programmes. Stephanie has managed projects for a number of public and private sector clients, in the oil and gas, power utilities, renewable energy, industrial, mining and transport sectors.

Name	Alta van Dyk
Role	Environmental Impact Assessor (EAP)
Highest qualification	Masters in Environmental Management
Years of Experience	23 years
Summary	<p>Alta van Dyk holds a Master's Degree in Environmental Management from the University of North-West. In terms of professional affiliation, Alta van Dyk is registered with the South African Council for Natural Scientific Professions in Ecological Science, as well as Environmental Science fields of practice.</p> <p>Alta van Dyk has been involved as the project manager in various EIAs in terms of the National Environmental Management Act (NEMA) (No 107 of 1998), the National Environmental Management Waste Act (NEMWA) (No 59 of 2008), the National Water Act (NWA) (No 36 of 1998) as well as the Minerals and Petroleum Resources Development Act (MPRDA) (No 28 of 2002). Her responsibilities included the overall management of the project, the identification and assessment of environmental impacts and the development of environmental management plans.</p>

Name	Tinus Breedt
Role	Environmental Consultant
Highest qualification	B.Sc (biological and Environmental Science)
Years of Experience	3 years
Summary	<p>After completing his Honours degree in 2012 Tinus started working at Kusile Power Station, being part of one of the largest construction sites in South Africa has given Tinus great exposure and vital experience early in his career. Tinus has since joined Alta van Dyk Environmental where he has been involved in various diverse projects. His proficiency includes the management of projects, environmental advice, and the compilation of reports in order to obtain authorizations from the various National Departments.</p>

1.5 *PURPOSE OF THE EIA & EMP*

1.5.1 *Purpose of the EIA*

An EIA is a planning and management tool used to predict and evaluate potential negative and positive impacts of a proposed activity. The function of the EIA is to help the competent authority in making informed decisions, the public in understanding the likely impacts of the project and the proponent in managing these impacts (UNEP, 2002). An EIA study entails an assessment of these potential project impacts on the biophysical and social environments (including communities and workers). This information is used to develop management measures to avoid, reduce or enhance potential project impacts and to develop an environmental management structure. This EIR provides the findings of this assessment.

The information contained in this Environmental Impact Report (EIR) along with comments and inputs received from all project stakeholders including

commenting authorities will assist the competent authority, the DEA, in deciding whether or not to grant a Waste Management Licence. The objectives of this report are therefore to:

- communicate the findings of the EIA for this Project;
- provide a record of comments and responses received from Interested and Affected Parties (I&APs) during the EIA process; and
- facilitate an informed, transparent and accountable decision-making process by the relevant authorities.

1.5.2 Purpose of the EMP

An Environmental Management Programme (EMP) is a site-specific programme developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

1.6 STRUCTURE OF THE EIA & EMP

The Environmental Impact Report (EIR) and Environmental Management Programme (EMP) has been structured in accordance to the requirements as specified in Government Gazette No 3306 dated 18 June 2010, Regulation 543

Table 1.3 Structure of the Report

No	Description as per Regulation 543	Reference in Report
a)	details of: (i) the EAP who compiled the report (ii) the expertise of the EAP to carry out an environmental impact assessment	Section 1.4
b)	a detailed description of the proposed activity	Section 2
c)	a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is: (i) a linear activity, a description of the route of the activity (ii) an ocean-based activity, the coordinates where the activity is to be undertaken	Table 1.2
d)	a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	Section 5
e)	details of the public participation process conducted in terms of sub-regulation (1), including: (i) steps undertaken in accordance with the plan of study (ii) a list of persons, organisations and organs of state that were registered as interested and affected parties (iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments (iv) copies of any representations and comments received from registered interested and affected parties	Section 4
f)	a description of the need and desirability of the proposed activity	Section 2
g)	a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Section 2
h)	an indication of the methodology used in determining the significance of potential environmental impacts	Section 6
i)	a description and comparative assessment of all alternatives identified during the environmental impact assessment process	Section 2
j)	a summary of the findings and recommendations of any specialist report or report on a specialised process	Annexure A
k)	a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	Section 6
l)	an assessment of each identified potentially significant impact, including: cumulative impacts the nature of the impact the extent and duration of the impact the probability of the impact occurring the degree to which the impact can be reversed the degree to which the impact may cause irreplaceable loss of resources the degree to which the impact can be mitigated	Section 6
m)	a description of any assumptions, uncertainties and gaps in knowledge	N/A
n)	a reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 6
o)	an environmental impact statement which contains: a summary of the key findings of the environmental impact assessment a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives	Section 7
p)	a draft environmental management programme containing the aspects contemplated in regulation 33	Section 7
q)	copies of any specialist reports and reports on specialised processes complying with regulation 32	Annexure A
r)	any specific information that may be required by the competent authority	N/A
s)	any other matters required in terms of sections 24(4) (a) and (b) of the Act.	N/A

2.1 EXISTING WASTE MANAGEMENT IN THE SALVAGE YARD

The various waste streams generated at Venetia are indicated in Table 2.1.

Table 2.1 Areas generating Waste on Venetia

Waste generating area	Waste type	Waste stream inventory
Mining Engineering Workshops as well as all service areas, Plant Area, Engineering Workshops, Venetia Underground Project Area	Recyclable domestic waste	<ul style="list-style-type: none"> • Paper • Plastic • Cardboard • Cans • Glass
	Non-recyclable domestic waste	<ul style="list-style-type: none"> • Non-recyclable dry waste to landfill • Food waste
	Recyclable hazardous liquids	<ul style="list-style-type: none"> • Used oil
	Non-recyclable hazardous liquids	<ul style="list-style-type: none"> • Grease • Contaminated diesel • Engine coolant • Hydrocarbon sludge • Old cooking oil • Battery acid • Chemical containers with redundant chemicals - liquid
	Recyclable hazardous solids	<ul style="list-style-type: none"> • Used ink cartridges • Sealed batteries • Un-sealed batteries • Empty (mostly 25 litre) chemical containers • Empty 210 litre oil drums
	Non-recyclable hazardous solids	<ul style="list-style-type: none"> • Expired medicine • 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 • Medical waste • 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
	Recyclable industrial waste	<ul style="list-style-type: none"> • Used Screen Panels • Ferrous and non-ferrous metals • Wood (pallets and boxes)

Waste generating area	Waste type	Waste stream inventory
		<ul style="list-style-type: none"> • Conveyor belting • Hard hats • Safety boots • Overalls • Plastic water containers • Blasting wire • All cabling
	Non-recyclable industrial waste	<ul style="list-style-type: none"> • Windscreen glass • LDV and EMV tyres • Building rubble, demolition and construction waste • Rubber • Air filters • Redundant furniture
Sewage Treatment Plant	Recyclable hazardous solids	<ul style="list-style-type: none"> • Sewage treatment plant sludge
	Non-recyclable hazardous solids	<ul style="list-style-type: none"> • 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
Wellness Centre	Recyclable domestic waste	<ul style="list-style-type: none"> • Paper • Plastic • Cardboard • Cans • Glass
	Non-recyclable domestic waste	<ul style="list-style-type: none"> • Non-recyclable dry waste to landfill • Food waste
	Non-recyclable hazardous liquids	<ul style="list-style-type: none"> • Expired medicine
	Recyclable hazardous solids	<ul style="list-style-type: none"> • Used ink cartridges
	Non-recyclable hazardous solids	<ul style="list-style-type: none"> • Medical waste • Sanitary waste generated in bathrooms and 'SHE' bins • Fluorescent tubes, Mercury vapour lamps and sodium lamps • Empty chemical containers
Current Waste tyre stockpile	Non-recyclable industrial waste	LDV and EMV tyres
Diamond recovery area (Red Area)	Recyclable domestic waste	<ul style="list-style-type: none"> • Paper • Plastic • Cardboard • Cans • Glass
	Recyclable or non-recyclable general waste	<ul style="list-style-type: none"> • Non-recyclable .dry waste to landfill • Food waste
	Recyclable hazardous liquids	<ul style="list-style-type: none"> • Used oil
	Non-recyclable hazardous liquids	<ul style="list-style-type: none"> • Grease • Contaminated diesel • Engine coolant • Hydrocarbon sludge • Old cooking oil • Battery acid • Chemical containers with redundant chemicals - Liquid • Expired medicine
	Recyclable hazardous solids	<ul style="list-style-type: none"> • Used ink cartridges • Sealed batteries • Un-sealed batteries

Waste generating area	Waste type	Waste stream inventory
		<ul style="list-style-type: none"> • Empty chemical containers • Empty oil drums
	Non-recyclable hazardous solids	<ul style="list-style-type: none"> • Oily rags, material contaminated with oil, diesel or grease, oil filters, empty oil/chemical containers • Contaminated spill sorb • Contaminated soil not suitable for bioremediation (due to levels of contamination) • Fluorescent tubes, mercury vapour lamps and sodium lamps • Empty chemical containers • Chemical containers with redundant chemicals – Solid • Electronic waste
	Recyclable Industrial waste	<ul style="list-style-type: none"> • Used Screen Panels • Ferrous and non-ferrous metals • Conveyor belting • Hard hats • Safety boots • Overalls • Cabling
	Non-recyclable industrial	<ul style="list-style-type: none"> • Building rubble, demolition and construction waste

At the salvage yard general as well as hazardous waste were received, stored, sorted, recycled and finally transferred from the mine for final disposal. Wastes generated in the Red Area were kept in the Red Area for extended period of time before being moved directly off-site.

Based on strict security control, waste generated end up being stored in these areas for extensive periods of time.

Figure 2.1 Existing Salvage Yard Area



2.2 IMPROVED WASTE MANAGEMENT

Venetia undertook the initiative to re-evaluate the current waste management practices on site as to derive the most suitable and sustainable environmental option. Refer to Annexure A for the Waste Management Optimisation Strategy and Programme (WMS), which is aligned to the National Department of Environmental Affairs (DEA) National Waste Management Strategy document published in 2012.

This proactive initiative of Venetia to initiate a valiant pursuit towards waste management optimisation, gave effect an overall reduction in the volumes of waste previously stored in both the salvage yard and Red Area and resulted in the effective removal there-off for safe disposal. Therefore, wastes that were normally stored on site for a significant period of time are now frequently removed off-site by an approved waste management contractor.

Wastes are now managed in the following manner:

- Waste generated across the mine is taken to the Waste Management Facility for sorting prior to having the waste frequently removed off site.
- The dried sewage sludge from the sewage treatment plant is taken to the Waste Management Facility where it becomes part of the green waste

stream used for the making of compost. The compost will be used in the rehabilitation process.

- Waste generated at the Wellness Centre, Bus Depot and Red Area is frequently directly removed off site from this area by a waste management contractor.
- Waste Tyres are stored on site at the Waste Management Facility, the Barloworld Workshop Area and on a demarcated area on the Waste Rock Dump.
- Building rubble and demolition waste (inclusive of wood) are disposed of in a dedicated area on the Waste Rock Dump.

2.2.1 *The Waste Management Facility*

The Waste Management Facility will be located within the same footprint area as the existing salvage yard, utilising the same existing infrastructure, where the general and hazardous waste streams across the mine are received, sorted, logged and stored prior to being removed off-site.

In order to allow for the improved storage of waste at the Waste Management Facility, the current facility has been evaluated and sub-demarcated into various areas pending the various waste streams as to allow each demarcated area to be designed, operated and managed in the appropriate manner. Where required, the existing demarcated areas will be improved during a four year period, pending capital approval as to comply with the structural requirements of GN R. 634 pertaining to the storage and management of waste. Waste is removed from the Waste Management Facility by an approved waste management contractor.

Solid waste streams are segregated pending on whether they are recyclable or non-recyclable into the main categories namely:

- Domestic Waste;
- Green Waste;
- Industrial Waste;
- Hazardous Waste;
- Building Rubble & Demolition Waste (inclusive of wood); and
- Waste Tyres.

The green wastes will be used to make compost which will be used on site for rehabilitation purposes. The building rubble and demolition waste are disposed of in a demarcated area on the waste rock dump.

Liquid Waste is deemed hazardous based on their classification and is segregated pending the streams potential to be recycled. These waste streams are removed off-site.

Due to the fact that apart from the composting material, waste tyres and building rubble and demolition waste, all other waste streams are removed off-site by an approved waste contractor. Therefore no disposal of waste is undertaken at the Waste Management Facility only the storage of waste till removal.

Figure 2.2 provides a lay-out plan of the proposed improved Waste Management Facility indicating each proposed demarcated storage area.

Figure 2.2 Waste Management Facility

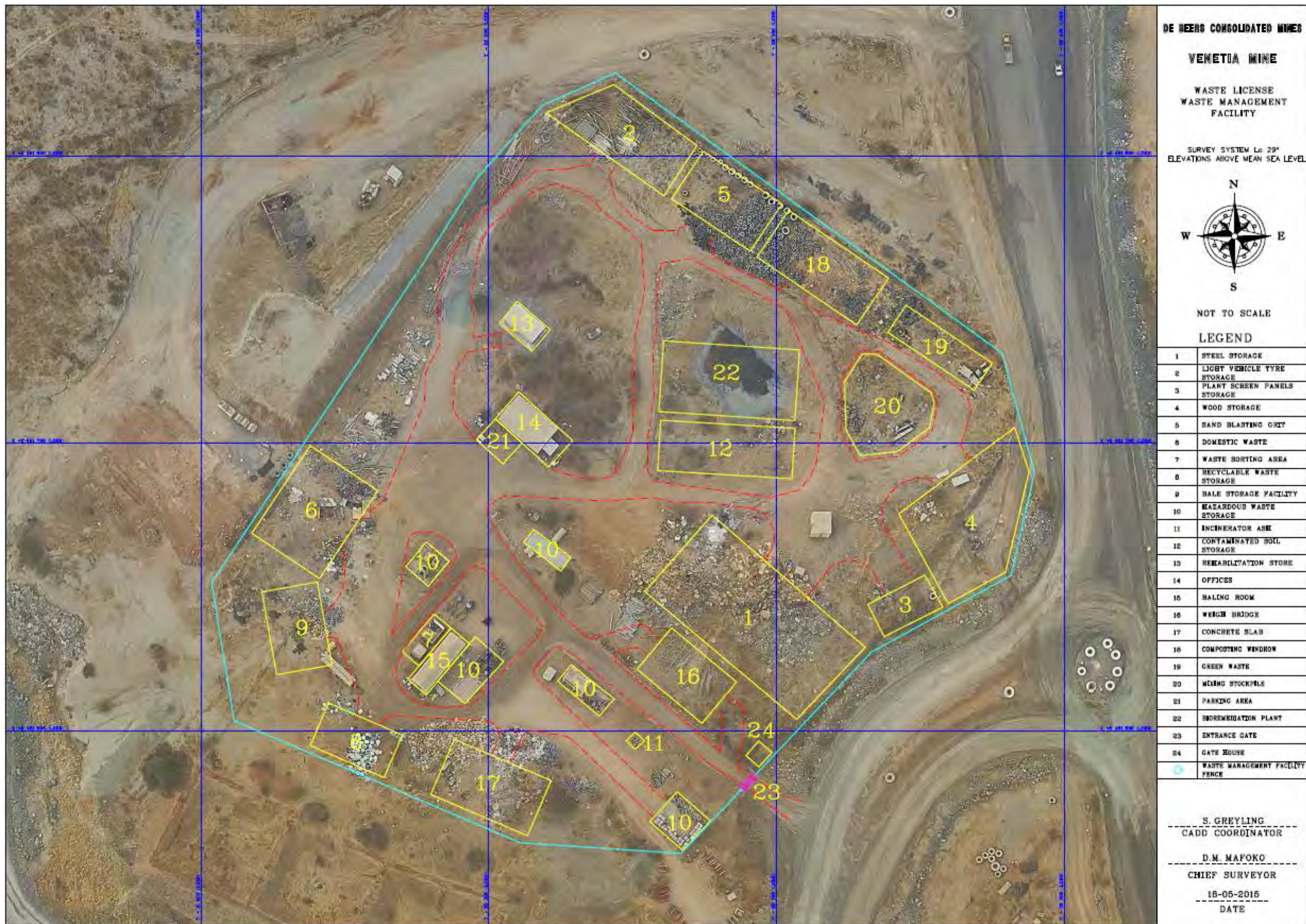


Table 2.2 Management of Waste Streams at the Waste Management Facility

Waste Type and Category	Waste Stream	Volumes (max monthly volume generated /removed during 2012)	Description of Current Waste Management Practice	Improved Waste Management Practice	Demarcated Waste Management Area (Figure 3.1)
General waste					
Recyclable General Waste	Paper	6.97 tonnes	Waste recycling contractor separates recyclable domestic waste and makes bales. Bales are removed from the mine site by the contractor under security escort.	Current management practices will remain unchanged.	Waste Sorting Area (Area 7) Baling Area (Area 15)
	Plastic	4.65 tonnes			
	Cardboard	9.683 tonnes			
	Cans	2.96 tonnes			
	Glass	Unknown	Glass is stored in 210 litre drums or within Skips.	Glass is removed off-site during once-off clean-up	Recyclable Waste Storage (Area 8)
Non-recyclable General Waste	Non- recyclable waste to landfill	3.99 tons	The waste is stored in FeSi bulk bags. 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.	Current management practices will remain unchanged.	Domestic Waste (Area 6)
Non-recyclable General Waste	Food waste	Unknown	Food waste is placed into a 6m ³ skip to "decompose" and is removed every 2-3 months for off-site disposal by a waste contractor.	Current management practices will remain unchanged.	Domestic Waste (Area 6)
Non-recyclable general waste	Green waste	Unknown	Currently the Green Waste is removed from site by the waste contractor to a domestic/general landfill site.	Green Waste will be collected within a skip. Waste collected will become part of the composting plant.	Green Waste Storage (Area 19) Composting Windrow (Area 18)
Industrial Waste					
Recyclable Industrial	Used screen panels	Unknown	Used screen panels are stored and removed off site by a contractor for recycling.	Removed off-site	Plant Screen Panes Storage Area (Area 3)
	Ferrous and non-ferrous metals	474.31 tonnes	Metals are stockpiled and removed for recycling by the waste contractor.	Removed off-site	Steel Storage Area (Area 1)
	Wood (pallets and boxes)	Unknown	Wood is stacked and crushed using a dozer. It is not currently removed from the mine site.	Wood will be chipped with a wood chipper and chipped wood will become part of the composting plant.	Wood Storage Area (Area 4)
	Hard hats	Unknown	Hard hats, safety boots and overalls are stored and removed off site during clean-up.	Removed off-site	Recyclable Waste Storage (Area 8)
	Safety boots	Unknown			
	Overalls	Unknown			
	Plastic water containers	Unknown	Containers are stored removed off site during clean-up.	Removed off-site	Recyclable Waste Storage (Area 8)
Blasting wire	Unknown	Blasting wire is stored removed off site during clean-up.	Removed off-site	Steel Storage Area (Area 1)	
Non-recyclable industrial	All cabling	Unknown	Cables are stored removed off site during clean-up.	Removed off-site	Steel Storage Area (Area 1)
	Windscreen glass	Unknown	Windscreen glass is stored removed off site during clean-up.	Removed off-site	Recyclable Waste Storage (Area 8)
	Air filters	Unknown	Air filters are stored removed off site during clean-up.	Removed off-site	Steel Storage Area (Area 1)
	Redundant furniture	Unknown	Redundant furniture is stored removed off site during clean-up.	Removed off-site	Recyclable Waste Storage (Area 8)
Hazardous waste					
Recyclable hazardous liquids	Used oil	85 838 litres used oil and grease	Used oil is stored in tanks outside of the mine after passing through a diamond trap. The oil is collected and removed by a contractor.	Removed off-site	Hazardous Waste Storage (Area 10)
	Old cooking oil	Unknown	Old cooking oil is stored in 210 litre and other small drums and removed during clean-up.	Removed off-site	
Non-recyclable hazardous liquids	Grease	85838 litres used oil and grease	Grease is stored in 210 litre drums and removed during clean-up.	Removed off-site	
	Contaminated diesel	Unknown	Contaminated diesel is stored in 1 000litre IBC Containers and removed during clean-up.	Removed off-site	
	Engine coolant	Unknown	Engine coolant is stored in 1 000litre IBC Containers and removed during clean-up.	Removed off-site	

Waste Type and Category	Waste Stream	Volumes (max monthly volume generated /removed during 2012)	Description of Current Waste Management Practice	Improved Waste Management Practice	Demarcated Waste Management Area (Figure 3.1)
	Hydrocarbon sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Hydrocarbon sludge is present in the Drizit sumps, workshop sumps and IBC containers at various locations and removed during clean-up.	Removed off-site	
	Battery Acid	Unknown	Battery acid is stored in 210 litre drums and removed during clean-up.	Removed off-site	
Recyclable hazardous solids	Used ink cartridges	130 cartridges	Used ink cartridges are stored and removed during clean-up.	Removed off-site	Hazardous Waste Storage (Area 10)
	Sealed batteries	183 lead acid batteries	Sealed batteries are stored at freight yard and removed from site during clean-up by a waste management contractor (Ad hoc)	Removed off-site	
	Un-sealed batteries	Unknown	Unsealed batteries, acid is drained and removed via the freight yard during ad hoc clean-up by a waste management contractor.	Removed off-site	
	Empty (mostly 25l) chemical containers	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Chemical containers are removed by the waste recycling contractor under security escort to a hazardous waste disposal facility.	Removed off-site	Hazardous Waste Storage (Area 10)
	Empty 210l oil drums	Unknown	Drums are stored removed from site during clean-up.	Removed off-site	Hazardous Waste Storage (Area 10)
Non-recyclable hazardous solids	Chemical containers with redundant chemicals -	Unknown	Containers with redundant chemicals and stored removed from site during clean-up.	Removed off-site	Hazardous Waste Storage (Area 10)
	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	The material is stored in 11 m ³ skips and removed under security escort by the waste contractor to a hazardous waste disposal facility (Holfontein).	Removed off-site	
	Contaminated spillsorb	Unknown	The contaminated spillsorb is stored in various containers, including 210 litre drums and IBC containers and removed from site during clean-up.	Removed off-site	
	Hardened sludge	Unknown - removed as part of "total hazardous waste" - up to 44m ³ per month for all hazardous waste	Hardened sludge is stored in various containers, including 210 litre drums and IBC containers removed from site during clean-up.	Removed off-site	
	Contaminated soil <u>not</u> suitable for Bioremediation (due to levels of contamination)	Unknown	Contaminated soil is stored in various containers, including 210 litre drums and IBC containers removed from site during clean-up.	Removed off-site	
	Launder grease	Unknown	Launder grease is stored in 210 litre drums or skips removed from site during clean-up.	Removed off-site	
	Fluorescent tubes, mercury vapour lamps and sodium lamps	Unknown	Crushed tubes are stored in 210 litre drums removed from site during clean-up.	Removed off-site	
	Chemical containers with redundant chemicals - Solid	Unknown	The containers are stored removed from site during clean-up.	Removed off-site	
	Electronic waste	Unknown	Electronic waste is stored removed from site during clean-up.	Removed off-site	Hazardous Waste Storage (Area 10)
	Sandblasting grit	Unknown	Sandblasting grit is stored.	Waste Classification to be undertaken	Sand Blasting Grit Area (Area 5)
Incinerator ash	Unknown	Stored in skips at the Salvage Yard and not currently removed from the mine site.	Removed off-site	Incinerator Ash Area (Area 11)	
Waste Tyres					
Non-recyclable industrial	LDV tyres	Approximately 120 LDV tyres	Tyres are stockpiled WMF	Removed off-site	Light Vehicle Tyre Storage Area (Area 2)

2.3 *WASTE TYRE STORAGE AREA*

Non-recyclable industrial waste in the form of LDV and EMV tyres are currently stored on the tyre stockpile area on the Waste Rock Dump.

Waste tyres will be stored in three different areas on the mine:

- LDV tyres are stored within the Waste Management Facility where tyres will be checked for options for re-use prior to being removed off-site;
- EMV tyres will be stored in a dedicated area near the Barloworld workshops as well as in a dedicated area on the Waste Rock Dump.

Shangoni Management Services (Pty) Ltd has been appointed by the Mine to register the tyre storage as detailed above.

2.4 *BUILDING RUBBLE AND DEMOLITION WASTE DISPOSAL AREA (INCLUSIVE OF WOOD)*

An area on the existing Waste Rock Dump will be demarcated for the disposal of construction, demolition wastes and building rubble, including wood.

Figure 2.3 Waste Tyre Storage Area

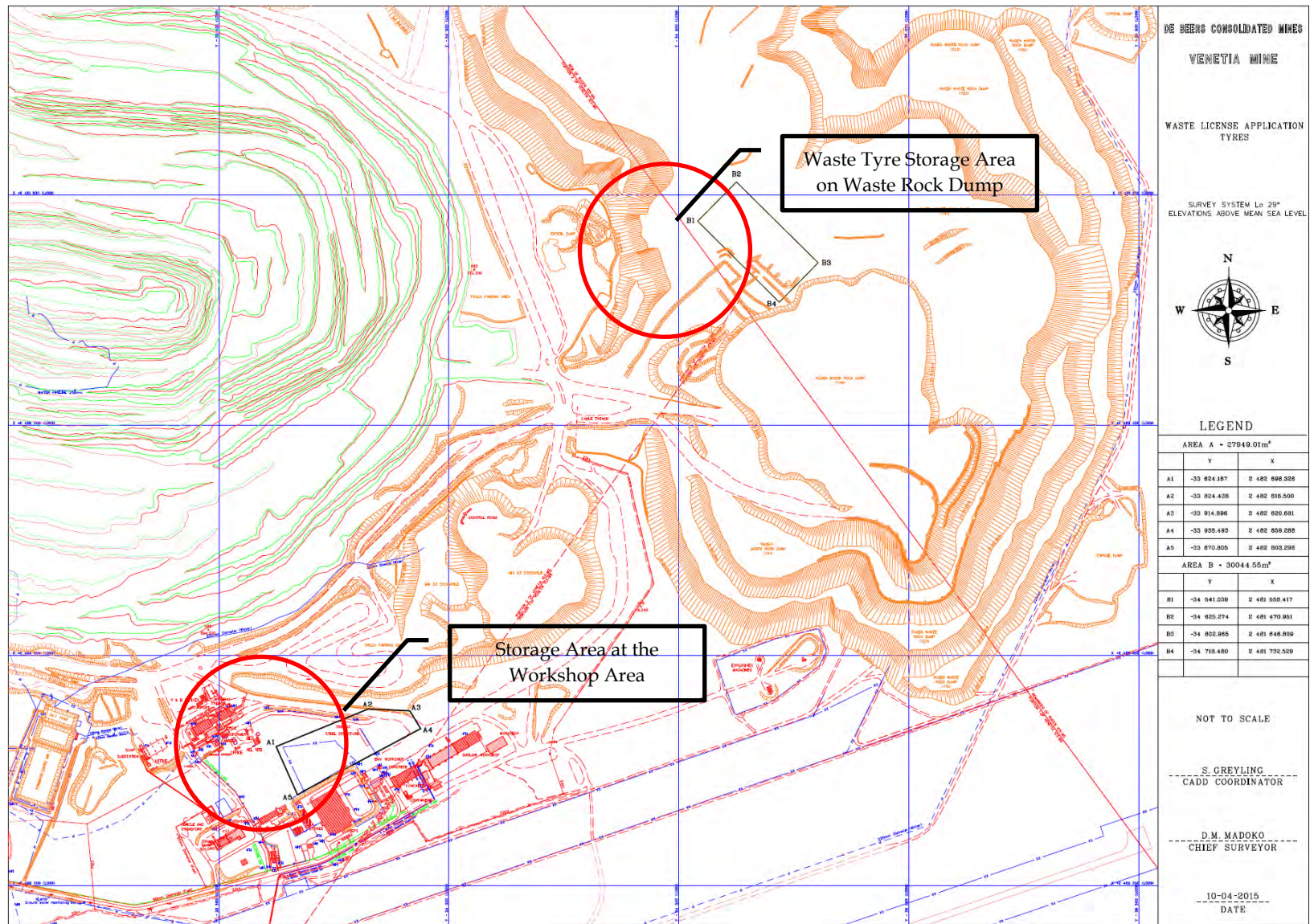
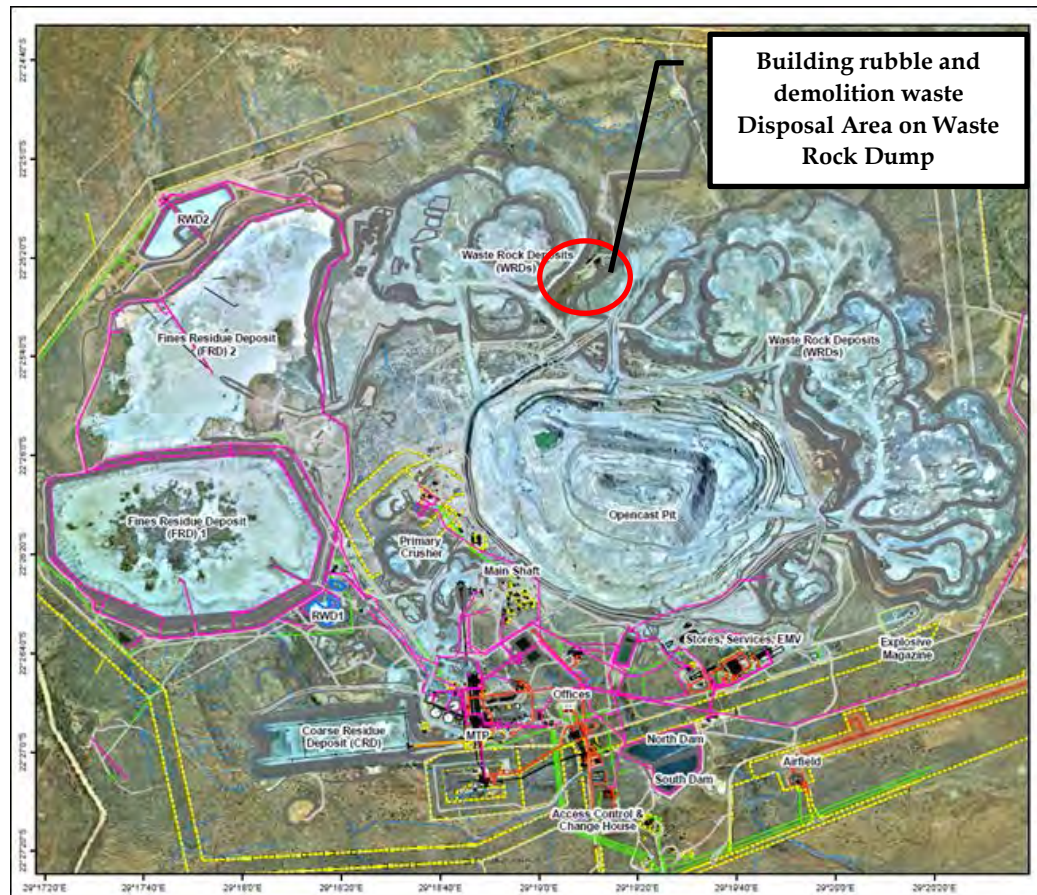


Figure 2.4 Disposal Area for Building rubble and demolition waste (including wood)



2.5 ALTERNATIVES

In terms of Section 28 of the EIA Regulations (GNR. 543 of June 2010), as amended, due consideration must be given to project alternatives during the EIA process.

Section 31 (2) (g) of the EIA Regulations (GNR. 543 of June 2010), as amended, requires a description of feasible and reasonable alternatives to be considered in the EIA Report. In part, the purpose of the Scoping Report is to review and screen alternatives to determine reasonable and feasible alternatives that need to be assessed in further detail in the EIA Report. In essence, an alternative is a different means to meet the general purpose and need of an action. The identification of alternatives is an integral part of the EIA/EMP and is required in terms of NEMA as described above.

As part of the scoping phase, project alternatives were identified as presented in Table 2.3. These are presented according to alternative categories required in terms of the legislation. A level of evaluation of these alternatives was conducted so that only **those that were deemed feasible were considered further during the impact assessment phase of the project**. The preferred alternative was identified during the scoping phase and taken forward into the EIA phase. The following categories of alternatives can be identified:

Table 2.3 Alternative Analysis

GN 921 Listing Category	Listed Activity	Description
Activity	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity	Proposed activities are based upon the improved strategy to the existing waste management operations on-site. No activity alternatives have therefore been considered. Should the proposed activities not be licensed and implemented, then the current activities/ waste management strategy will continue.
Locality	Location alternatives could be considered, for example, for the location of the Waste Management Facility. This is sometimes considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate and alternative locations that are in close proximity. Alternative locations would mean additional surface area requirements and bush clearing in Venetia Mine	This is an existing site and there is little scope for assessing alternative locations for the proposed activities. The proposed activities are part of an improvement strategy for the existing waste management facility and associated waste management activities. The current salvage yard is will be improved and will be referred to as the Waste Management Facility. Total area - 30 634m ² .
Process	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process.	There is the potential for alternative technologies to be used in the management of waste tyres such as tyre pyrolysis which could significantly reduce tyre volumes on site in the future. This will, however, require further investigation and has not been included in this application.
Demand	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means.	Waste generation will remain unchanged during the life of mine
Scheduling	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise a number of components, which can be scheduled in a different order or at different times and as such produce different impacts.	Diamond regulations and diamond security are important considerations when scheduling waste management activities at a diamond mine. Due to the nature of the high security associated with diamond mining the ability to look at alternate scheduling is very limited. Removal of waste thus has to remain on an <i>ad hoc</i> basis in order to maintain diamond security.
Input	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes.	There are no input alternatives in the process of waste management as the type of waste generated on the site will remain constant with current processes. There is however, the potential to try and purchase various materials that are more 'environmentally friendly' and easier to process on site thus promoting their reuse or recycling and resulting in less waste, e.g. using plastic pallets rather than wood. This may be considered at a later stage and will be subject to the Mine's internal processes and procurement.
Routing	Consideration of alternative routes generally applies to linear developments such as power lines, transport and pipeline routes	The site, WMF and the WRD are existing facilities at the mine and current routes will still be utilised until there is a need for alternative routes to be considered

Site Layout	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site	Various layout and design alternatives have been considered. The first alternative was to keep the current layout of the salvage yard as is. The proposed activities however, could not be accommodated efficiently within the parameters of the existing layout and facility size. A subsequent revision (the preferred WMF layout) which includes designated areas for the applicable waste management activities. .
Scale	In some cases, activities that can be broken down into smaller units can be undertaken on different scales	The volume of waste on site for the same number of workers and unchanged operations would remain constant and as such it would not be possible to manage waste on a smaller scale. Wastes are disposed of off-site.
Design	Consideration of different designs for aesthetic purposes or different construction materials in an attempt to optimise local benefits and sustainability would constitute design alternatives	In order to allow for the storage of waste at the Waste Management Facility, the current facility has been sub-demarcated into various areas pending the various waste streams as to allow each demarcated area to be designed, operated and managed in the appropriate manner. Where required, the existing demarcated areas will be improved during a four year period, pending capital approval as to comply with the structural requirements of GN R. 634 pertaining to the storage and management of waste. Waste is removed from the Waste Management Facility by an approved waste management contractor.

3.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 7 OF 1998) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT AMENDMENT ACT, 2008 (ACT NO. 62 OF 2008) (NEMA)

NEMA requires that the potential impact on the environment, socio-economic conditions, and cultural heritage of activities that require authorisation or permission by law must be considered, investigated and assessed prior to implementation, and reported to the relevant authority.

The Environmental Authorisation was granted by LEDET on the 13 of July 2012 (Ref: 12/1/9-7/2-V49-W109) and amended on 5 February 2015.

3.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008) AND AMENDED (NEMWA)

NEMWA came into effect on 1 July 2009 and Government Notice Regulation GNR 921, the list of waste management activities that have, or are likely to have a detrimental effect on the environment was published on 29 November 2013.

Section 2 of the Act states the objectives of NEMWA are to protect the health and well-being of the environment, ensure awareness of the impacts of waste on health and provide for compliance with measures to protect health in order to secure an environment that is not harmful to health and well-being.

NEMWA provides 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.

The listed activities that require licencing in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and associated listing notice; Government Notice 921 (29 November 2013) relevant to this project are described in Table 3.2. With project registration, both Category A and B listed activities were triggered. During the waste management optimization efforts, it was decided to move waste off-site which resulted in only Category A listed activities being triggered. A description of the applicable listed activities as well as those no longer triggered, was submitted to the DEA in a Scoping clarification letter (refer to Annex C2). Although Category A listed activities trigger a Basic Assessment process and are generally dealt with via the provincial authorities, the DEA accepted the Scoping Report in a letter dated 26 June 2015 (Annex C3).

3.2.1 Norms and Standards

As of 23 August 2013 the Minister of Environmental Affairs published the following regulations for immediate implementation in Government Gazette No 36784:

- R634 Waste Classification & Management Regulations;
- R635 National Norms & Standards for the Assessment of Waste for Landfill Disposal; and
- R636 National Norms & Standards for Disposal of Waste to Landfill.

Government Notice 926 – Norms and Standards applicable to the Storage of Waste.

3.3 OTHER APPLICABLE LEGISLATION

Table 3.1 below indicated other legislative requirements applicable to the entire mining operations. These are excluded from this document as they do not apply to the management of waste as per this application.

Table 3.1 Other Environmental Legislation

Act	Description
Constitution of the Republic of South Africa (No 108 of 1996)	The Constitution of South Africa compels all to ensure the rights of South African citizens. Section 24 of the constitution provides: Everyone has the right: <ul style="list-style-type: none"> • to an environment that is not harmful to their health or well-being; • to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that • prevent pollution and ecological degradation; • promote conservation; and • secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.
Mineral and Petroleum Resources Development Act (No 28 of 2002)	In terms of Section 102 (as amended 21 April 2009) of the MPRDA a mine may not amend a Mining Right, a Mining Works Programme, environmental management programme or an environmental authorisation issued in terms of the National Environmental Management Act, 1998, without the written consent of the Minister.
National Water Act (No 36 of 1998)	The National Water Act, 1998 identifies 11 consumptive and non-consumptive water uses, which must be authorised under a tiered authorisation system, which include Scheduled uses, General Authorisations, or Licences
National Heritage Resources Act (No 25 of 1999) - NHRA	The Act requires all developers (including mines), to undertake cultural heritage studies for any development exceeding 0.5 ha. It also provides guidelines for impact assessment studies to be undertaken whenever cultural resources may be destroyed by development activities.
National Forest Act (No 84 of 1998)	This act includes a list of all protected trees. The effect of this declaration is that in terms of Section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an

Act	Description
World Heritage Convention Act (No 49 of 1999)	<p>applicant and subject to such period and conditions as may be stipulated.</p> <p>The World Heritage Convention Act (Act No. 49 of 1999) established the legal, institutional and administration framework that provides for the incorporation of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention into South African law. Section 5 makes provision for the enforcement and implementation of the World Heritage Convention in South Africa and the protection of the country's listed World Heritage Sites.</p> <p>The Act requires that the South African government fulfil its international obligations in terms of the World Heritage Convention to preserve palaeontological and palaeo-anthropological sites, and avoid and prevent all forms of activity that may lead to their destruction.</p> <p>The mine site is located in close proximity to the Mapungubwe National Park. This park was declared a National Heritage Site in December 2001 and listed as a World Heritage Site in July 2003. The highlight of the park is the Mapungubwe Archaeological Site, which was a precursor to Great Zimbabwe and Thulamela and also the location where the Gold Rhino and many other artefacts were uncovered (SA PLACES, 2010).</p>
National Environmental Management: Air Quality Act (No 39 of 2004)	<p>The Act provides that reasonable measures needs to be taken to ensure the protection and enhancement of air quality to ensure ambient air quality that is not harmful to the health and well-being of people.</p> <p>Section 32 specifically deals with control measures in respect of dust control according to ambient air quality standards.</p>

Table 3.2 Applicable Listed Activities from GN 921

GN 921 Listing Category	Listed Activity	Description
Waste Management Activities: Waste Management Facility (WMF)		
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 1,000m ² .	The sorting and baling of general waste: <ul style="list-style-type: none"> • Cardboard; • Paper; • Glass; • Cans; • Plastic; and • Non-recyclable domestic waste, including food waste. The WMF has an area of 50 000m ² .
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.	Recycling and/or re-use of wastes within the WMF (area of 50 000m ²) including the 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 (located within the Mine area).
Category A, Activity No 9	The disposal of inert waste to land in excess of 25 tons but not exceeding 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.	Demolition and Building Rubble (inclusive of wood) disposal on a demarcated area on the waste rock dump.
Waste Activities: Waste Tyres		
Category C	GN R. 926 National Environmental Management: Waste Act (59/2008): National norms and standards for the storage of waste.	Registration for Storage of waste under Category C of GN R. 921.
Category C, No.3	The storage of waste tyres in a storage area exceeding 500m ² .	There will be three storage areas of waste tyres on the mine: <ul style="list-style-type: none"> • Tyres will be stored in an area in the WMF where is will be <i>evaluated</i> for possible re-use. • Tyres will be stored at a dedicated area at the Barloworld Workshop Area - area of 27 949 m². • Tyres will be stored at dedicated area on the Waste Rock Dump - 30 044.55m²

Table 3.3 *Listed Activities No longer applicable due to Waste Management Optimisation*

GN 921 Listing Category	Listed Activity	Description
Waste Management Activities: Waste Management Facility (WMF)		
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.	Recovery of approximately 5.5 tons of wood (chipping and hammer mill) per day. <i>This activity is less than the trigger value of 10tons per day and therefore does not require licensing in terms of this WML.</i>
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.	<i>Ex situ</i> bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge. It is anticipated that approximately 2 tons of contaminated soil per week will be bio-remediated. <i>This activity is less than the trigger value of 1 ton per day and therefore does not require licensing in terms of this WML.</i>
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.	<i>Ex situ</i> bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge. It is anticipated that approximately 2 tons of contaminated soil per week will be bio-remediated. <i>This activity is less than the trigger value of 1 ton per day and therefore does not require licensing in terms of this WML.</i>
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.	<i>Ex situ</i> bio-remediation of hydrocarbon contaminated soil, with the potential addition of sewage sludge. It is anticipated that approximately 2 tons of contaminated soil per week will be bio-remediated. <i>This activity is less than the trigger value of 1 ton per day and therefore does not require licensing in terms of this WML.</i>
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).	All activities relating to the upgrade of the WMF will trigger Category A, No. 12.

GN 921 Listing Category	Listed Activity	Description
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.	The Waste Management Facility will not be expanded.
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).	Due to waste removal on a frequent basis from site, the volumes have been significantly reduced. Existing facilities will just be improved and areas for waste management demarcated.
Waste Activities: Demolition and Building Rubble Dump & Waste Tyres		
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.	<p>Disposal of inert waste (demolition and building rubble e.g. concrete, bricks, etc.) used for levelling and building (infilling) to a designated area on the WRD.</p> <p>The anticipated inert waste to be disposed of is a once off disposal of 1 564.24 tons and thereafter a monthly disposal of 120.33 tons.</p> <p><i>This activity is less than the trigger value of 25 000 tons and therefore does not require licensing in terms of this WML.</i></p>

The EIA study is not a linear process, but one where several stages are carried out in parallel and where the assumptions and conclusions are revisited and modified as the project progresses. The Scoping and Environmental Impact Reporting (S&EIR) procedure is the applicable EIA process required for developments in South Africa that “*could have a substantial detrimental effect on the environment*” (EIA Regulations GNR. 543, June 2010). The S&EIR procedure is shown schematically in Figure 4.1 and discussed in the following subsections. It is important to note that the process followed is as per the 2010 regulations as this WML application was submitted prior to the new (2014) regulations coming into effect.

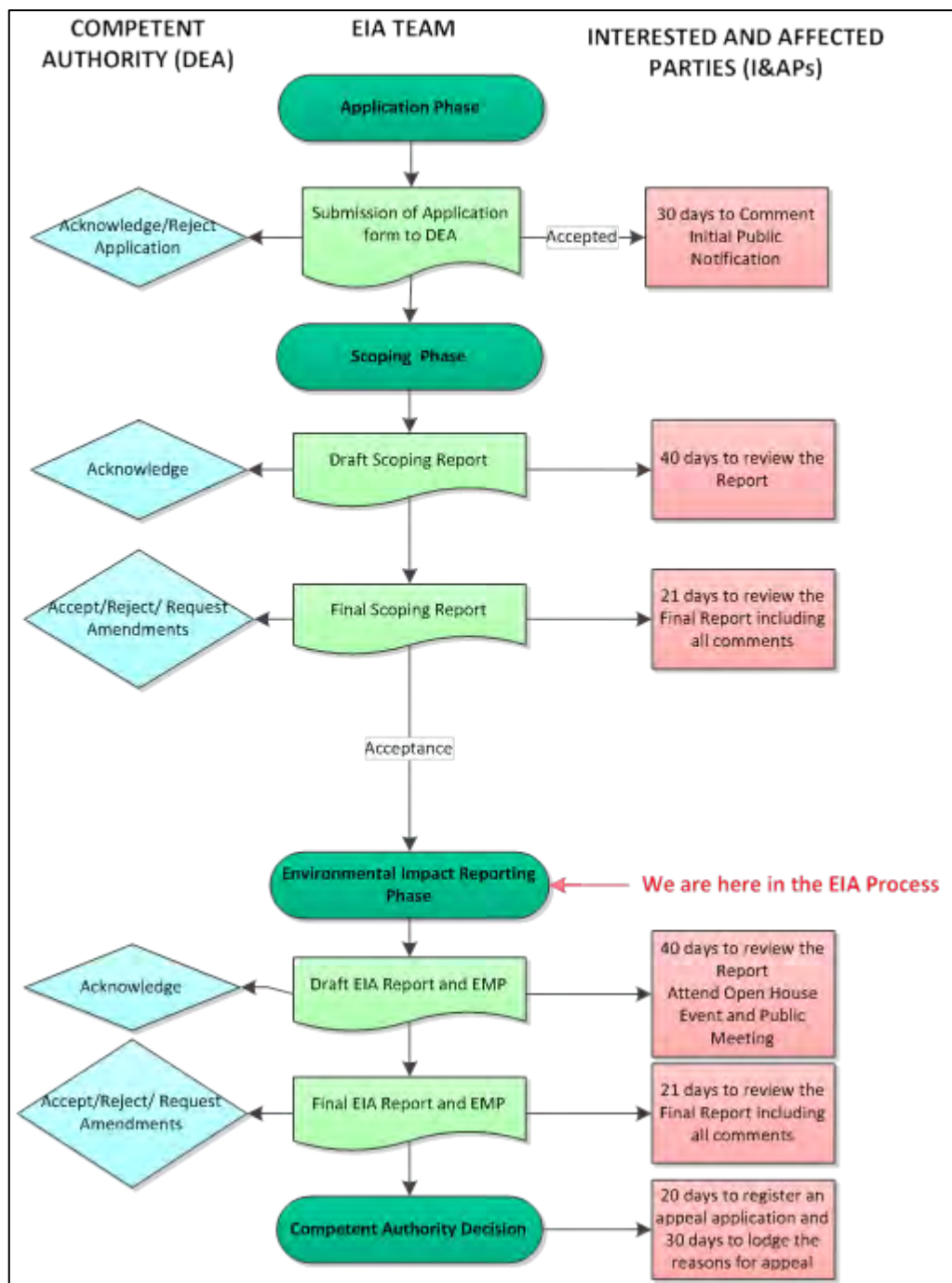
At a high level, the Project EIA process is undertaken in five key phases, in accordance with the EIA Regulations (GNR. 543) of June 2010, as amended.

- **Application Phase** - identify listed activities that are triggered by the Project and submit an application for EA to the competent authority.
- **Scoping Phase** - identify interactions of project activities and environmental and social resources to determine which should be included in the scope of the impact assessment.
- **Environmental Impact Reporting Phase** - the characteristics of the potential effects of project activities on bio-physical and social resources and features are evaluated and quantified to determine potential impact significance (or importance) taking into account the sensitivity of the particular resource or receptor. This phase also includes the identification of mitigation/management measures and the development of an Environmental Management Programme.
- **Competent Authority Decision** - the decision on the Project will be distributed to all project interested and affected parties and informed of the appeal process.

The public consultation activities undertaken during the EIA process is described under each phase. The Project is currently at the Environmental Impact Reporting (EIR) Phase.

Figure 4.1

The EIA Process



4.1 Application Phase

The purpose of the application phase is to notify the competent authority and all interested and affected parties of the Project. As part of this phase, ERM as the appointed independent environmental assessment practitioner undertook the following activities.

4.1.1 *Submission of Application*

An application for an EA was submitted to the DEA on 1 April 2014 (subject to amendments) and the activities that have been applied for have been listed in *Chapter 3, Table 3.2*. The DEA subsequently acknowledged and accepted the application on 18 June 2014, with reference *12/9/11/L43049/5* (Annex C1).

4.1.2 *Identification of I&APs*

An I&AP database was compiled and includes the contact details of:

- Central and Provincial Government Representatives;
- Local Authorities; and
- Affected and surrounding landowners.

All stakeholder information, including contact details were gathered previously during the NEMA and MPRDA processes that were undertaken in 2011 and 2012 and has been updated accordingly. This database will be updated on an on-going basis throughout the project, and will act as a record of the communication/ public involvement process.

4.1.3 *Initial Public Notification*

According to the EIA Regulations (GNR. 543 of June 2010), as amended, the environmental assessment practitioner is required to provide I&APs with an opportunity to comment on the Project.

A Background Information Document (BID) was compiled in English, Afrikaans, Sepedi and Venda. The purpose of the BID was to provide stakeholders with background information on the EIA process, the stakeholder engagement process and the rationale for the proposed project. The BID included information about the project and invited people to register as stakeholders. The BID was accompanied by a commenting sheet and a notification letter which was distributed via email and physical drop off at the following locations on 19-20 September 2014:

- Local Musina Municipal office;
- Local Musina Municipal library;
- Blouberg Municipality Alldays satellite library;
- Musina Spar;
- Pontdrift police station;
- Musina tourism centre.

A2 site notices in the same four languages were placed at a number of conspicuous locations on 19 and 20 September 2014 to announce the Project and advertise the availability of the draft Scoping Report for Public Comment. The notices were displayed for the duration of the 40-day comment period. Site notices were placed at the venues mentioned above.

The notification of the EIA was advertised in the Northern Review, Limpopo Mirror, Northern Gazette, the Zoutpansberger and the Sowetan News on 19 September 2014 in English (refer to Annex B3). This advert informed the public of the EIA process conducted for the waste management licence application for Venetia Mine and details of how to register as an Interested and Affected Party (I&AP). All I&APs that responded to the advertisements were included on the project stakeholder database.

The primary aim of the advertisement was to ensure that the widest possible group of stakeholders were informed of the project, and to elicit comments from the public and the authorities regarding the proposed project.

Refer to Annex B1 for Initial PPP documents and proof of distribution/comments.

4.1.4 Authority Meetings

Two pre-scoping meetings were held with authorities, namely:

- A meeting with the DEA (Lucas Mahlangu) on 16 July 2014 to discuss the proposed project and understand the Department's requirements and opinion on the project;
- A meeting with LEDET (Tsepo Maselela) on 24 July 2014 to present the project to the department and discuss a feasible and sustainable approach. The disposal of non-hazardous industrial waste (excluding conveyor belts), such as building rubble, wood, glass, etc. on the waste rock dump were also discussed at this meeting.

The DEA were given the opportunity to comment on the DSR before the submission of the Final Scoping Report (FSR) for their final comment.

Refer to Annex C4 for the minutes of the meetings held.

4.2 Scoping Phase

The various scoping phase tasks and participation activities undertaken are described below.

4.2.1 Compilation of Draft Scoping Report

The Draft Scoping Report (DSR) was compiled in accordance with the regulatory requirements stipulated in the EIA Regulations (GNR. 543) of June 2010, as amended. The main objectives of this report were to:

- describe the Project in detail and the regulatory process to be followed;

- report the significant environmental and social issues for further investigation during the EIA process;
- provide a record of all comments/concerns raised by project stakeholders and provide responses to those comments; and
- provide a Plan of Study (PoS) or approach for the EIA phase of the Project.

Various supporting documentation was also provided as annexures to the DSR, these include a site locality map, site plan, land-use zoning certificates, site photographs and proof of public participation.

4.2.2 *Release of Draft Scoping Report for Public Review*

The DSR was made publically available in hardcopy from the 26 September to 05 November 2014 at the locations listed below (*Table 4.1*). Furthermore, an electronic version of the DSR was made available on the project website (<http://www.erm.com/VenetiaMineEIA>). Availability of the DSR was communicated to registered I&APs via email.

Table 4.1 Availability of DSR

VENUE	CONTACT DETAILS	CONTACT PERSON	ADDRESS
Local Musina Municipal Library	(015) 534 6100	Tshepo Duba	21 Irwin Street Musina 0900
Blouberg Municipality Alldays Satellite Library	(015) 5751144	Vinola Boloka	Allday Municipality 28 Serwituut Street All Days 0909
Musina Post Office	(015) 534 2003	Ronald Manzere	10 Harold Grenffel Street Musina
Musina Spar	(015) 534 0750	Thea Muller/Martin Botha	6 National Road Musina 0900
Pontdrift Police Station	(015) 575 9908	Warrant Officer Sam	Pointdrift Border Post Limpopo
Musina Municipal Offices	(015) 534 6181	Mimi Boa	21 Irwin Street Musina 0900
Tourism Center	073 607 9904	Milanzi William	Harold Grenffel Street Musina
ERM Project Website	(021) 684 5400	Tougheeda Aspeling	http://www.erm.com/VenetiaMineEIA

The DSR was acknowledged by the DEA in a letter dated 05 February 2014.

Refer to Annex B4-B7 for the Scoping phase PPP documents.

4.2.3 *Open House Event and Public Meeting on the Draft Scoping Report*

An open house event and public meeting was held on 20 October 2014 to afford I&APs and the general public the opportunity to comment on the Project and engage with the EIA team on the DSR. The public meeting was held at the Nancefield Community Hall, Musina from 10:00 am -12:00 pm.

Registered I&APs were informed of the date, time and venue of the meeting via email on the 7 October 2014.

I&APs were invited to view A2 posters with information on the Project, potential environmental and socio-economic impacts identified as well as the way forward in terms of the EIA process and how they can be involved. The key comments made during the open house event are listed below.

- Query concerning the types of hazardous liquids that are stored on site.
- Comment regarding employment opportunities for the local community and what is De Beer's commitment to social development (ad-hoc or long term).
- Queries surrounding the potential impacts on water resources and the community's health and safety.

The minutes of this meeting, attendance register and presentation given have been appended as Annex B8. Comments from this meeting have been integrated into the comments and responses report.

4.2.4 *Compilation of Final Scoping Report*

The Final Scoping Report (FSR) was finalised by incorporating all comments received by I&APs and commenting authorities on the DSR.

Throughout the scoping phase to date, issues and concerns raised by I&APs and authorities have been recorded in an updated project Comments and Responses Report (Annex B9). This CRR has been categorised into comments received during each phase of the EIA process, namely comments received during the application phase and scoping phase thus far and will be updated during the EIA phase of the process. This updated CRR was included into the FSR for review by all project stakeholders.

The FSR was made publically available on the project website (<http://www.erm.com/VenetiaMineEIA>) and registered I&APs were informed of its availability and submission to the DEA. A notification letter was sent to all registered I&APs to inform them of the release of the FSR on 20 January 2015. The FSR was acknowledged by the DEA in an email on 26 January 2015.

4.2.5 *DEA decision on Scoping Phase*

The DEA requested further information in an email dated 3 March 2015. This information was supplied to the Department on 21 May 2015. The DEA accepted the FSR and Plan of Study for EIA in a letter dated 26 June 2015

(Annex C3). No recommendations were made in the acceptance letter regarding considerations to take forward into the EIA.

4.3 *EIA Phase*

4.3.1 *Release of the Draft EIR and EMPr for Public Review*

The draft EIR is available for public comment for a 40 day period between 24 August 2015 to 2 October 2015 at the Local Musina Municipal Library, Musina Post Office, Musina Tourism Centre, Venetia reception area and the ERM Project Website. I&APs were notified regarding the availability of the EIA via email on 21 August 2015 and will be encouraged to participate in the WML by providing comments. Comments to be received will be included in the CRR (Annex B9) and EIA where applicable. The Draft EIR and EMPr will then be finalised and developed into a Final EIR and EMPr, which will be submitted to the DEA for decision.

4.4 *Specialist Studies*

Refer to Annexure A for the Waste Management Optimisation Strategy and Programme (WMS), which is aligned to the National Department of Environmental Affairs (DEA) National Waste Management Strategy document published in 2012.

4.5 *Environmental Impact Reporting Phase*

The purpose of the impact assessment is to identify and evaluate the likely significance of the potential impacts on identified receptors and resources according to defined assessment criteria, to develop and describe measures that will be taken to avoid, minimize, reduce or compensate for any potential adverse environmental effects, and to report the significance of the residual impacts that remain following mitigation.

5.1 CLIMATOLOGY

The Venetia mine is located in the Limpopo Province which experiences a sub-tropical climate in most of the province. The site is, however, located in the western half of the province and close to Botswana where the climate is semi-arid to arid in the southern parts. It may therefore be suggested that Venetia is located in a transitional zone of the two different climatic zones.

5.1.1 Precipitation

Rainfall data was obtained from the on-site weather station at the Venetia mine. The rainfall data was for the period January 1999 – March 2014. Due to gaps in the data the actual rainfall figures for each month may not be accurate and representative of regional rainfall conditions. Rainfall data is also presented from the South African Weather Bureau (SAWB), WB42 document which presents historical rainfall data for Musina (Macuville) which has an agricultural weather station.

The average monthly rainfall for Venetia for the period January 2006 to March 2014 is presented in *Table 5.1*. In 2013, the highest total rainfall at Venetia for a year from January to December was calculated to be 681.7mm. The highest average rainfall for a month was recorded during January at 47 mm. The rainfall recorded at the on-site weather station does not correlate to the regional annual rainfall meaning that the weather station may not be correctly calibrated, that regular maintenance has not been done, or that the rainfall is very localised.

In general, however, although rainfall is highly unpredictable, it shows a seasonal pattern, with the highest rainfall between November and March. Rainfall is mainly driven by thunderstorms which on average occur five days a month and most frequently result in less than 21 mm of rain. The Mean Annual Precipitation (MAP) for Alldays (1931 - 1988) is 374 mm. The maximum recorded rainfall intensities are 48 mm/h and 110 mm in 24 hours. The 1 day event in a 50 year return period and the 1 day event in a 100 year storm event are 160 mm and 189 mm respectively.

Table 5.1 *Average rainfall for Venetia: January 2006 to March 2014*

Month	Rainfall (mm)
January	145
February	24
March	45
April	49
May	2
June	0
July	0
August	0
September	18
October	22
November	87
December	56
Total	448

5.1.2 *Maximum and mean monthly temperatures*

Daytime temperatures peak during the summer months while decreasing during the winter months. Average monthly temperatures recorded at Venetia for the period June 2006 to April 2011 are presented in *Table 5.2*. The maximum temperature at Venetia occurred during the month of October with the temperature reaching 41.5°C which is during spring. The minimum temperature was recorded during July (2.7°C). The average temperatures are variable in the project area, ranging from 16.9 to 26.4 °C.

Table 5.2 *Average monthly, maximum and minimum temperatures for Venetia for the period June 2006 to April 2011*

Month	Average	Maximum	Minimum
January	25.3	40.0	15.7
February	26.4	39.3	14.9
March	25.8	37.4	14.0
April	22.1	36.5	9.9
May	18.9	33.5	7.9
June	17.2	31.1	3.8
July	16.9	30.1	2.7
August	18.1	34.0	5.3
September	22.8	38.2	7.2
October	25.3	41.5	13.7
November	25.5	40.3	14.9
December	26.1	39.8	14.2

5.1.3

Monthly mean wind direction and speed

Hourly meteorological data was obtained from the on-site weather station at Venetia for the period June 2006 to April 2011.

The prevailing winds are relatively consistent throughout the year at the mine. The prevailing winds are from the east, with an occurrence of winds from the east-northeast, east-southeast and north. Wind patterns observed during the day and at night are similar, with the winds from the north being more prominent during the day.

The average wind speed for the Venetia mine area for all hours is 3.64 m/s with maximum speeds generally less than 11.1 m/s. The average wind speeds for daytime during the year are 4.39 m/s with calms of 14.62%, during the earlier parts of the night the average wind speed is 3.09 m/s, whilst decreasing during the latter parts of the night to 2.55 m/s with calms of 40.68%.

Wind roses were also created for the four seasons. The prevailing wind direction is from the east for all four seasons. During spring there are a higher percentage of winds greater than 11.1 m/s from the east when compared to the other seasons. There is an increase of winds from the north during the cooler seasons of autumn and winter. The highest average wind speeds of 5.53 m/s occur during spring period with calms of 12.04%. The lowest average wind speeds occur during autumn with an average of 2.46 m/s with calm conditions occurring 33.66% of the time. The average wind speed for summer and winter are 3.20 m/s and 3.23 m/s respectively.

The majority of winds experienced at the Venetia Mine are low, with 66.5 % of the winds below 3.6 m/s, of which 24.4 % are calm conditions. The strong winds which are above 5.7 m/s represent 24.1 % of the wind data recorded.

5.2

TOPOGRAPHY

The Venetia mine area incorporating the WMF and WRDs forms part of the Limpopo Plain Eco-region (Henning, 2011) and is situated to the north of the Soutpansberg and to the south of the Limpopo River. The topography of the area is a mixture of terrains and consists of low hills and wide valleys varying in elevation from 600 metres above mean sea level (mamsl) at the valley bottom to 710 mamsl at the hill peaks in the south. It is characterised by shallow stony soils associated with calcrete or granite gneisses and deeper soils at the foot slopes and valley bottoms (EMP, 2004).

The topography of the existing Salvage Yard is flat. The surface topography and associated landscape has been and will further be altered by the mining activities. The remains of Waste Rock Dump (WRD) will have lasting effects on the surface topography.

5.3 GEOLOGY

5.3.1 *Local mine geology*

The mine area itself contains kimberlites, dolerite sills and rocks belonging to Malala Drift and Gumbu groups of the Beitbridge Complex. The Malala Group consists of strongly sheared rocks with a well-developed fabric/mineral lineation. Biotite gneisses (augen biotite gneisses; banded biotite gneisses), quartzofeldspathic gneisses, biotite schist (garnetiferous biotite schist, convoluted biotite schist and garnetiferous convoluted biotite schist) and amphibolite gneisses (biotite-bearing amphibolite schist and garnetiferous amphibolite schist) make up the 'Gneissic Package' on the mine. A portion of the pit contains hydrothermal copper hosted in schist.

Thin residual soils interspersed with patchy calcrete and less dominant alluvial soils prevail in the lower-lying site areas. Soil depths vary from 100mm to about 2500mm.

Several dolerite sills have been identified in the mine area at depth. These sills may have an influence on groundwater storage, movement and compartmentalisation.

As the waste management activities are in an area that is already disturbed by current mining activities and within the mining lease area and footprint of the existing mine and its associated activities; soil characteristics and land capability are not assessed in detail in this Waste Management Licence Application.

5.4 SOIL

Four different soil classification units were identified in the total mining area including Mispah (Ms) form, two Hutton forms of varying depth (Hu1500mm+ and Hu400mm) and the Clovelly form (Cv450 mm). Refer to *Figure 5.1* for an illustration of the distribution of the soils.

Soil pH

According to the Venetia Mine Soils Report (2011), soils found on the sites can be described as moderately alkaline (pH range of 7,9 - 8,4). For crop production purposes and to determine the agricultural potential of the land, the pH is slightly too alkaline to be able to produce a wide range of crops. Higher pH levels are often also associated with high salt levels and soil may either be saline or sodic - either as a natural occurrence or from existing pollution.

The level of zinc (Zn) is slightly higher than the target level at the Mine. Acid-leached soils often have Zn deficiency because of depletion of this element in the surface layer. Calcareous and alkaline soils also commonly have Zn

deficiency, but the cause is low solubility. All other metal levels are within acceptable parameters.

Other soil elements

The phosphorus (P) level measured is 630 mg/kg. Calcium and magnesium are important because they include two of the major plant nutrients, and sodium because it indicates the possible sodicity of the soil, especially in circumstances where saturated paste data are not available. Lack of organic matter and clay minerals, which provide exchange sites that serve as nutrient stores result in the soil having a low ability to retain and supply nutrients for plant growth. The calcium and magnesium levels are high at the Mine (Ca=33,000 mg/kg and Mg=13,000 mg/kg). The sodium level is acceptable at 480 mg/kg.

Soils at the existing salvage yard

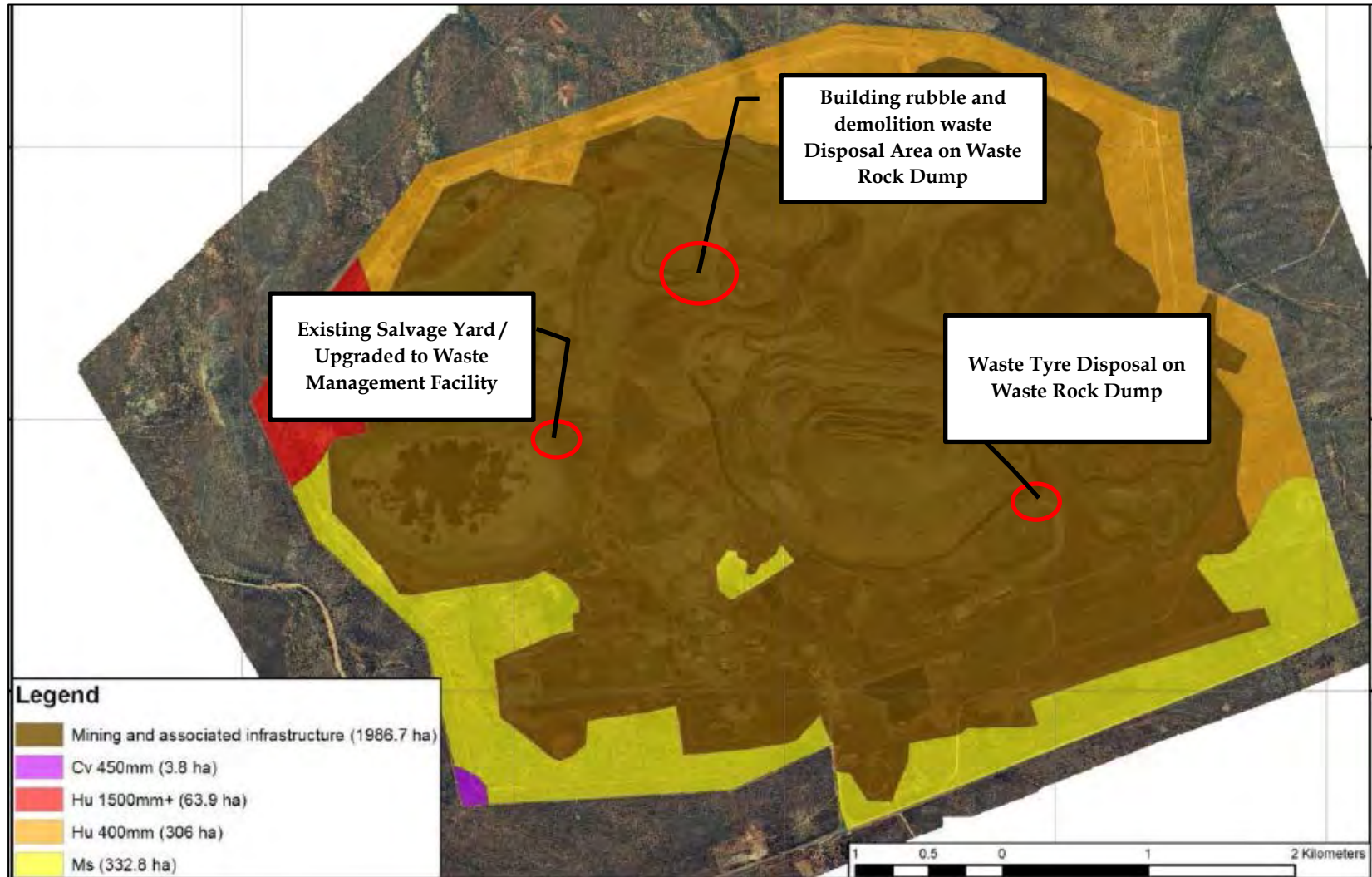
The topsoil at the salvage yard has already been removed due to previous mining activity. The already disturbed site is not suitable for vegetation growth.

5.4.2 *Land capability*

The current land use is mining as the area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard footprint area.

The current land use for the Waste Rock Dump is also classified as mining.

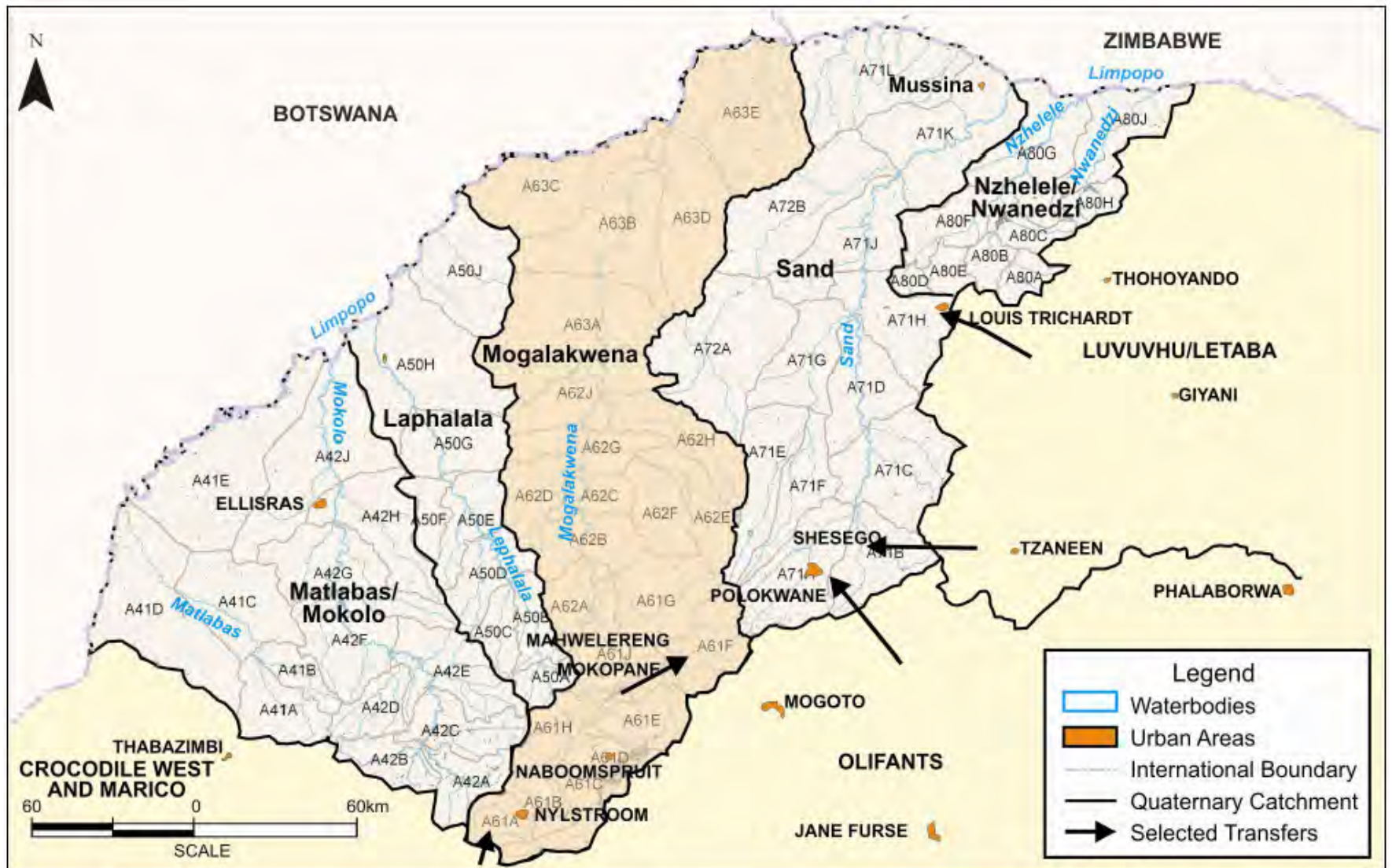
Figure 5.1 Soil Distribution Map



The mine is situated within the A63E (Mogalakwena) quaternary catchment (*Figure 5.2*) of the Limpopo Water Management Area (WMA) which has an area of approximately 1,992 km². On a local scale, the mine is situated in its own sub-catchment as it is within a large basin formed by a dolerite ridge to the north and the west. The mean annual run-off for the Venetia site is 1.5 Million m³/a (De Beers, EMP, 2000).

The local catchment area consists of the non-perennial Kolope River which flows to the west of the mine and a tributary of this river, the Matotwane River, flows to the east. The confluence of the Kolope and Matotwane Rivers is about 10 km downstream of the mine. Thereafter, the Kolope River flows into the Limpopo River about 5 km upstream of the Shashe River. There are no perennial rivers on the mine property, however, it has been noted that prior to the mining excavations, a small ephemeral streambed "Central" passed through the centre of the pit running from south to north. This was deviated via a canal to the west towards the Kolope River. Nevertheless under extreme rainfall conditions, this area can still transport water into the pit as this remains a preferential water flow path.

Figure 5.2 Map showing the Mogalakwena Quaternary Catchment



5.5.1 *Site specific water resources*

Water is currently obtained from two well fields, Schroda and Greefswald, located in alluvial deposits along the banks of the Limpopo River, approximately 30km north of the mine site. To limit water level reductions in these well fields during low flow conditions and thereby limiting potential adverse impacts on the riverine riparian vegetation, the mine abstracts additional water from the well fields when the Limpopo River is in flood which is stored in the Schroda Off-Channel Storage (OCS) Dam.

The current, approved abstraction volumes are as follows:

- Maximum abstraction quantity of 4.2 Million m³/a from boreholes located in the alluvial aquifer on the bank of the Limpopo River for industrial purposes;
- Additional 5 Million m³/a, at a maximum abstraction rate of 500 l/s during surplus flow conditions;
- A maximum licensed abstraction of 9.2 Million m³/a during surplus flow times for the combined Greefswald and Schroda well fields.

5.5.2 *Current storm water status and management*

Currently, the WRD comprises a number of individual deposits that have been joined to form one consolidated deposit. During rehabilitation, the outer slopes of the deposit are shaped to long-term stable landforms with associated benches.

According to the Surface Water Management Plan (2014), measures have been conceptualised to ensure that all WRDs will be constructed and managed in a manner to facilitate stormwater control during operational phases of the operations. These facilities will be non-water shedding in order to mitigate the risk of polluted runoff leaving the site and to ensure sustainable rehabilitation of the facilities in this arid region which is characterised with high intensity storm events.

The WMF area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard. The surface water on the existing salvage yard is managed as part of the overall Venetia Surface Water Management Plan (2014). Storm water emanating from this area is directed toward the proposed new PCD 2 Complex.

5.5.3 *Flood lines*

The floodlines shown in *Figure 5.3* were determined by SRK in 2007 and were updated again in 2011. The floodlines have been determined for the 1:100 year flood and fall well outside the activities being applied for in this Waste Management Licence Application.

Figure 5.3 Map showing the Mogalakwena Quaternary Catchment



5.6 GROUND WATER

The Mogalakwena A63E catchment is water stressed and the aquifers are considered minor. The Limpopo River is shared by numerous surface and groundwater users in South Africa as well as with Zimbabwe, Botswana and Mozambique.

5.6.1 Groundwater Use and Sources

A 5 km radius hydrocensus was conducted in 2008 to identify water users in the vicinity of the mining operations. The closest water users were located 500m west and 2,700m south east of the Kolope River for domestic use and 980m north of the river for livestock. Thirty-two boreholes were identified within a 5km radius of the mine site. The areas covered by the hydrocensus included the farms Gotha, Endora, Luna, Venetia (outside mine lease), Krone, Rugen and Drumsheugh. All farms except for Gotha form the VLNR.

Groundwater in the area is assumed to be used for small-scale livestock watering and domestic purposes. Within the surveyed area, boreholes are relatively shallow (< 20m) and groundwater level is at 15mbgl (abstraction amounts are unknown). Despite the country rock being a minor aquifer, it is the sole source for local farmers who use the water for domestic and livestock watering (SRK, 2010). Due to the paucity of groundwater occurrences in the

A63E catchment and unfavourable aquifer site geology, Venetia obtains its water supply from the Limpopo Sand Aquifer.

5.6.2 *Groundwater quality monitoring network and protocol*

The existing water quality monitoring programme is a mandatory requirement as stipulated in the National Water Act and forms an integral part of the legal requirements of the MPRDA. The design of the water monitoring program is based on the approved overall Venetia Site EMP.

Groundwater levels are currently measured routinely in approximately 20 boreholes around the mine area as part of the monitoring programme for Venetia. The 2008 to 2011 data has been reviewed and is compared with the earlier monitoring (2001) by KLMCS in *Table 5.3*.

Table 5.3 *Comparison of groundwater levels around Venetia Mine (2001 and 2010) – KLMCS (2001) and Clean Stream (2010)*

ID	Jan 2001	Dec 2008	Mar 2009	Jun 2009	Sep 2009	Dec 2009	Mar 2010	Jun 2010	Sep 2010	Dec 2010
B01							6.84		6.84	8.19
KLM01	2.84	21.25	21.57	21.51	21.45	15.05	12.38	9.65	8.99	9.11
KLM03	14.25	22.25	20.88	19.14	18.29	19.48	19.58	18.22	18.07	18.13
KLM04	8.49	13.5	4.90	7.44	8.45	8.31	7.91	2.76	5.05	4.16
KLM05	7.03	8.17	8.29	7.97	8.11	7.94	8.04	7.54	7.63	7.54
KLM06	11.07	12.48	12.02	12.3	12.54	12.69	12.71	10.91	11.91	11.64
KLM07	4.66	7.73	6.62	6.75	7.11	7.39	7.54	6.67	7.07	7.36
KLM08	7.62	11.97	12.08	11.34	10.04	10.5	6.89	10.36	10.91	10.33
MBH01		5.01	4.58	6.59	4.58	4.7	4.92	4.36	4.02	4.31
MBH02		6.33	6.30	5.98	5.78	6.03	6.02	5.85	5.77	6.38
MBH03		11.8	9.96	10.54	10.84	10.97	9.52	11.06	9.07	
MBH04		7.01	5.67	6.24	6.73	6.68	7.05	6.71	6.81	5.86
MBH05		6.47	5.93	5.8	5.89	5.4	5.56	4.66	4.29	6.31
MBH06		9.13	6.82	9.25	8.44	8.68			9.76	
MBH07		7.06	6.73	5.85	6.59	6.29			6.79	

Possible sources of contamination such as the pit sump water, and seepage from the toe of the FRD and CRD are also routinely sampled and the groundwater chemistry has been evaluated in terms of possible contaminant loading from these sources.

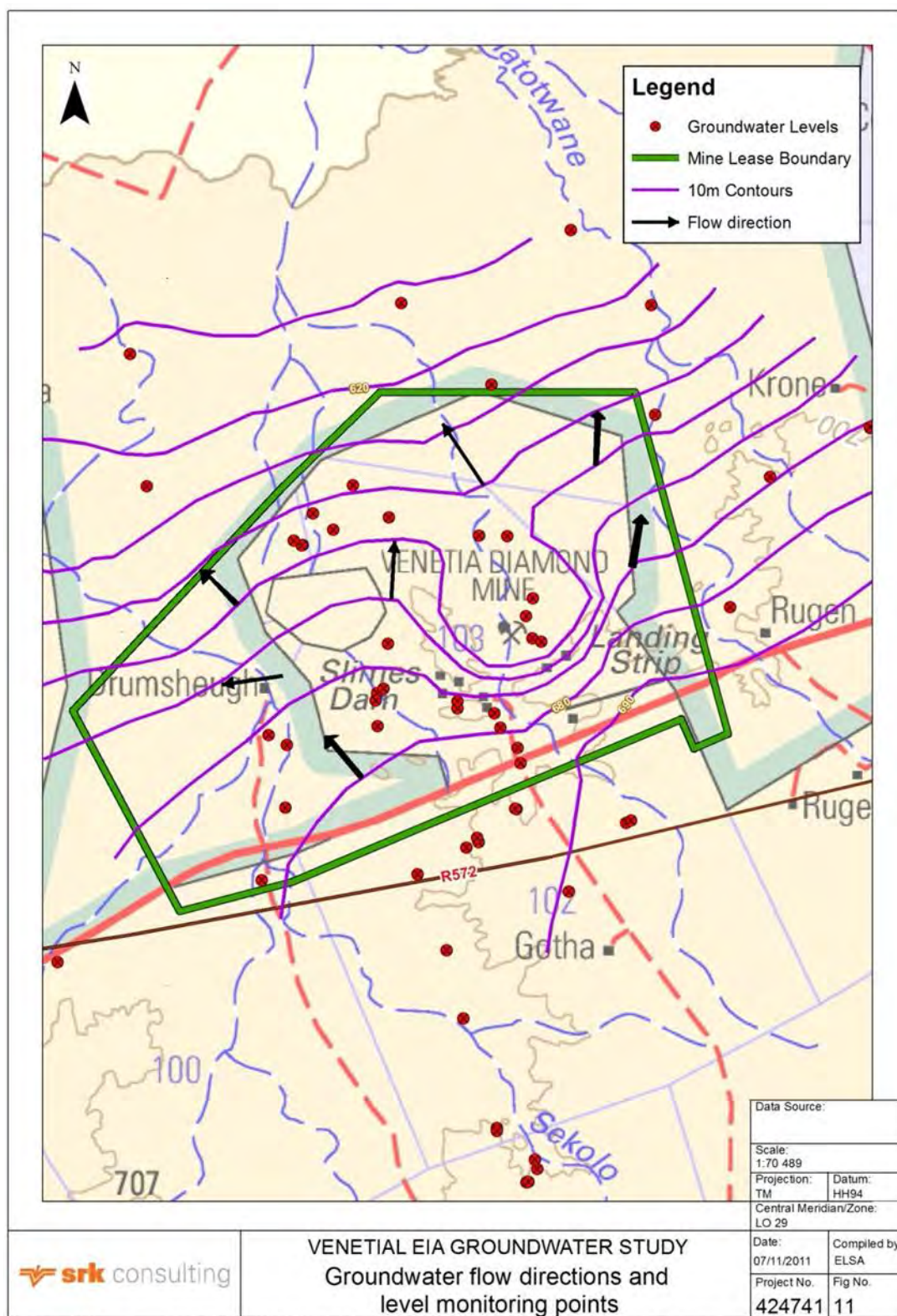
5.6.3 *Groundwater Contamination*

Potential Sources of Contamination

The main waste management activities and infrastructure on the site that could be sources of contamination are listed below:

- Waste Rock Dumps;
- Sewage Treatment Plant; and
- Old waste dump, salvage yard and bioremediation area.

Figure 5.4 Groundwater level monitoring points and flow directions



KLM (2008) distinguished 3 predominant water types occurring within the mine area: i.e. kimberlite water, process water and gneissic water. The water types are characterised as follows:

- Kimberlite water: high TDS, sodium, chloride, magnesium and sulfate;
- Gneissic Water: Elevated sodium, calcium and magnesium due to the dissolution of feldspar in solution; and
- Process water: mix of gneissic-kimberlitic water and rainfall.

Piper diagrams have been used to compare the overall inorganic water composition as ratios in milliequivalents/liter (meq/l). The Piper diagram is useful for showing the sources and mixing of waters and is particularly useful for indicating progressive contamination due to mining leachates as this will plot in the top apex of the quadrilateral. *Figure 5.5* indicates the chemical composition of the water from the mine site.

Figure 5.5 Piper Plot for boreholes at Venetia Mine

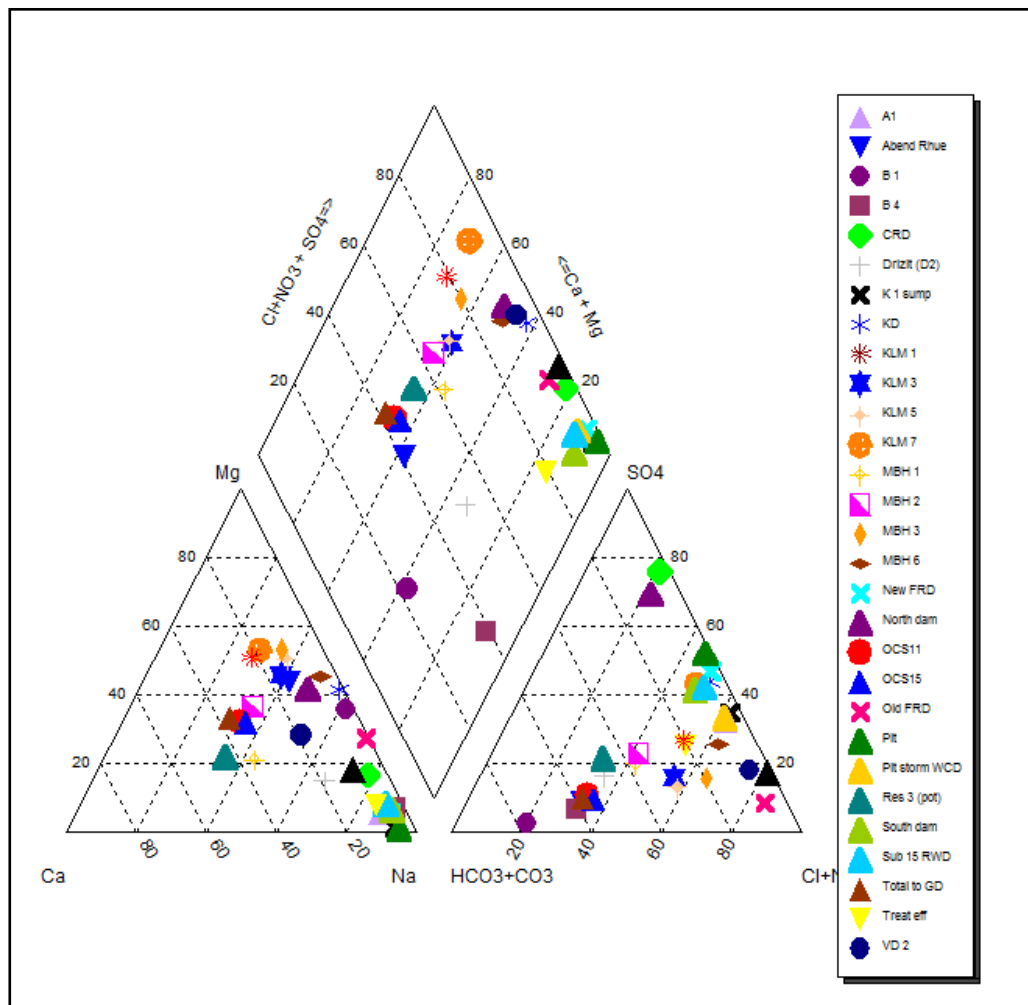


Figure 5.5 shows that the background boreholes as represented by B 4 and from the Abend Rhue represent one end point and these are slightly brackish due to sodium and chloride as would be expected in the highly evaporative environment. Samples from KLM01 and KLM07 and MBH3 represent the most impacted groundwater due to the elevated sulfate emanating as seepage from the waste facilities and they plot towards the top apex of the piper

diagram. Groundwater samples plotting in a straight line between these two endpoints indicate mixing of background water impacted by the mining activities.

Recent water quality monitoring (Clean Stream 2010) categorises the water quality inside the mine boundary as follows:

- The groundwater is generally stable and metal concentrations are low. However, the water is slightly alkaline, very saline (exceeds domestic Target Water Quality -TWQGR) and extremely hard with high to medium levels of sulfate, chloride, calcium, magnesium, sodium and/or nitrate.
- Seepage from WRD are sources of high sulfate (up to 5000mg/l), Chloride (up to 4000mg/l), sodium (up to 3000mg/l) and Nitrate (up to 200mg/l).
- High salinity levels of the boreholes in the vicinity of the waste rock dump (MBH2S, MBH4 and MBH4S, KLM1 and KLM7) indicate impact from the mining infrastructure.
- pH across the site is between 7-8 thus minimising the likelihood of acid rock drainage occurring. Typically groundwater associated with Kimberlite is alkaline.
- Dissolved Molybdenum has been detected in water separators, the CRD and FRD. It is particularly high in the pit sump (up to 0.3 mg/l) indicating the seepage from the rock dumps is being pulled towards the open pit where it is collected. A background borehole at Abend Ruhe is of fair quality but has elevated sodium and chloride levels due to evaporation and poor recharge.
- The drizits D1-D8 are a source of total petroleum hydrocarbons and lead and traces of Arsenic exceeding the SANS 241: 2006 limits.

5.6.4 *Conceptual hydrogeological model*

Local Hydrostratigraphy

The geology in and around the Venetia mine area is not favourable to significant permeable units and groundwater occurrence is assumed to be structurally confined. Itasca Denver (2008) concluded that the presence of fractures, joints, and foliation planes in otherwise “tight” metamorphic rocks impart the majority of their hydraulic conductivity. There is also an overall stratification and decrease with depth in the hydraulic conductivity due to the discontinuities decreasing in number and aperture with depth. Faults within the mine area generally run in a south-west to north-easterly direction and are assumed to be preferential flow paths for groundwater.

Magnetic surveys and subsequent drilling in the south-western and north-western corners of Venetia along the Kolope River indicated high-yielding

boreholes were located on narrow fractures or contact zones; this was confirmed by many dry boreholes in close proximity.

In general, the geology has a low porosity and permeability, Itasca Denver (2008). The hydrostratigraphy in the various geological groupings described below are referenced from Itasca Denver (2008, 2006) and KLMCS (2004):

Country rock

The hydrostratigraphy consists of 'tight' metamorphic rocks (very low porosity) that lack sufficient hydraulic conductivity to permit significant movement and storage of groundwater. The top weathered zone (0-70 meters below ground level (mbgl)) does have relatively higher permeability and has a shallow or perched aquifer associated with it. It will most likely be drained by the end of open pit operations but might remain a good collector and conduit of infiltrated precipitation.

There are some carbonate rocks (marble) occurring in the Gumbu Formation and if there are karstic cavities that have developed within these, they could contain relatively large amounts of stored water and should be explored by probe holes in the preliminary underground development. There is also a brecciated zone occurring within country rock exposed in the pit which did release water when intercepted but to date this unit has not been tested.

Large permeable structures

Any significant hydraulic conductivity, storativity and preferential groundwater flow-pathways is limited to individual fractures, lithological contacts, weathered zones and cross-cutting geological structures and features such as the numerous SW-NE striking faults. This structural control on hydraulic conductivity is further confirmed by magnetic surveys and subsequent drilling in the south-western and north-western corners of Venetia along the Kolope River. The results indicate high yielding and dry boreholes in the same vicinity. The high yielding boreholes are located on narrow fractures or contact zones.

The Lizel fault intersects the pit along the eastern side of the pit. It strikes north-east and has horizontal striations along the fault plane with 100-150m of displacement. Structures including the Lizel, Tina, Gloudina, K3 and Slimes Dam Faults could collect water from large volumes of rock and conduct it from relatively great distances to the pit and underground mine. However, to date drilling of these structures has been difficult to intercept and target for dewatering boreholes and although there does seem to be higher permeability as evidenced by seepage along these structures into the existing pit, the seepage rates are low and manageable.

Paleochannels associated with the Central stream have higher permeability and can transport water into the open pit via this structure.

Kimberlite/country rock/dolerite contact zones

The contact zones between the country rock and dolerite sills could be relatively permeable leading to weathering of the kimberlite, and further increased hydraulic conductivity.

Zone of relaxation

The zone of relaxation (ZOR) is 50-100m wide, associated with the Kimberlite contact and sagging towards the pit, may conduct precipitation and lateral groundwater flow towards the pit and into the cave zone of the underground mine. However to date, it has been essentially impossible to intercept water in the ZOR.

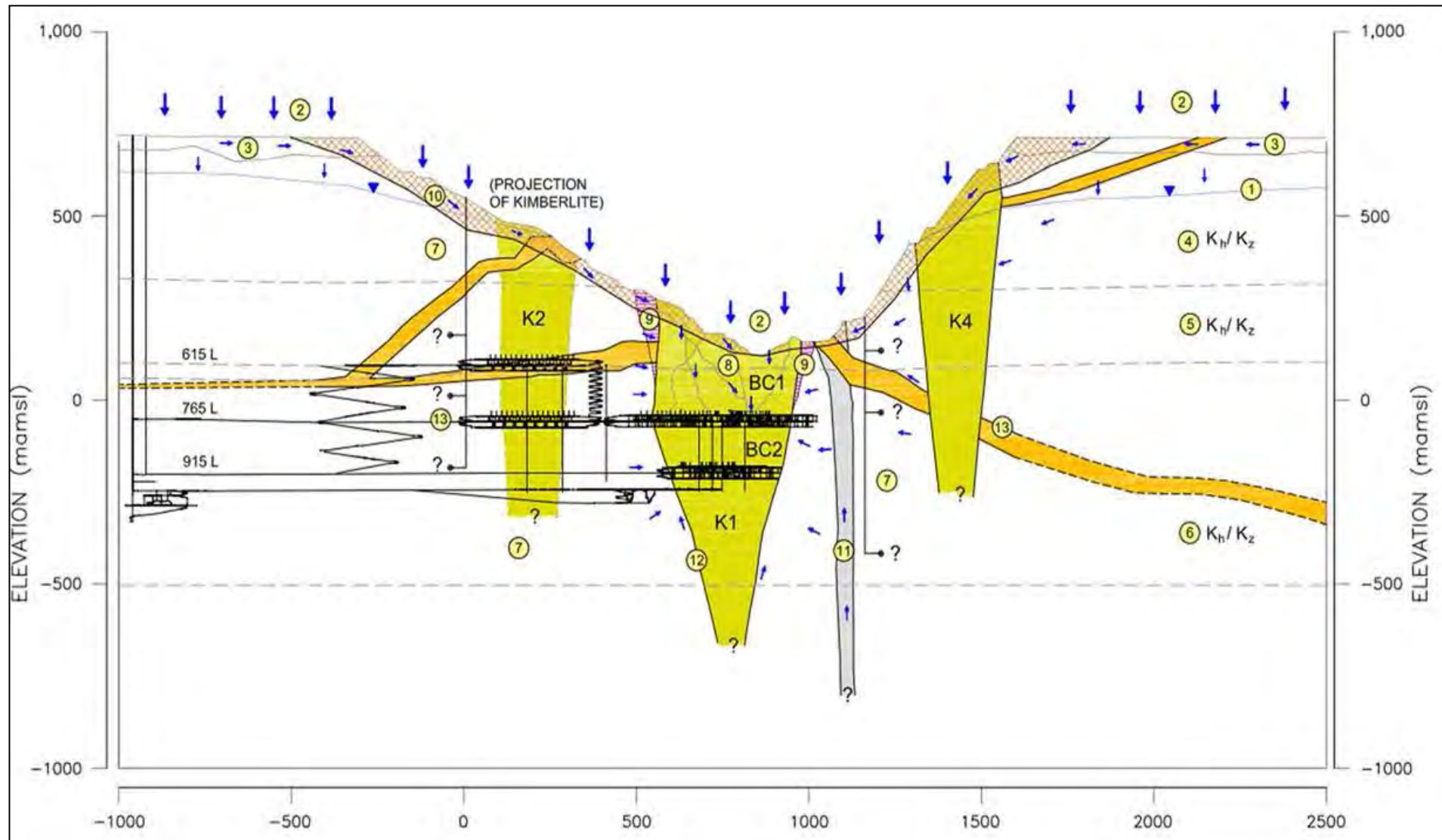
Hydraulic properties

Drilling and testing of the different lithologies and structures was undertaken by other consultants and is referenced below:

- Data from packer testing of 10 holes (KLMCS, 2007) around the open pit has been analysed and shows that the hydraulic conductivity for the country rock is low to very low ($<10^{-3}$ m/day).
- Weathered horizons (<70 mbgl) and fault zones have higher conductivity in the order of 10^{-1} to 10^{-2} m/day.
- Transmissivity decreases with depth due to a reduction in the number and aperture of discontinuities, a typical characteristic of fractured rock aquifers.
- The effective porosity of the Limpopo alluvial aquifer is 24% with relatively high hydraulic conductivity of 120m/d (Cobbing et al, year).

A conceptual schematic cross section from west to east through the K1 and K4 kimberlite and open pit was developed by Itasca Denver in 2008 and shows the relative hydraulic conductivities of the formations and structures in the vicinity of the proposed underground shaft.

Figure 5.6 Conceptual schematic cross section from the west to east through the K1 and K4 Kimberlite and open pit.



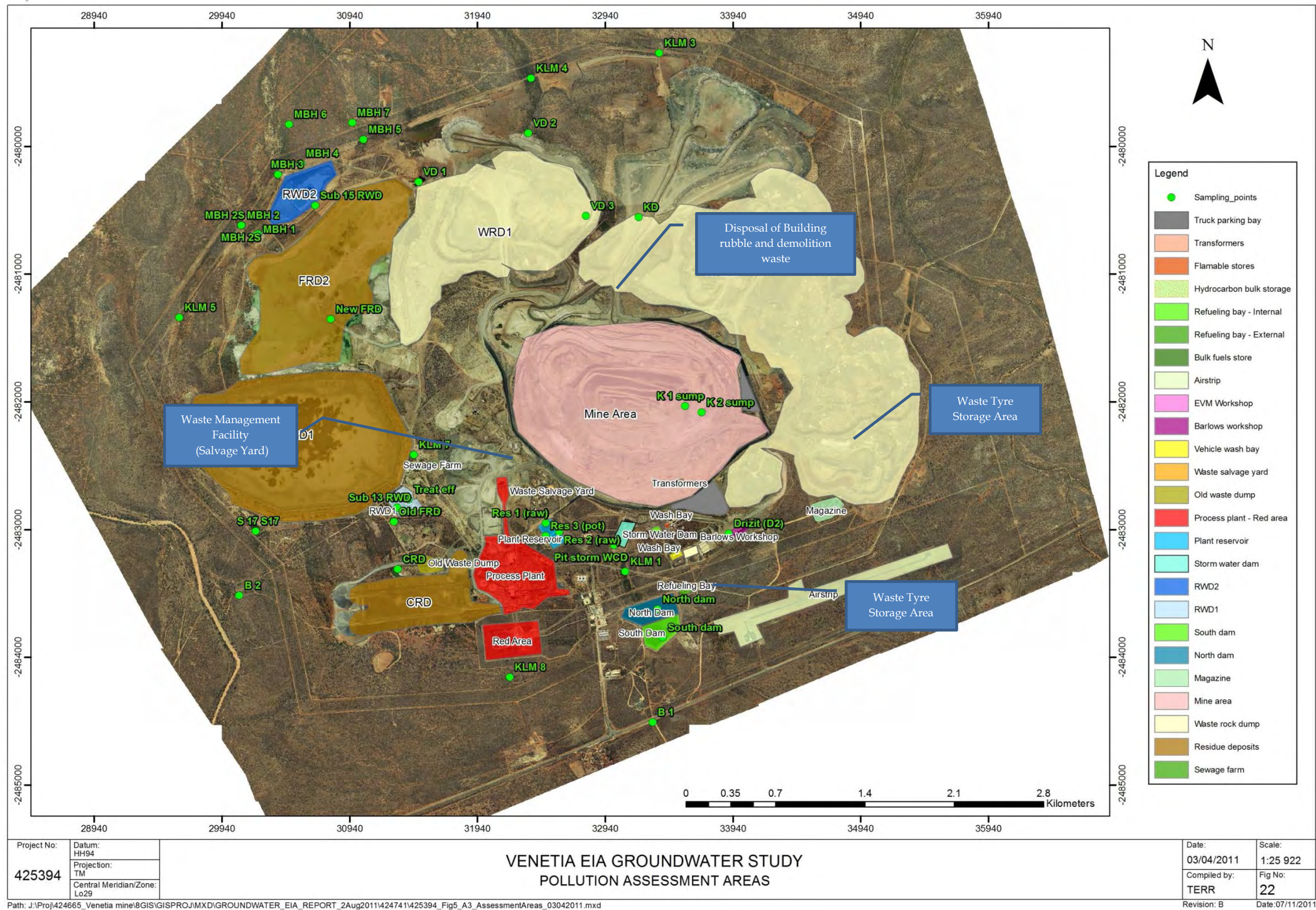
5.6.5 *Groundwater Contamination*

Potential Sources of Contamination

The Venetia mine site has an estimated footprint of 48km². The main activities and infrastructure on the site that could be sources of contamination are listed below:

- Residue Deposits, namely the Course Residue Deposit (CRD), an old Fines Residue Deposit (FRD 1) and a new Fines Residue Deposit (FRD 2)- these will have a rock buttress to make into one larger disposal area allowing the dam wall to be raised as o accommodate the underground mining project;
- Waste Rock Dumps;
- Ore Stockpiles;
- Mine pits, namely K1, K2, K3 and K4;
- Process Area;
- Explosives Magazine;
- Surface dams, including a storm water control dam, return water dams 1 and 2, plant reservoirs, a potable water reservoir, a mine water storage reservoir;
- Sewage Treatment Works;
- Old waste dump, salvage yard and bioremediation area.

Figure 5.7 Pollution Assessment Areas.



5.7 *FLORA AND FAUNA*

The waste management activities are in an area that is already disturbed by current mining activities and within the mining lease area and footprint of the existing mine and its associated activities. Fauna and flora at the waste management facilities are therefore sparse.

5.8 *AIR QUALITY*

The Venetia project area and surrounding land can be described as being rural with no other large scale industrial or mining activity in the area (> 5km away from the project area), except for the current mining operations at Venetia. The area is characterised as an area that is sparsely populated with the closest town being Musina (± 75km east) and Alldays (± 40 km west).

5.8.1 *Windblown dust*

The waste rocks dumps are located upwind of the Venetia mine, so any dust blown off the dumps will move over the mine area, however, because the material deposited on the waste rock dumps is large, there will only be an initial layer of dust on the waste rock that is erodible and as more waste rock is dumped it will prevent the erosion of the layers below.

The existing salvage yard (to be upgraded to the WMF) is located within the centre of Venetia mine site and currently windblown dust and vehicle tailpipe emissions are the only sources that may impact on air quality. The facility is surrounded by mine access roads that contribute towards windblown dust.

5.9 *NOISE*

The environment in which Venetia mine is located has the topography of an undulating landscape interspersed with some hills in the closer vicinity of the mining operation. Furthermore, there are numerous dumps which together with the natural topography of the area provide significant screening against the propagation of noise.

The current noise levels at the WRD and existing salvage yard (to be upgraded to the WMF) is minimal and in noise can only be attributed to vehicle noise.

5.10 *SITES OF ARCHAEOLOGICAL IMPORTANCE*

The waste management activities that require licensing in terms of this WML are in an area that is already disturbed by current mining activities and within the mining lease area and footprint of the existing Mine and its associated activities. A Heritage 2 Risk Assessment conducted for Venetia Mine indicated that there are no cultural and heritage resources present on these areas.

The area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard.

Waste tyres will be stored within a demarcated area on the existing waste rock dump which is within the existing mining footprint area.

Building rubble and demolition waste (inclusive of wood) will be disposed of within a demarcated area on the existing waste rock dump which is within the existing mining footprint area.

All the waste management activities that require licensing in terms of this WML is situated within the existing mining boundary footprint and is already operational and managed by licenced contractors. The waste management areas forms part of the overall socio economic impacts of Venetia mine.

6.1 BUSINESS AND CORPORATE POLICIES RELATING TO THE ENVIRONMENT

Environmental management within the De Beers Group of Companies is guided by a series of multi-layered commitments that are relevant to the Group of Companies and different Business Units as well as the Anglo Standards and Anglo Environmental Way.

The principles that underpin the companies guiding principles define the behaviour and decision making which are internationally benchmarked. They include the best practice standards of ISO 14001:2004, OHSAS 18001, sector initiatives and the De Beers Best Practice Principles (BPPs).

Supporting the Principles are detailed policy statements that set out the goals and behaviours in significant areas of responsibility for De Beers.

The Environmental Standards (Outcomes and Performance) are absolute requirements across the Group of Companies and give effect to the commitments made in the Environmental Policy. Standards and Guidelines are to be reviewed annually by the relevant peer group and in some cases by external expert/s, to assess alignment with global trends and practices and the De Beers Group of Companies specific risk profile.

6.1.1 Environmental Policy

- Objective - The objective of this policy is to provide guidance for the application, management and administration of environmental requirements within the De Beers Group of Companies;
- Scope - This policy is applicable to all the entities of the De Beers Group of Companies. Members of the De Beers Group of Companies may adapt the policy to include local legislative and stakeholder priorities within the countries in which they operate;
- Responsibility for the Policy - The maintenance, revision and distribution of this policy are the responsibility of the Principal Environment, De Beers Group Services;
- Environmental Policy - *The guiding Principles of the De Beers Group of Companies articulate our commitment to taking responsibility for the short and long term economic, social and environmental implications of decisions across the diamond pipeline. We commit to building diamond dreams through effective partnerships and enhancing the confidence of consumers in the diamond product. In pursuit of the highest standards of environmental care and protection, the De Beers Group of Companies is committed to:*
 - *Managing all aspects of environmental policy as an integral part of business while adopting a precautionary approach to environmental challenges;*

- *Developing and implementing appropriate environmental policies, systems, programmes and training and ensuring these are adequately resourced;*
- *Requiring all producing mines to be certified compliant with the ISO 14001:2004 international standard for environmental management systems as the foundation for continual improvement;*
- *Conducting all activities in compliance with applicable legislation and other environmental requirements to which De Beers has subscribed and being aligned with international good practice;*
- *Adopting the mitigation hierarchy approach by first assessing, seeking to avoid, minimizing and then rehabilitating potential environmental impacts, risks and emergencies when planning, designing and implementing exploration, mining, marketing and related activities;*
- *Aiming to have no net loss of significant biodiversity through responsible planning and stewardship of biodiversity, from exploration through to the closure of operations and making a contribution to biodiversity conservation in the regions within which we operate;*
- *Respecting legally designated Protected Areas and key biodiversity areas and not mining within World Heritage Site Core Areas;*
- *Promoting the efficient and sustainable use of natural resources, especially energy and water, by employing the principles of reduction, recovery, re-use and recycling;*
- *Reducing greenhouse gas emissions and participating in climate change initiatives;*
- *Managing effluents, wastes, emissions, dust and the use of hazardous substances to prevent pollution;*
- *Ensuring comprehensive environmental planning, implementation and costing for project, operational and closure phases is undertaken and that the financial provision for present and expected future environmental liabilities and obligations is included in strategic business plans;*
- *Fostering awareness across the organisation, communicating and building a culture of shared responsibility and accountability for the environment;*
- *Engaging and co-operating openly with governments, local communities, employees and other interested parties to improve understanding, promote constructive interaction and seek solutions to environmental and social issues;*
- *Influencing joint venture partnerships to follow practices consistent with this policy and ensuring that contractors do so;*
- *Regularly monitoring, auditing and reviewing environmental performance and compliance to ensure continual improvement; and*
- *Reporting environmental performance publicly and providing assurance to the Boards of Directors*

This Policy documents the requirements for the management of hazardous substances and non-mineral waste so as to avoid potential adverse impacts on the environment and prevent pollution.

- Policy Statement - Adopting the mitigation hierarchy approach by first assessing, seeking to avoid, minimizing and then mitigating potential environmental impacts, risks and emergencies when planning, designing and implementing exploration, mining, marketing and related activities. Managing effluents, wastes, emissions, dust and the use of hazardous substances to prevent pollution;
- Guiding Principles;
 - Precautionary Approach - A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.
 - Mitigation Hierarchy - The Mitigation Hierarchy for waste (avoid, reduce, reuse, recycle and disposal) classifies waste management strategies according to their desirability, and are mentioned in order of importance. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste;
 - Eco-efficiency - This concept describes a vision for production of economically valuable goods and services while reducing the ecological impacts of production. In other words eco-efficiency means producing more with less. Critical aspects of eco-efficiency are a reduction in the energy intensity of goods and services, improved ability to recycle, maximum use of renewable resources and greater durability of products;
 - Cradle to Grave (Life Cycle Assessment) - The entire life cycle of a product should be considered in order to clearly understand the direct and indirect, positive and negative environmental impacts of the product.
- Hazardous Substances Management;
 - The use of high risk hazardous substances has been eliminated or substituted with non-hazardous or lower hazard alternatives wherever possible;
 - Where hazardous substances are used they are securely and appropriately stored and segregated from incompatible substances;
 - The Safety Data Sheet (SDS) specific to the substances are easily accessible at both the location of storage and use. These are reviewed regularly and, if necessary, updated. The MSDSs include ecological data;
 - Procedures to review and approve the introduction of new hazardous substances are implemented;
 - Procedures for the transportation and delivery of hazardous substances are in place and communicated with the supplier. These ensure that the legal requirements for the transportation of hazardous substances are

- complied with and include the labelling and packaging requirements, transport documentation and qualification/permitting of carriers;
- An inventory of all hazardous substances is maintained and includes the approximate quantities stored, consumed and the hazard rating;
 - The appropriate emergency equipment, including spill kits, is easily accessible in the event of a spill/incident. Relevant employees are trained in the safe handling, storage, transfer, use and disposal of hazardous substances and in the emergency response procedures to be implemented in the event of an unplanned release;
 - Where relevant, procedures for the control of electronic products generating radiation and radioactive material are prepared;
 - Incidents or emergencies are recorded as per the site incident reporting system and where required as per the Environmental Reporting Standard;
 - The use of identified hazardous substances is recorded on ENABLON, as per the Environmental Reporting Standard.
- Waste Management;
 - The waste hierarchy applies. This includes separation, treatment and on/off-site handling.
 - Waste audits are conducted to identify the different waste streams and opportunities for their reduction, reuse or recycling (this may include the various types of domestic or general waste, hazardous waste, medical waste, effluent and emissions).
 - Each operation/facility has developed a waste management plan that includes:
 - the different waste streams,
 - an estimate of the quantity of each type of waste, and
 - waste management actions for each type of waste that shall include opportunities for waste reduction, reuse or recycling;
 - Designs and operational controls for waste separation, temporary storage, recycling, treatment, transportation and disposal that incorporate measures to avoid or minimize impact on the environment are developed.
 - General and hazardous waste disposal is in compliance with applicable legislation. This may be at a registered disposal facility or in compliance with appropriate permits;
 - Waste receiving facilities are audited and/or their licenses checked to assure conformance to waste management commitments and legal requirements;
 - Where the trans-boundary movement of hazardous waste is required this is in terms of the Basel Convention;
 - Hazardous and general waste disposal / recycling is recorded and reported on ENABLON, as per the Environmental Reporting Standard.

6.2 *IMPACT ASSESSMENT METHODOLOGY*

6.2.1 *Impact Identification and Characterisation*

An 'impact' is any change to a resource or receptor brought about by the presence of a project component or by a project-related activity. In this assessment, the impacts are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency).

The impacts have been rated in the following manner:

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?), and
- Duration of occurrence (how long may it last?).

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?), and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site)

In order to assess each of these factors for each impact, the following ranking scales were used:

Table 6.1 **Ranking Scales**

<u>Probability:=P</u>	<u>Duration:=D</u>
5 - Definite/ don't know	5 - Permanent
4 - Highly probable	4 - Long-term (ceases with the operational life)
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 - Improbable	1 - Immediate
0 - None	
<u>Scale:=S</u>	<u>Magnitude:=M</u>
5 - International	10 - Very high/ don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 - None	

Once the above factors had been ranked for each impact, the environmental significance of each was assessed using the following formula:

$$SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value is 100 significance points (SP). Environmental effects were rated as either of high, moderate or low significance on the following basis:

- More than 60 significance points indicated high (H) environmental significance.
- Between 30 and 60 significance points indicated moderate (M) environmental significance.
- Less than 30 significance points indicated low (L) environmental significance.

Table 6.2 Operational Phase - Impact Assessment – Waste Management Facility, Waste Tyre Storage and Disposal of Building rubble and demolition waste

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
TOPOGRAPHY														
Alteration of local topography	Change in topography due to the height and visibility of structures (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	2	4	1	0	0	L	<ul style="list-style-type: none"> Facility is located near the edge of the open pit which has already altered the localized topography. The site is surrounded by existing mining related activities such as satellite kimberlite stockpiles, break ramps, berms around the pit and mine residue deposits. No mitigation required. 	2	4	1	0	0	L
SOILS														
Soil Contamination	Spillage, leakage, incorrect storage and handling of chemicals, oils, lubricants, fuel and other general and hazardous material in the WMF. (Areas 1, 5, 6, 7, 10, 12, 20, 22)	6	2	1	3	27	L	<ul style="list-style-type: none"> The WMF has been sub-divided into various storage areas pending the storage of a specific waste streams. Each waste storage area will be designed, operated and maintained as per specific storage requirements relating to the classification of the waste. Where required, storm water ingress will be prevented. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. 	6	1	1	2	16	L
Soil Erosion	Exposed soil surfaces may be eroded during high rainfall events. (All storage areas within the WMF)	2	1	1	2	8	L	<ul style="list-style-type: none"> The area where the facility is located is flat in topography with no steep slopes. Storm water run-off from the WMF will report to the PCD2 Complex. Limit the areas vulnerable to erosion i.e. use of dust-a-side on the roads / access routes. Areas that pond during rainfall event should be in-filled. 	2	1	1	1	4	L
LAND USE														
Change in Land Use	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint. (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	2	1	1	0	0	L	<ul style="list-style-type: none"> Current land use is mining. The area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard footprint area. As part of the upgrade of the salvage yard to a WMF, some of the demarcated areas within the WMF will be improved as part of maintenance activities. Waste tyres will be stored within a demarcated area on the existing waste rock dump which is within the existing mining footprint area. Building rubble and demolition waste will be disposed of within a demarcated area on the existing waste rock dump which is within the existing mining footprint area 	2	1	1	0	0	L
LAND CAPABILITY														
Change in Land Capability	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint. (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste)	2	1	1	0	0	L	<ul style="list-style-type: none"> Current land use is mining. The area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard. As part of the upgrade of the salvage yard to a WMF, some of the demarcated areas within the WMF will be improved as part of maintenance activities. Waste tyres will be stored within a demarcated area on the existing waste rock dump which is within the existing mining footprint area. Building rubble and demolition waste will be disposed of within a demarcated area on the existing waste rock dump which is within the existing mining footprint area 	2	1	1	0	0	L
VEGETATION														

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
Loss of vegetation and habitat	Removal of vegetation as to allow for the various storage areas within the WMF	2	1	1	1	4	L	<ul style="list-style-type: none"> The WMF is being upgraded at the current salvage yard. As part of the operational philosophy of the salvage yard the vegetation has been cleared and managed where necessary. 	2	1	1	1	4	L
Propagation of alien invasive species	Natural re-growth of alien and invasive plant species on open soil areas and in between the various storage areas (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	4	4	1	4	36	M	<ul style="list-style-type: none"> The implementation of an alien and invasive species eradication and control programme is a mine wide eradication programme which will focus explicitly on the WMF and the waste rock dumps. 	4	3	1	2	16	L
FAUNA														
Disturbance of fauna	Operational activities in the WMF relating to the handling, storage and removal of general and hazardous waste streams. Storage of waste tyres. Disposal of building rubble and demolition waste.	2	1	1	1	4	L	<ul style="list-style-type: none"> The existing salvage yard is being upgraded to the WMF. This area is already fenced. The area is located within the overall mining area where existing mining infrastructure and activities limit available habitat. Waste tyre storage area on the waste rock dump will not be rehabilitated until the closure phase when the waste tyres will be removed off site prior to rehabilitation of the waste rock dump. The disposal area for the building rubble and demolition waste will be within the waste rock dump and will have no impact on rehabilitation. 					0	L
Introduction of Nuisance Vectors (Pests) during Operation	Pests such as insects, rodents, baboons and bird species may be found on site and specifically drawn to the WMF and disposal/ storage areas	8	4	1	4	52	M	<ul style="list-style-type: none"> Correct storage, handling and operation of the WMF. Optimise the efficiency of storage, handling and operation of the WMF. Limit access to stored waste. 	4	1	1	2	12	L
SURFACE WATER														
Contamination of surface water	<ul style="list-style-type: none"> Dirty storm water run-off. Spills/ leaks associated with the storage of general, hazardous and industrial waste on the WMF. Incorrect storage and handling of general, hazardous and industrial waste on the WMF. Spills/ leaks associated with vehicles (All storage areas at the WMF and the disposal of building rubble and demolition waste on the waste rock dump)	8	4	2	4	56	M	<ul style="list-style-type: none"> Correct storage, handling and operation of the WMF. Prevent storm water ingress into storage areas which have the potential for surface water contamination. Prevent the outflow of water from storage areas i.e. management of sumps. Storm water run-off from the WMF will report to the PCD2 Complex. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. During the disposal of building rubble and demolition waste ensure that the wastes are free from any hazardous materials and glass. 	4	1	1	2	12	L
GROUND WATER														
Contamination of groundwater	Spillage, leakage, incorrect storage and handling of general, hazardous and industrial waste in the WMF. Disposal of building rubble and demolition on the waste rock dump	8	4	2	4	56	M	<ul style="list-style-type: none"> Correct storage, handling and operation of the WMF. Prevent storm water ingress into storage areas which have the potential for surface water contamination. Prevent the outflow of water from storage areas i.e. management of sumps. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. During the disposal of building rubble and demolition waste ensure that the wastes are free from any hazardous materials and glass. 	4	1	1	2	12	L
AIR QUALITY														
Fall-out dust	<ul style="list-style-type: none"> Fugitive dust will be generated from the tipping of material and the Hammer Milling (shredding and mulching of wood). Dust generation due to vehicular movement. Windblown dust (Areas 4, 5, 12, 18, 19, 20, 22)	6	4	1	2	22	L	In places of high vehicular traffic, dust suppression measures on the roads may be implemented to reduce dust levels. These measures will range from watering of roads and the application of a chemical dust suppressant.	4	1	1	2	12	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
Odour	Smells that emanate from waste storage areas. (Areas 6, 7, 8, 9, 10, 15, 18, 19, 20)	6	4	1	2	22	L	<ul style="list-style-type: none"> Odour will never be fully eliminated; however, the correct containment of waste and frequent waste removal will reduce the length of the impact. Odour can be managed through regulation of the frequency at which the waste is collected. Use of enclosed storage containers with adequate ventilation. 	4	1	1	2	12	L
Emissions	Emissions generated due to vehicular movement.	4	1	1	4	24	L	<ul style="list-style-type: none"> Monitored as part of the Occupational Hygiene Management System. Ensure that vehicles are maintained as per the approved maintenance program. 	4	1	1	4	24	L
NOISE														
Noise	Noise generated from vehicular movement. Noise generated from the tipping of material and the shredding and mulching of wood at the WMF. Noise generated from the tipping of building rubble and demolition waste.	4	1	1	3	18	L	This noise impact is not expected to be significant due to the baseline noise levels at the mine and this noise will not be heard beyond the mine.	4	1	1	3	18	L
VISUAL														
Aesthetic	Wind-blown litter. (Storage areas at the WMF)	6	2	1	3	27	L	<ul style="list-style-type: none"> Wind-blown litter can be prevented by enclosures and closed containers. Housekeeping - The entire site should be kept neat and tidy at all times. 	4	1	1	2	12	L
	Visibility of tyre storage area on the waste rock dump	6	2	1	3	27	L	<ul style="list-style-type: none"> Waste tyres will be stored within a demarcated area on the existing waste rock dump which is within the existing mining footprint area. The concurrent rehabilitation of the waste rock dump reduces visual impact on sensitive receptors. Cover the waste tyres with waste rock as to not only address the fire hazard but also reduce the visibility. The demarcated area is located outside of sensitive view sheds. 	4	1	1	2	12	L
	Disposal of demolition and building rubble on the waste rock dump	6	2	1	3	27	L	<ul style="list-style-type: none"> Demolition waste and building material will be disposed of within a demarcated area on the existing waste rock dump which is within the existing mining footprint area. The concurrent rehabilitation of the waste rock dump reduces visual impact on sensitive receptors. The demarcated area is located outside of sensitive view sheds. 	4	1	1	2	12	L
HERITAGE														
Loss of cultural and heritage resources	Operational activities in the WMF relating to the handling, storage and removal of general and hazardous waste streams. Storage of waste tyres. Disposal of building rubble and demolition waste. (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	8	5	5	2	36	M	<ul style="list-style-type: none"> Current land use is mining. The area is located within the existing mining footprint area, and the WMF will be located within the existing salvage yard. Heritage 2 Risk Assessment indicated that there are no cultural and heritage resources present on these areas. Should an artefact be found on site follow the correct EMS procedures for the management of heritage resources - ENV-OP-11. As part of the upgrade of the salvage yard to a WMF, some of the demarcated areas within the WMF will be improved as part of maintenance activities. Waste tyres will be stored within a demarcated area on the existing waste rock dump which is within the existing mining footprint area. Demolition waste and building material will be disposed of within a demarcated area on the existing waste rock dump which is within the existing mining footprint area 	8	5	5	1	18	L

Table 6.3 Closure Phase - Impact Assessment – Waste Management Facility, Waste Tyre Storage and Disposal of Building rubble and demolition waste

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
TOPOGRAPHY														
Alteration of local topography	Change in topography due to the height and visibility of structures (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	2	4	1	0	0	L	<ul style="list-style-type: none"> Facility is located near the edge of the open pit which has already altered the localized topography. The site is surrounded by existing mining related activities such as satellite kimberlite stockpiles, break ramps, berms around the pit and mine residue deposits. At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The Waste Rock Dumps will be rehabilitated in line with the approved rehabilitated plan. Remaining waste tyres will be removed off site by an approved waste management contractor. 	2	4	1	0	0	L
SOILS														
Soil Contamination	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolishing activities. (Areas 1, 5, 6, 7, 10, 12, 20, 22)	6	2	1	3	27	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. All contaminated demolition rubble will be disposed of at a registered waste disposal site. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. 	6	1	1	2	16	L
Soil Erosion	Exposed soil surfaces may be eroded during high rainfall events. (All storage areas within the WMF)	2	1	1	2	8	L	<ul style="list-style-type: none"> The area will be ripped, top soiled, contoured and vegetated. The rehabilitation will be in line with the approved rehabilitation plan and will be monitored as to ensure sustainable rehabilitation. 	2	1	1	1	4	L
LAND USE														
Change in Land Use	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint. (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	2	1	1	0	0	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The WMF area will be incorporated into the mine's post closure land use. The WRD will be rehabilitate in line with the approved rehabilitation plan and incorporated with the mine's post closure land-use plan. 	2	1	1	0	0	L
LAND CAPABILITY														
Change in Land Capability	The storage of general waste, hazardous waste, and industrial waste within the current mining footprint. (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste)	2	1	1	0	0	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The WMF area will be incorporated into the mine's post closure land use. The WRD will be rehabilitate in line with the approved rehabilitation plan and incorporated with the mine's post closure land-use plan. 	2	1	1	0	0	L
VEGETATION														

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
Loss of vegetation and habitat	Removal of vegetation as to allow for the various storage areas within the WMF	2	1	1	1	4	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The WMF area will be incorporated into the mine's post closure land use. The WRD will be rehabilitate in line with the approved rehabilitation plan and incorporated with the mine's post closure land-use plan. 	2	1	1	1	4	L
Propagation of alien invasive species	Natural re-growth of alien and invasive plant species on open soil areas and in between the various storage areas (All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)	4	4	1	4	36	M	<ul style="list-style-type: none"> The monitoring of the alien and invasive species eradication and control programme will continue during the post closure monitoring phase (3 years). 	4	3	1	2	16	L
FAUNA														
Disturbance of fauna	Removal of all remaining general and hazardous waste material from the WMF. Removal of any remaining waste tyres.	2	1	1	1	4	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The WMF area will be incorporated into the mine's post closure land use. The WRD will be rehabilitate in line with the approved rehabilitation plan and incorporated with the mine's post closure land-use plan. 					0	L
SURFACE WATER														
Contamination of surface water	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolition activities. (Areas 1, 5, 6, 7, 10, 12, 20, 22)	8	4	2	4	56	M	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. All contaminated demolition rubble will be disposed of at a registered waste disposal site. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. 	4	1	1	2	12	L
GROUND WATER														
Contamination of groundwater	Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolishing activities. (Areas 1, 5, 6, 7, 10, 12, 20, 22)	8	4	2	4	56	M	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. All contaminated demolition rubble will be disposed of at a registered waste disposal site. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. Continue with the three year groundwater monitoring programme during the post closure phase. 	4	1	1	2	12	L
AIR QUALITY														
Fall-out dust	<ul style="list-style-type: none"> Fugitive dust will be generated during the demolition phase as well as the ripping of soils. Dust generation due to vehicular movement during rehabilitation. Windblown dust. (Areas 4, 5, 12, 18, 19, 20, 22)	6	4	1	2	22	L	<ul style="list-style-type: none"> Rehabilitate in accordance to the approved rehabilitation plan 	4	1	1	2	12	L
Emissions	Emissions generated due to vehicular movement during rehabilitation.	4	1	1	4	24	L	<ul style="list-style-type: none"> Monitored as part of the Occupational Hygiene Management System. Ensure that vehicles are maintained as per the approved maintenance program. 	4	1	1	4	24	L
NOISE														

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
Noise	Noise generated from vehicular movement during demolition and rehabilitation.	4	1	1	3	18	L	<ul style="list-style-type: none"> This noise impact is not expected to be significant due to the baseline noise levels at the mine and this noise will not be heard beyond the mine. Ensure that vehicles are maintained as per the approved maintenance program. 	4	1	1	3	18	L
VISUAL														
Aesthetic	Wind-blown litter. (Removal of remaining waste at the WMF)	6	2	1	3	27	L	<ul style="list-style-type: none"> Wind-blown litter can be prevented by enclosures and closed containers. Housekeeping - The entire site should be kept neat and tidy at all times. 	4	1	1	2	12	L
	The remaining waste tyres will be removed off site.	4	2	1	2	14	L	<ul style="list-style-type: none"> Remaining waste tyres will be removed off-site. 	4	2	1	2	14	L
	Disposal of building rubble and demolition waste	4	2	1	2	14	L	<ul style="list-style-type: none"> The area of disposal will be incorporated into the waste rock dump and will be rehabilitated in line with the concurrent rehabilitation and end land use plan. 	4	2	1	2	14	L
HERITAGE														
Loss of cultural and heritage resources	<p>Demolition activities associated with the rehabilitation of the WMF.</p> <p>Removal of the remaining waste tyres.</p> <p>Rehabilitation of building rubble and demolition waste disposal area on the waste rock dump.</p> <p>(All storage areas within the WMF, as well as the waste tyre storage area on the waste rock dump, the disposal of building rubble and demolition waste on the waste rock dump)</p>	4	2	1	2	14	L	<ul style="list-style-type: none"> At closure, all infrastructure in the WMF will be demolished and removed from site. The area will be ripped, top soiled and vegetated. The WMF area will be incorporated into the mine's post closure land use. The WRD will be rehabilitate in line with the approved rehabilitation plan and incorporated with the mine's post closure land-use plan. 	4	2	1	2	14	L

An Environmental Management Programme (EMP) is a site-specific programme developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

The management of the Waste Disposal Facility, as well as the storage of waste tyres and the disposal of building rubble and demolition waste on the waste rock dump form an integral part of the overall management of environmental aspects on Venetia through the ISO14001 system.

Although the activities are managed within the ISO14001 system, a facility specific EMP was prepared for the Waste Management Facility, the storage of waste tyres and the disposal of demolition and building waste taking into account the likely environmental issues for the site, the likely harm these issues can cause to the surrounding environment and how to manage these issues to minimise harm to the environment.

Operational related environmental issues include:

- Topography;
 - Change in topography due to the height and visibility of structures;
- Air Quality
 - Generation of fugitive dust;
 - Generation of odours (smells);
 - Emissions generated due to vehicular movement;
- Soils;
 - Soil contamination;
 - Soil erosion;
- Surface water contamination;
 - Dirty storm water run-off;
 - Spills/ leaks associated with the storage of general, hazardous and industrial waste on the WMF;
 - Incorrect storage and handling of general, hazardous and industrial waste on the WMF;
 - Spills/ leaks associated with vehicles;
- Groundwater contamination;
 - Spillage, leakage, incorrect storage and handling of general, hazardous and industrial waste in the WMF.
 - Disposal of building rubble and demolition waste on the waste rock dump
- Noise;
 - Noise generated from vehicular movement;

- Noise generated from the tipping of material and the shredding and mulching of wood at the WMF;
 - Noise generated from the tipping of building rubble and demolition waste;
- Cultural and Heritage Resources;
 - Loss of cultural and heritage resources
- Visual
 - Wind-blown litter

Closure related environmental issues include:

- Surface Water contamination;
 - Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolishing activities.
- Groundwater Contamination;
 - Removal of all remaining general and hazardous waste material from the WMF which may result in spillages and leakages of chemicals, oils, lubricants, fuel during the decommissioning and demolishing activities.
- Soils;
 - Soil contamination due to possible spillage;
 - Soil erosion due to site rehabilitation – ripping of soils, sloping and re-vegetation;
- Noise;
 - Noise generated from vehicular movement during demolition and rehabilitation;
- Air Quality;
 - Fall-out Dust due to demolition and rehabilitation activities;
 - Emissions from vehicular movement;

In order to address the facility specific issues, the EMP has been structured in such a manner as to address each waste storage area.

Table 7.1 Operational Phase Environmental Management Programme: Waste Management Facility

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN	
Steel Storage Area (Area 1)	Storage of ferrous and non-ferrous metals (Recyclable)	Most metals corrode: iron rusts, copper turns green, silver turns black, and lead disintegrates into a white powder. Stored improperly, most of the metals will slowly transform into oxides, sulphides, carbonates, or other compounds. The corrosion processes are faster on metal surfaces contaminated by salts, volatile organic acids, ammonia from cleaning fluids, or dust pending relative humidity.	EMS Blue and Green Area Waste Management ENV-OP-07 EMS Herbicides , Pesticides and Insecticides Management ENV-OP-21 EMS Competence Training and Awareness 2013 ENV-SP-06	<ul style="list-style-type: none"> • Behavioral change: <ul style="list-style-type: none"> ○ Steel should only be stored/ stockpiled in the designated steel laydown area within the WMF. • Physical reduction: <ul style="list-style-type: none"> ○ 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. • Require skips for the storage of steel or a lay-down area for larger steel components. • Store steel in open areas in the sun. • Ensure the storage area is free draining from storm water as to prevent standing water during high rainfall events. • Remove any organic growth from the area and alien plant infestation. • Where required, lift steel from soil as to prevent soil moisture contact. 	<ul style="list-style-type: none"> • Demarcate the steel storage area. • Clear the area of vegetation and organic content. • Steel should be stored in direct sunlight. • Demarcate sub-storage areas as to segregate various steel sizes. • Should steel not be removed within a 90 day period, consideration should be given to storage options as to lift steel from the soil to prevent moisture contact. • Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. 	
	Blasting Wire					<ul style="list-style-type: none"> ○ Recycle - scrap metal dealer. ○ Dispose of at a general landfill site.
	All cabling					<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ○ Strip cables and wind into rolls e.g. copper wires. ○ Acquire a cable stripper. • Auction stripped cable parts or recycle with a metal recycling contractor (e.g. copper). • Disposal of stripped parts that cannot be recycled at the closest licensed landfill site. • Use a licensed/permitted waste contractor. • Acquire bale storage bags.
Light Vehicle (LDV) Storage Area (Area 2)	Storage of all Waste Tyres (Excluding EMV tyres)	<ul style="list-style-type: none"> • Storage of tyres can be a fire hazard and the breeding ground for mosquitoes, rodents and other pests. 	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ Removal of used tyres by tyre contractor when bringing new tyres to the mine. • Tyres can be painted white and used as demarcation where necessary. • Legacy waste LDV tyres could be placed in a demarcated, excavated storage area on the Waste Rock Dump and covered with a layer of waste rock as fire prevention until an economical recycling option becomes available, at which time they should be removed from the storage area. • Waste LDV tyres could 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"> • Demarcate the area where the LDV tyres will be stored. • Indicate with clear signage that only LDV tyres may be stored in the area. • Store the LDV tyres per sizes. • Cover the tyres on the waste rock dump with 2m of rock as to prevent fire hazard. • Investigate options for the removal of the waste tyres off-site to a permitted waste tyre recycling or disposal facility. • Tyres stored in the Waste Management Facility or at the workshop area should be stored in the sun and stacked to minimize any standing water in the tyres as to prevent breeding ground for mosquitoes, rodents and other pests. 	
Plant Screen Panels Storage (Plastic) (Area 3)	These are plastic screens which are used in the treatment plant to size kimberlite ore post crushing.	Aesthetic impact due to waste build up.	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> • The used screen panels must be removed off site by a contractor for recycling. 	<ul style="list-style-type: none"> • Demarcate the area where the screen panels will be stored. • Store the screen panels per sizes. 	
Wood Storage (Area 4)	Storage of wood	Aesthetic impact due to waste build up	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ The use of wooden pallets must be phased out completely where practicable. Plastic pallets should be bought instead. • Behavioral change: <ul style="list-style-type: none"> ○ 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. • Physical reduction: <ul style="list-style-type: none"> ○ Broken wooden pallets should be dismantled and stored prior to removal from the WMF. • Burial under WRD or disposal at a general landfill site. • Chipping of wood and used for composting. 	<ul style="list-style-type: none"> • Demarcate the area where the wooden pallets will be stored. • Demarcate an area within this area as to place and operate the wood chipper / alternative. • Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. 	

Sand Blasting Grit (Area 5)	Sand used for cleaning of plant infrastructure as well as in the fabrication of new steel structures	May contain paint remnants that may impact on surface or groundwater	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> Manage storm water run-off from the area. 	<ul style="list-style-type: none"> Undertake the Waste Classification of the Sandblasting Grit as to determine the storage design requirements. Demarcate an area for the storage of the Sand Blasting Grit. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that the floor is constructed in line with the storage requirements. Prevent storm water ingress.
Domestic Waste (Area 6)	All recyclable and non-recyclable domestic waste. Receives the waste from the Concrete Slab (Area17)	<ul style="list-style-type: none"> Spillage, leakage, incorrect storage and handling of general waste on site. Surface water contamination. Groundwater contamination. Aesthetics – visual screening required. Pest control. 	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Proper waste segregation. Colour coded bins for non- recyclable domestic waste Physical reduction: <ul style="list-style-type: none"> Investigate the possibility of utilisation of a rear-end loader mobile compactor vehicle (by the waste contractor) when collecting waste. Any paper and plastic not separated out for recycling, for example paper and plastic contaminated by food waste, must be disposed of at the closest licensed landfill site as general waste. Use a licensed/permitted waste contractor. Manage nuisance vectors (pests). Prevent storm water ingress into the facility. Disposal 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"> Demarcate the area where domestic waste will be managed. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that the floor of the area is paved with bricks or concreted. Construct a roof over the area as to prevent rainwater from entering the area. Prevent storm water ingress. Enclose the area with wire mesh and shade cloth as to prevent pests from entering and to improve the ventilation. Install a sliding gate as to prevent unauthorized entry.
Waste Sorting Area (Area 7)	Area where paper, plastic, cardboards and cans will be sorted. Waste bales can be stored in the area.	<ul style="list-style-type: none"> Spillage, leakage, incorrect storage and handling of general waste on site. Surface water contamination. Groundwater contamination. Aesthetics – visual screening required. Pest control. 	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Use recycled paper. The purchase of water dispensers and re-usable plastic bottles. Remove polystyrene water cups. Buy in bulk to avoid generation of many small cardboard containers. Behavioral change: <ul style="list-style-type: none"> 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. Use one-sided scrap paper for informal notes or scratch paper. Bin for one-sided scrap paper – use when making informal copies. Physical reduction: <ul style="list-style-type: none"> Baling of paper. Baling of plastic. Baling of cardboard. Baling of cans. Prevent storm water ingress into the facility. 	<ul style="list-style-type: none"> Demarcate the waste sorting area. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that the floor of the area is paved with bricks or concreted and slightly sloped to a sump. Construct a roof over the area as to prevent rainwater from entering the area. Construct a low level wall around the facility as to prevent storm water ingress. Enclose the area with wire mesh and shade cloth as to prevent pests from entering and to improve the ventilation. Install a sliding gate as to prevent unauthorized entry.
Recyclable Waste Storage (Area 8)	Storage of Glass Including windscreen glass	Aesthetic impact due to waste build up	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Crush and place into re-usable storage containers prior to removal for recycling. Crushed glass should be removal by a local recycler or Consol Glass. Windscreen glass to be disposed off at the closes licensed landfill site. Use a licensed/permitted waste contractor. 	<ul style="list-style-type: none"> Demarcate the area where the recyclable waste will be managed. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that the floor of the area is paved with bricks or concreted. Prevent storm water ingress.
	Hard Hats	Aesthetic impact due to waste build up		<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> All hard hats must be taken to the WMF. Physical reduction: <ul style="list-style-type: none"> Hard hats must be dismantled in the sorting area. The pieces must be stored in a designated plastic storage area within the WMF. Recycling contractor: The dismantled hard hats must be removed from the WMF for recycling. 	

	Safety Boots			<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> 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. 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. 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. 	
	Overalls			<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Cut up overalls to re-use as oil rags. Procurement: <ul style="list-style-type: none"> Used overalls should be used as oil rags instead of purchasing oil rags. Social upliftment programmes should be investigated whereby used overalls that are still in good condition can be donated to communities surrounding the mine. 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. 	
	Plastic Water Containers			<ul style="list-style-type: none"> Recycling by waste recycling contractor. Store in bale storage bags. 	
Bale Storage Facility (Area 9)	Demarcated area where bales is stored	Storm water contamination	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> Recycling contractor: <ul style="list-style-type: none"> Recycling of baled paper. Use colour coded recycling bins. Recycling of baled plastic. Colour coded recycling bins. Recycling of cardboard bales. Colour coded recycling bins. Recycling of can bales. Colour coded recycling bins. 	<ul style="list-style-type: none"> Demarcate the area where bales will be stored. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that the floor of the area is paved with bricks or concreted. Construct a roof over the area as to prevent rainwater from entering the area. Prevent storm water ingress.
Hazardous Waste Storage (Area 10)	Used Oil	<ul style="list-style-type: none"> Spillage, leakage, incorrect storage and handling of hazardous waste on site. Surface water contamination. Groundwater contamination 		<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Prevent contamination of oil with water and engine coolant, this decreases the volumes that can be recycled. 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. 	<ul style="list-style-type: none"> Demarcate the area where hazardous waste will be managed. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Where applicable, containers shall be stored in a bunded area of which the volume shall be at least 110% of the volume of the largest tank. The floor of the bund shall be sloped towards a trap or sump to enable any spilled material to be removed. The bunded area shall be covered by a roofed structure to prevent the bunded area from filling with rain water. Adequate precautions shall be provided to prevent spillage during the filling of any container and during the dispensing of the contents. The site shall have a supply of absorbent material readily available to absorb any emergency hydrocarbon spills. Ensure that all containers are correctly labelled irrespective of the size. Prevent the build-up of waste on the site through frequent removal actions.
	Grease			<ul style="list-style-type: none"> 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. 	
	Contaminated Diesel			<ul style="list-style-type: none"> Different storage containers must be provided for the contaminated diesel. Remove contaminated diesel off site by way of a waste contractor. 	
	Engine Coolant			<ul style="list-style-type: none"> Different storage containers must be provided for the storage of engine coolant. Remove engine coolant off site by way of a waste contractor. 	
	Hydrocarbon Sludge			<ul style="list-style-type: none"> Different storage containers must be provided for the storage of hydrocarbon sludge. Remove hydrocarbon sludge off site by way of a waste contractor. 	
	Old Cooking Oil			<ul style="list-style-type: none"> Remove old cooking oil from the WMF by way of a waste contractor for disposal at the closest licensed hazardous landfill site. Use a licensed/ permitted waste contractor. 	
	Battery Acid			<ul style="list-style-type: none"> Remove batteries off site by way of a waste contractor. 	
	Fluorescent Tubes	<ul style="list-style-type: none"> These lamps contain mercury and are deemed hazardous waste. 		<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> The use of fluorescent tubes should be phased out and LED (light-emitting diodes) used throughout the mine. Used lamps are collected and stored in the WMF for removal by an approved waste contractor. Use a licensed/ permitted waste contractor. 	
	High Intensity Discharge Lamps (HID)				

	Oil Rags and Oil Filter	<ul style="list-style-type: none"> Spillage, leakage, incorrect storage and handling of hazardous waste on site. Surface water contamination. Groundwater contamination 		<ul style="list-style-type: none"> Ensure that oil filters are properly drained prior to placing them into the hazardous waste skip. Oil rags and oil filters must be placed in a hazardous waste skip. The oil rags and filters must be removed by the hazardous waste contractor. 	<ul style="list-style-type: none"> Demarcate the area where hazardous waste will be managed. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Where applicable, containers shall be stored in a bunded area of which the volume shall be at least 110% of the volume of the largest tank. The floor of the bund shall be sloped towards a trap or sump to enable any spilled material to be removed. The bunded area shall be covered by a roofed structure to prevent the bunded area from filling with rain water. Adequate precautions shall be provided to prevent spillage during the filling of any container and during the dispensing of the contents. The site shall have a supply of absorbent material readily available to absorb any emergency hydrocarbon spills. Ensure that all containers are correctly labelled irrespective of the size. Prevent the build-up of waste on the site through frequent removal actions.
	Material contaminated with oil, diesel or grease		<ul style="list-style-type: none"> Material must be placed in a hazardous waste skip. Material 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. 		
	Contaminated spillsorb		<ul style="list-style-type: none"> Material must be placed in a hazardous waste skip. Material 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. 		
	Electronic Waste		<ul style="list-style-type: none"> Remove by a waste contractor for disposal at the closest licensed landfill site. Use a licensed/permitted waste contractor. 		
	Launder Grease		<ul style="list-style-type: none"> 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. 		
Incinerator Ash (Area 11)	Incinerator Ash are stored in 210 Lt drums	<ul style="list-style-type: none"> Surface water contamination. Groundwater contamination 	<ul style="list-style-type: none"> Incinerator Ash to be stored in storage drums. Bunded storage area. 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"> Demarcate the area where incinerator ash will be managed. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Ensure that all storage drums are completely sealed. Construct the storage area within a bunded area. Ensure that the bunded area has a false floor as to secure the required 110% storage capacity should a leak occur. Ensure that the bunded area outlet valve is connected to a sump. Ensure that the outlet valve is lockable. 	
Contaminated Soil Storage (Area 12)	Storage area for soil contaminated with hydrocarbon.	<ul style="list-style-type: none"> Surface water contamination. Groundwater contamination 	<ul style="list-style-type: none"> Implement good housekeeping practices as to avoid the generation of contaminated soil due to accidental drips and spills. Contaminated soil not suitable for bioremediation should be placed in a hazardous waste skip. Material not suitable for bioremediation should be removed together with other hazardous waste by the waste management contractor and disposal of at the closest licensed landfill site. Soils contaminated with heavy metals should 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"> Demarcate the area where contaminated soil will be stored. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area. Construct the storage area within a bunded area with a concrete floor. Ensure that the bunded area outlet valve is connected to a sump. Ensure that the outlet valve is lockable. 	
Rehabilitation Store (Area 13)	This area only acts as a storage area for material used in rehabilitation such as fertilizers and seeds. (No waste related activity)			<ul style="list-style-type: none"> Indicate with clear signage that this building only acts as a store for rehabilitation material such as fertilizers and seeds. 	
Baling Room (Area 15)	Existing brick roofed build where cans and paper is baled and tins are pressed in a drum press.	No Impact	EMS Blue and Green Area Waste Management	<ul style="list-style-type: none"> Recycling by waste recycling contractor. Store in bale storage area. 	<ul style="list-style-type: none"> Indicate with clear signage the type of waste stream permissible to be baled in the baling room.
Weigh Bridge (Area 16)	Incoming and outgoing trucks are weighted as to log and monitor waste volumes.	No Impact	ENV-OP-07	N/A	<ul style="list-style-type: none"> Weigh Bridge
Concrete Slab (Area 17)	Incoming waste will be stored on the concrete floor prior to distribution to the various waste storage areas	<ul style="list-style-type: none"> Surface water contamination. Groundwater contamination 		N/A	<ul style="list-style-type: none"> Demarcate the area. Indicate with clear signage the type of waste streams permissible to be stored in the demarcated area. Construct the concrete floor area. Prevent storm water ingress.
Composting Windrow (Area 18)	Area where the green waste and wood chips will be placed in a windrow as to aid composting.	<ul style="list-style-type: none"> Surface water contamination. Groundwater contamination 		<ul style="list-style-type: none"> Add dried sludge to composting/mulching windrows in WMF and use for rehabilitation together with bought in compost/manure. 	<ul style="list-style-type: none"> Demarcate the area. Indicate with clear signage the type of waste streams permissible to be managed in the demarcated area

Green Waste (Area 19)	Storage and chipping of green waste for composting purposes	<ul style="list-style-type: none"> • Generation of dust. • Generation of noise from wood chipper/alternative. 		<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ○ Shredding of plant material. • Composting of green waste: <ul style="list-style-type: none"> ○ 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. • Remove non-recyclable green waste off site – require a storage container. 	<ul style="list-style-type: none"> • Demarcate the area. • Indicate with clear signage the type of waste streams permissible to be managed in the demarcated area
Mixing Stockpile (Area 20)	Receives green waste as well as bio-remediated soil for mixing as to use in the rehabilitation	<ul style="list-style-type: none"> • Generation of dust. 		N/A	<ul style="list-style-type: none"> • Demarcate the area. • Indicate with clear signage the type of waste streams permissible to be managed in the demarcated area
Bioremediation Plant (Area 22)	Receives the contaminated soils for bioremediation	<ul style="list-style-type: none"> • Surface water contamination. • Groundwater contamination 		N/A	<ul style="list-style-type: none"> • Demarcate the area. • Indicate with clear signage the type of waste streams permissible to be managed in the demarcated area. • Construct the storage area within a bunded area with a concrete floor. • Ensure that the bunded area outlet valve is connected to a sump. • Ensure that the outlet valve is lockable.
Access Control (Area 23 % 24)	Access control to the WMF	N/A		N/A	<ul style="list-style-type: none"> • Demarcate the entire Waste Management Facility with a fence with a minimum height of 1.8m all around. • Manage access control at the access gate. • Indicate with clear signage the type of waste streams permissible to be managed in the demarcated area. • Dust control measures shall be implemented where necessary.

Table 7.2 Closure Phase Environmental Management Programme: Waste Management Facility

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN
Waste Management Facility	Demolition of all infrastructure.	<ul style="list-style-type: none"> Fugitive Dust Noise 	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> All contaminated demolition rubble will be disposed of at a registered waste disposal site. Keep records of the disposal. 	<ul style="list-style-type: none"> On an annual basis update the mine's rehabilitation plan to include the relevant areas of the WMF. The rehabilitation plan is to detail the necessary disposal methods of the demolished material on the waste management facility. This will include disposal at a registered landfill facility. The rehabilitation plan for the WMF is to align to the mine wide rehabilitation plan to ensure sustainable rehabilitation as well as alignment with the mine's end land use objectives.
	Removal of all remaining waste	<ul style="list-style-type: none"> Surface water contamination. Groundwater contamination. Visual - wind-blown litter Fugitive Dust 	EMS Herbicides , Pesticides and Insecticides Management ENV-OP-21 EMS Competence Training and Awareness 2013 ENV-SP-06 EMS Weeds and Alien Plant Species Management ENV-OP-03	<ul style="list-style-type: none"> Remove all remaining waste off-site through an approved waste removal contractor. Implement good housekeeping practices as to avoid the generation of contaminated soil due to accidental drips and spills. Spills must be quickly and adequately cleaned up (spill response plan developed and implemented). Spill kits will be available on site. Housekeeping - The entire site should be kept neat and tidy at all times. Use a licensed/permitted waste contractor. Keep records of the disposal. 	
	Rehabilitation of the area through ripping of the soils, top soiling and re-vegetation	<ul style="list-style-type: none"> Fugitive Dust 	EMS Heritage Resource ENV-OP-11 EMS Rehabilitation, Monitoring and Maintenance ENV-OP-29	<ul style="list-style-type: none"> Rehabilitate in accordance to the approved rehabilitation plan. Soils contaminated with heavy metals should be removed together with other hazardous waste by the waste management contractor and disposal of at the closest licensed landfill site. 	
	Vehicular movement during rehabilitation.	<ul style="list-style-type: none"> Emissions Noise 	EMS Surface Disturbance Management ENV-OP-02	<ul style="list-style-type: none"> Monitored as part of the Occupational Hygiene Management System. Ensure that vehicles are maintained as per the approved maintenance program. 	
	Soil disturbance	<ul style="list-style-type: none"> Propagation of alien and invasive plant species. Erosion 		<ul style="list-style-type: none"> The monitoring of the alien and invasive species eradication and control programme will continue during the post closure monitoring phase (3 years). The rehabilitation will be in line with the approved rehabilitation plan and will be monitored as to ensure sustainable rehabilitation. 	

Table 7.3 Operational Phase Environmental Management Programme: Waste Tyre Storage Area

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN
Waste Tyre Storage Areas	Storage of EMV Tyres	<ul style="list-style-type: none"> Storage of tyres can be a fire hazard and the breeding ground for mosquitoes, rodents and other pests. 	EMS Blue and Green Area Waste Management ENV-OP-07	<ul style="list-style-type: none"> 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. Tyres can be painted white and used as demarcation where necessary. Waste EMV tyres should be placed in a demarcated, storage area on the Waste Rock Dump and covered with a layer of waste rock 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"> Demarcate the EMV Tyre storage area on both the Waste Rock Dump and at the Workshop Area. Cover the waste tyres at the Waste Rock Dump storage area with a layer of waste rock as to act as fire prevention. Indicate with clear signage the type of waste stream permissible to be stored in the demarcated area.

Table 7.4 Closure Phase Environmental Management Programme: Waste Tyre Storage Area

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN
Waste Tyre Storage Areas	Storage of EMV Tyres	Storage of tyres can be a fire hazard and the breeding ground for mosquitoes, rodents and other pests.	EMS Rehabilitation, Monitoring and Maintenance ENV-OP-29 EMS Surface Disturbance Management ENV-OP-02	<ul style="list-style-type: none"> Remove all remaining stored waste tyres off-site. 	<ul style="list-style-type: none"> Remove all waste tyres from the demarcated area where the tyres were covered with waste rock. Rehabilitate the waste rock dump. Remove all tyres previously used as demarcation markers. Dispose of the waste tyres off site in the appropriate manner. Keep records of the disposal.

Table 7.5 Operational Phase Environmental Management Programme: Building Rubble and Demolition Waste Area (inclusive of wood)

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN
Building rubble and demolition waste Disposal Areas	Disposal of building rubble and demolition waste	Contamination of building rubble and demolition waste with hazardous materials which could cause surface and groundwater contamination.	EMS Rehabilitation, Monitoring and Maintenance ENV-OP-29 EMS Surface Disturbance Management ENV-OP-02	<ul style="list-style-type: none"> Use building rubble, demolition and construction waste as filling, building foundations or compaction material. Burial of building rubble, demolition and construction waste on the waste rock dump. Building rubble, demolition waste and construction waste must be disposed of a designated area within the Waste Rock Dump. 	<ul style="list-style-type: none"> Ensure that all building rubble and demolition waste are free from any hazardous materials and glass. Demarcate the building rubble and demolition waste disposal area. Indicate with clear signage the type of waste stream permissible to be disposed in the demarcated area.

Table 7.6 Closure Phase Environmental Management Programme: Building Rubble and Demolition Waste Disposal Area (inclusive of wood)

Area	ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	Existing EMS control	Mitigation	ACTION PLAN
Building rubble and demolition waste Disposal Areas	Disposal of building rubble and demolition waste	Contamination of building rubble and demolition waste with hazardous materials which could cause surface and groundwater contamination.		<ul style="list-style-type: none"> Rehabilitate as part of the Waste Rock Dump rehabilitation strategy. 	<ul style="list-style-type: none"> Cover the building and demolition waste with waste rock as part of the overall waste rock rehabilitation strategy.

This Chapter details the monitoring programme in terms of this EMP.

8.1 **EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM**

Venetia has developed and implements an Environmental Management System (EMS) that is certified to the ISO14001 International Environmental Management Standard. This International Standard, as per *SANAS ISO14001: 2004 Edition 2, Environmental Management Systems - Requirements with guidance for use*, states that the Standard “specifies requirements for an environmental management system to enable an organisation to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organisation subscribes, and information about significant environmental aspects. It applies to those environmental aspects that the organisation identifies as those which it can control and those which it can influence. The system enables an organisation to develop an environmental policy, establish objectives and processes to achieve the policy commitments, take action as needed to improve its performance and demonstrate the conformity of the system to the requirements of the ISO14001 International Standard”.

“The ISO14001 Standard is based on the methodology known as Plan-Do-Check-Act, which is described as follows:

- **Plan:** establish the objectives and processes necessary to deliver results in accordance with the organisation’s environmental policy;
- **Do:** implement the processes;
- **Check:** monitor and measure processes against environmental policy, objectives, targets, legal and other requirements, and report the results; and
- **Act:** take actions to continually improve performance of the environmental management system.” (SANAS ISO14001: 2004 Edition 2, Environmental Management Systems - Requirements with guidance for use)

The scope of Venetia Mine’s EMS includes all activities, products and services that occur within the mine lease area, which includes the management of the Waste Management Facility, as well as the storage and handling of building rubble and demolition waste and the storage of waste tyres.

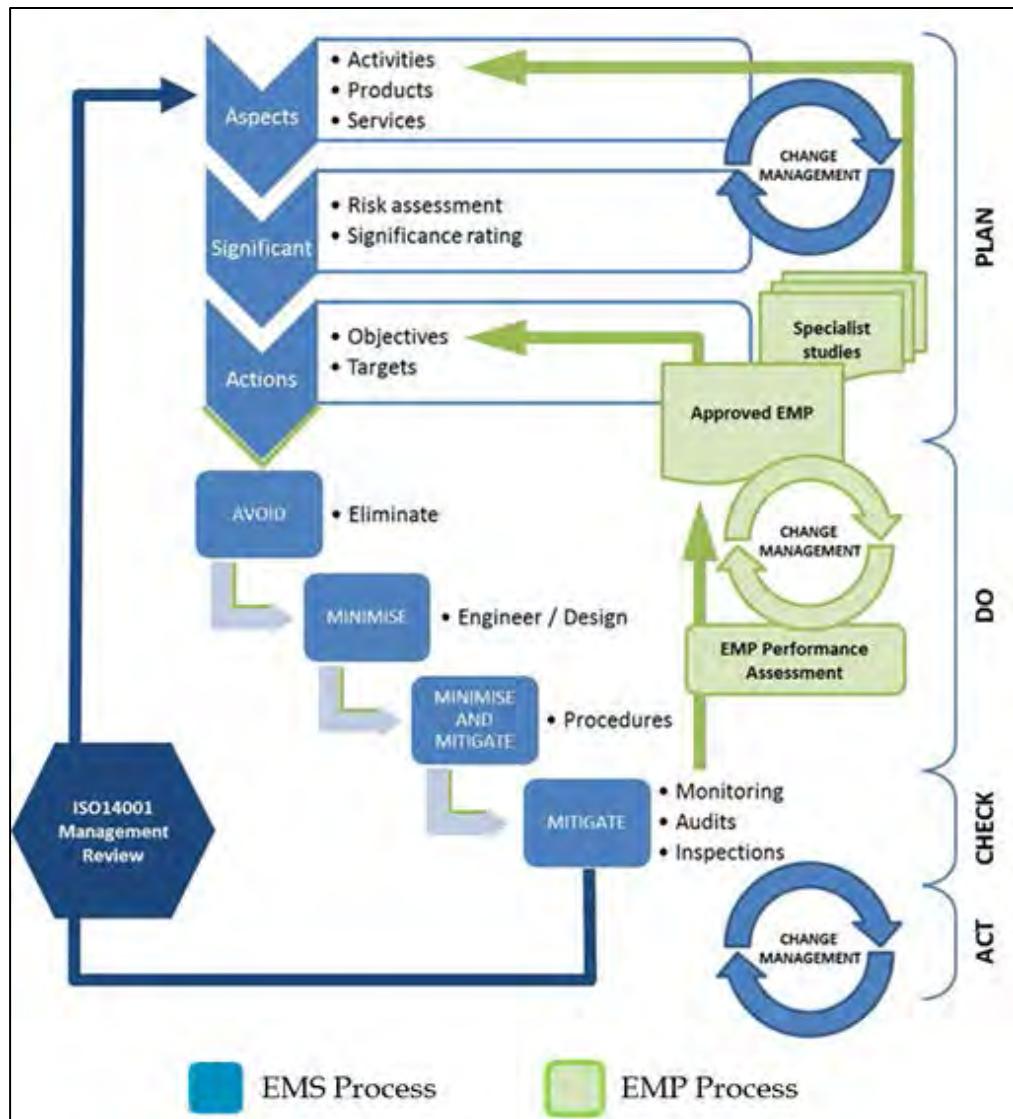
The EMS is subjected to annual internal and external audits by competent, independent assessors. External assessors are accredited to the South African National Accreditation System (SANAS) which is an EMS certification body, and adjudicate whether or not the mine meets the minimum requirements of the ISO14001 Standard.

8.2 **MANAGEMENT OF THE EMP VIA THE ISO14001 CERTIFIED EMS**

The approved EMP is implemented via the EMS as illustrated in Figure 8.1. Management objectives at the Mine are actioned via the EMS and specialist study outcomes are integrated into the aspects registers for the mine. The EMP

will be subjected to checking via annual performance assessments and changes required will be managed via the EMS's change management system and EMP amendment processes.

Figure 8.1 Management of the EMP through the EMS



8.3 MONITORING AND MAINTENANCE – WASTE MANAGEMENT FACILITY

Refer to Table 8.1 for the monitoring associated with the Waste Management Facility.

Table 8.1 Waste Management Facility - Monitoring

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
General Waste: Recyclable General Waste			
Paper	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Use recycled paper. 	-	<ul style="list-style-type: none"> Monitor volume of paper removed from the WMF.
	<ul style="list-style-type: none"> Behavioral change: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Waste reduction and recycling guide. 	Waste reduction and recycling guide.	<ul style="list-style-type: none"> Monitor volume of paper removed from WMF.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Baling of paper. 	Multi-purpose bailers with correct specifications - buy or rent the bailer.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of waste exiting WMF per day. Number of bales made per day.
	<ul style="list-style-type: none"> Behavioral change: <ul style="list-style-type: none"> 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"> Monitor volume of paper removed from WMF.
	<ul style="list-style-type: none"> Recycling contractor: <ul style="list-style-type: none"> 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. Number of paper bales exiting WMF per day.
	<ul style="list-style-type: none"> Any paper not separated out for recycling, for example paper 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. Volume of paper exiting WMF per day.
Plastic	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> 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"> Volume of polystyrene water cups exiting the WMF per month.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Baling of plastic. 	Multi-purpose baler with correct specifications.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of plastic exiting WMF per day. Number of bales made per day.
	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Re-use of water bottles at water dispensers. 	Water dispensers and re-usable plastic bottles.	<ul style="list-style-type: none"> -
	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Agreements to have the water dispenser bottles collected, refilled and supplied back to the mine. 	Water dispensers.	<ul style="list-style-type: none"> Number of plastic entering the mine per month.
	<ul style="list-style-type: none"> Recycling contractor: <ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> 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. volume of plastic exiting WMF per day. .
Plastic pallets	<ul style="list-style-type: none"> Plastic pallets should be recycled. 	Storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of plastic pallets exiting WMF per day. .

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
Cardboard	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Buy in bulk to avoid generation of many small cardboard containers. 	-	<ul style="list-style-type: none"> Waste manifest. Weight of cardboard exiting WMF per day.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Baling of cardboard. 	Multi-purpose bailer with correct specifications - buy or rent the baler.	<ul style="list-style-type: none"> Monitoring and measurements sheet. Waste manifest. Number of bales made per day.
	<ul style="list-style-type: none"> Recycling contractor: <ul style="list-style-type: none"> 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 the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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/ permitted 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 the WMF on adhoc basis.
Cans	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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 exiting the WMF on adhoc basis. Number of bales made per day.
	<ul style="list-style-type: none"> Recycling: recycling of can bales. <ul style="list-style-type: none"> 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 the WMF on adhoc basis.
Glass	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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 glass exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
General Waste: Non-Recyclable General Waste			
Non-recyclable general waste	<ul style="list-style-type: none"> Behavioral change: <ul style="list-style-type: none"> Proper waste segregation. 	Colour coded bins for non-recyclable domestic waste.	<ul style="list-style-type: none"> Waste manifest. Weight of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Utilisation of a rear-end loader mobile compactor vehicle (by the waste contractor) when collecting waste. 	Contractors' rear-end loader mobile compactor vehicle.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of domestic waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Disposal 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 the WMF on adhoc basis.
Food waste	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Check expiry dates prior to purchasing. Consider shelf-life of products. Investigate optimal portion sizes. 	-	<ul style="list-style-type: none"> Waste manifest. Weight of food waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Utilisation of a rear end loader mobile compactor vehicle (by the waste contractor) when collecting waste. 	Contractors' rear-end loader mobile compactor vehicle.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of food waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Disposal 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 the WMF on adhoc basis.
General Waste: Recyclable Green Waste			
Green waste	<ul style="list-style-type: none"> Physical reduction: 	Shredder / chipper	<ul style="list-style-type: none"> Waste manifest.

Waste stream	Best Practicable Waste Management Option	Equipment/ Technology	Monitoring
	<ul style="list-style-type: none"> ○ Shredding of plant material. • Composting of green waste: <ul style="list-style-type: none"> ○ 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. 	Shredder / chipper; Windrow turner or tractor; Temperature probe; Compost activator enzymes.	<ul style="list-style-type: none"> • Weight of waste exiting the WMF on adhoc basis. • Monitoring and Measurements sheet. • Waste manifest. • volume of compost/mulch exiting the WMF on adhoc basis.
General Waste: Non-Recyclable Green Waste			
Green waste	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ○ Shredding of plant material. • Remove off site and take to the closest licensed landfill site or burial of green waste under the waste rock dump. 	Shredder / chipper	<ul style="list-style-type: none"> • Waste manifest. • Volume of waste exiting the WMF on adhoc basis.
		Storage skip/container	<ul style="list-style-type: none"> • Monitoring and measurements sheet. • Waste manifest. • Volume of waste exiting the WMF on adhoc basis.
Industrial Waste: Recyclable Industrial Waste			
Screen panels	<ul style="list-style-type: none"> • 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. • Volume of screen panels exiting the WMF on adhoc basis.
Ferrous and non-ferrous metals	<ul style="list-style-type: none"> • Behavioural change: <ul style="list-style-type: none"> ○ Steel should only be stored/ stockpiled in the designated steel laydown area within the WMF. • Physical reduction: <ul style="list-style-type: none"> ○ 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. • Existing contract with recycling company must be continued. 	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of waste exiting WMF on adhoc basis.
		Blow torch/cutting torch and PPE.	
		Skips for storage of steel.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of steel waste exiting the WMF on adhoc basis.
Wood (pallets and boxes)	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ The use of wooden pallets must be phased out completely. ○ Plastic pallets must be bought instead. • Behavioural change: <ul style="list-style-type: none"> ○ 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. • Behavioural change: <ul style="list-style-type: none"> ○ 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. • Physical reduction: <ul style="list-style-type: none"> ○ Broken wooden pallets should be dismantled and stored prior to removal from the WMF. • Burial under WRD or disposal at a general landfill site. 	-	<ul style="list-style-type: none"> • Volume of wooden pallets exiting the WMF on adhoc basis.
		Storage containers for wood e.g. Skips.	
		Skip for wood storage.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of wood exiting the WMF on adhoc basis.
		Skip for wood storage.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of wood exiting the WMF on adhoc basis.
Conveyor belting	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ○ Conveyor belts less than 50m in length must be rolled up and stored for sale at a later stage. ○ Local farmers can be targeted. 	<ul style="list-style-type: none"> • Conveyor belt winding machine. • Storage skip. 	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Length of conveyor belts exiting WMF on adhoc basis.

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
	<ul style="list-style-type: none"> o Conveyor belts longer than 50m should be taken back by Dunlop for recycling. 		
Hard hats	<ul style="list-style-type: none"> • Behavioural change: <ul style="list-style-type: none"> o All hard hats must be taken to the WMF. 		<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of hard hats exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> o Hard hats must be dismantled in the sorting area. o The pieces must be stored in a designated plastic storage area within the WMF. 	Bale storage bags.	
	<ul style="list-style-type: none"> • Recycling contractor: <ul style="list-style-type: none"> o 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. • Volume of hard hats exiting the WMF on adhoc basis.
Safety boots	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> o 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). o Shoes with composite toe caps can be scanned by security. 		
	<ul style="list-style-type: none"> • 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. • Volume of safety boots exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • If the used safety shoes cannot be donated, they should be disposed of at the closes licensed landfill site. • Use a licensed/ permitted waste contractor. 	Bale storage bags.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of safety boots exiting the WMF on adhoc basis.
Overalls	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> o Cut up overalls to re-use as oil rags. 	Scissors.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of overalls exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> o Used overalls should be used as oil rags instead of purchasing oil rags. 		<ul style="list-style-type: none"> • Volume of oil rags exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of overalls exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of overalls exiting the WMF on adhoc basis.
Plastic water containers	<ul style="list-style-type: none"> • Recycling by waste recycling contractor. 	Bale storage bags.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of plastic water containers exiting the WMF on adhoc basis.
Blasting wire	<ul style="list-style-type: none"> • Recycle - scrap metal dealer. 	Bale storage bags.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of blasting wire exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Dispose of at a general landfill site. 	Bale storage bags.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Weight of blasting wire exiting the WMF on adhoc basis.
All cabling	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> o Strip cables and wind into rolls e.g. copper wires. 	Cable stripper.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of cabling exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of cabling exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of cabling exiting the WMF on adhoc basis.

Industrial Waste: Non-Recyclable Industrial Waste

Windscreen glass	<ul style="list-style-type: none"> • Windscreen glass 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 windscreen glass.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of windscreen glass exiting the WMF on adhoc basis.
LDV tyres	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ◦ Removal of used tyres by tyre contactor when bringing new tyres to the mine. 	Storage skip/area.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis.
	<ul style="list-style-type: none"> • Tyres can be painted white and used as demarcation where necessary. 	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis.
	<ul style="list-style-type: none"> • 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"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis. • Volume of tyres placed in the designated storage areas on adhoc basis.
	<ul style="list-style-type: none"> • 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"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis.
EMV tyres	<ul style="list-style-type: none"> • 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. • Volume of tyres exiting the Mine on adhoc basis.
	<ul style="list-style-type: none"> • Tyres can be painted white and used as demarcation where necessary. 	-	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis.
	<ul style="list-style-type: none"> • 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"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of tyres exiting the Mine on adhoc basis. • Volume of tyres placed in the designated storage areas on adhoc basis.
Rubber	<ul style="list-style-type: none"> • Rubber should be recycled wherever possible. 	Skip for storage of rubber.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of rubber exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of rubber exiting the WMF on adhoc basis.
Air filters	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ◦ 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. • Volume of air filters exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of air filters exiting WMF on adhoc basis.
Redundant furniture	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ◦ Furniture must be dismantled in the sorting area. 	Dismantling tools.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of redundant furniture exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> • Material from dismantled furniture can be re-used as oil rags or absorbent material for spills. 	-	<ul style="list-style-type: none"> • Weight of used oil rags exiting the WMF on adhoc basis. • Monitoring and Measurements sheet. • Waste manifest. • Volume of redundant furniture exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of waste exiting WMF on adhoc basis.

Building, construction and demolition waste			
Building rubble, demolition and construction waste	<ul style="list-style-type: none"> 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. Volume of waste exiting WMF on adhoc basis. Volume of waste exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> 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. Volume of waste exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> Building rubble, demolition waste and construction waste must be stored in a designated area within the WMF. It must be removal 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. Volume of waste exiting WMF on adhoc basis. Volume of waste exiting WMF on adhoc basis.
Recyclable hazardous liquids			
Used oil	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> 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 the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
Non-Recyclable hazardous liquids			
Grease	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
Contaminated diesel	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
Engine coolant	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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 the WMF on adhoc basis.
Hydrocarbon sludge	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Service sumps on a regular basis. 	Contractor's super sucker.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sludge exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Disposal of hydrocarbon sludge at the closest licensed hazardous landfill site. Use a licensed/ permitted waste contractor. 	Contractor's super sucker.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sludge exiting the WMF on adhoc basis.
Old cooking oil	<ul style="list-style-type: none"> 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. Volume of waste exiting the WMF on adhoc basis.

Battery Acid	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Do not drain batteries. 	-	
	<ul style="list-style-type: none"> Removal to 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. Volume of waste exiting the WMF on adhoc basis.
Chemical containers with redundant chemicals - Liquid	<ul style="list-style-type: none"> Removal to 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. Volume of containers exiting the WMF on adhoc basis.
Recyclable hazardous solids			
Used Ink cartridges	<ul style="list-style-type: none"> 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. Volume of cartridges exiting the WMF on adhoc basis.
Sealed batteries	<ul style="list-style-type: none"> Recycling of batteries by supplier. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sealed batteries exiting the WMF on adhoc basis.
Un-sealed batteries	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Phase out un-sealed batteries and only use sealed batteries at the mine. 	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of un-sealed batteries exiting WMF on adhoc basis.
	<ul style="list-style-type: none"> Recycling of batteries by supplier. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of un-sealed batteries exiting the WMF peon adhoc basis.
Empty (mostly 25l) chemical containers	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Compact/compress empty containers. 	Compactor/drum press.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of containers exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Recycling of plastic containers by a waste recycling contractor. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of containers exiting the WMF on adhoc basis.
Empty 210l oil drums	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Compact/compress empty oil drums. 	Compactor/drum press.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of drums exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Recycling of metal oil drums by scrap metal recycler. 	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of drums exiting the WMF per day and destination.
Oily rags and oil filters	<ul style="list-style-type: none"> 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. Bunded storage area. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of used oil rags and oil filters exiting the WMF on adhoc basis.
Contaminated soil	<ul style="list-style-type: none"> 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. Volume of contaminated soil exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Hydrocarbon contaminated soil that cannot be bioremediated must be disposed of as hazardous waste at the closest licensed hazardous landfill site. Use a licensed 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. Volume of waste exiting the WMF on adhoc basis.
Sewage treatment plant sludge	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Allow sludge to dry out in drying bed with impermeable surface. 	Impermeable drying bed (e.g. slab or bunker).	
	<ul style="list-style-type: none"> 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. Volume of compost/mulch exiting the WMF on adhoc basis.
Fluorescent tubes, mercury vapour lamps and sodium	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Crushing of lamps must occur in a drum- top crusher. Crushed lamps must then be stored in weather- proof containers at the WMF. 	<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. Volume of waste exiting the WMF on adhoc basis.

lamps	<ul style="list-style-type: none"> ○ Employees must wear the necessary PPE when crushing the lamps. 		
	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ The use of fluorescent tubes should be phased out and LED (light-emitting diodes) used throughout the mine. 		<ul style="list-style-type: none"> • Volume of fluorescent tubes exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of fluorescent tubes exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of fluorescent tubes exiting the WMF on adhoc basis.
Non-Recyclable hazardous solids			
Material contaminated with oil, diesel or grease, empty oil/ chemical containers	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the WMF on adhoc basis.
Contaminated spillsorb	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the WMF on adhoc basis.
Hardened Sludge	<ul style="list-style-type: none"> • Behavioural change: <ul style="list-style-type: none"> ○ The generation of hardened sludge must be prevented by ensuring that sludge from the drizit 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 the WMF on adhoc basis.
	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the WMF on adhoc basis.
Contaminated soil not suitable for bioremediation (due to levels of contamination)	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the WMF on adhoc basis.
Launder grease	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the WMF on adhoc basis.
Expired medicines	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the Wellness Centre on adhoc basis.
Medical waste	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the Wellness Centre on adhoc basis.
Sanitary waste generated in bathrooms and 'SHE' bins	<ul style="list-style-type: none"> • 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. • Volume of waste exiting the Mine on adhoc basis.
Empty chemical containers	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ Buy chemicals in bulk wherever possible. For example, IBC containers should be purchased instead of many small containers, e.g. 25 litre containers. 	-	<ul style="list-style-type: none"> • Volume of chemical containers and IBC chemical containers exiting the WMF on adhoc basis.

	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Compact/compress empty containers. 	Compactor/drum press.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of containers exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Remove 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. Volume of containers exiting the WMF on adhoc basis.
Chemical containers with redundant chemicals	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> 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. 	Chemicals register.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of containers exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Chemical containers with expired/redundant chemicals must be stored in a bunded 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"> Bunded storage area. Ro-Ro bins. 	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of containers exiting the WMF on adhoc basis.
Electronic waste	<ul style="list-style-type: none"> Remove by a waste contractor for disposal at the closest licensed hazardous 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. Volume of waste exiting the WMF on adhoc basis.
Sand- blasting grit	<ul style="list-style-type: none"> 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/ 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. Volume of waste exiting the WMF on adhoc basis.
Incinerator ash	<ul style="list-style-type: none"> 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/ 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. Volume of waste exiting the WMF on adhoc basis.

Table 8.2 Monitoring – Disposal of Building Rubble and Demolition Waste on the Waste Rock Dump

Waste stream	Best Practicable Waste Management Option	Equipment/ Technology	Monitoring
General Waste: Building, Construction and Demolition Waste			
Building rubble, demolition and construction waste	<ul style="list-style-type: none"> Use building rubble, demolition and construction waste as filling, building foundations or compaction material. 	-	-
	<ul style="list-style-type: none"> Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.

Table 8.3 Additional Monitoring – Waste directly removed by a Waste Contractor from the Red Area

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
RED AREA			
General Waste: Recyclable General Waste			
Paper	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Use recycled paper. 	-	
	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Waste reduction and recycling guide. 	Waste reduction and recycling guide.	
	<ul style="list-style-type: none"> Paper should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	
	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> 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"> Paper should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	
Plastic	<ul style="list-style-type: none"> Plastic should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	
	<ul style="list-style-type: none"> Plastic should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	
Plastic pallets	<ul style="list-style-type: none"> Plastic pallets should exit the Red Area after security clearance and be taken to the WMF. 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	<ul style="list-style-type: none"> Monitoring and measurement sheet. Waste manifest. Volume of waste exiting the WMF exiting the Red area on adhoc basis.
Cardboard	<ul style="list-style-type: none"> Cardboard should be incinerated in the Red Area. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	<ul style="list-style-type: none"> -
	<ul style="list-style-type: none"> Cardboard should be incinerated in the Red Area. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	<ul style="list-style-type: none"> -
Cans	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitoring and measurement sheet. Waste manifest. Volume of waste exiting the WMF exiting the Red area on adhoc basis.
	<ul style="list-style-type: none"> Cans should exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
Glass	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Glass should exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Glass should exit the Red Area after security clearance and be taken to the WMF. Crushed glass (as described above) 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 measurement sheet. Waste manifest. Volume of waste exiting the WMF on adhoc basis.
Food waste	<ul style="list-style-type: none"> Food waste should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. Existing incinerator. 	
	<ul style="list-style-type: none"> Food waste should be incinerated in the Red Area incinerator. 	<ul style="list-style-type: none"> Storage drums. 	

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
RED AREA			
General Waste: Recyclable General Waste			
		• Existing incinerator.	
General Waste: Non-Recyclable General Waste			
Food waste	• Food waste should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	
	• Food waste should be incinerated in the Red Area incinerator.	• Storage drums. • Existing incinerator.	
General Waste: Recyclable Green Waste			
Green waste	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> 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 WMF. Shredded plant material (as described above) should be composted/ mulched. Composting of green waste: <ul style="list-style-type: none"> 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. Volume of compost/mulch exiting WMF on adhoc basis.
General Waste: Non-Recyclable Green Waste			
Green waste	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Green waste should exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
General Waste: Recyclable Industrial Waste			
Used Screen Panels	<ul style="list-style-type: none"> Used screen panels must exit the Red Area after security clearance and be taken to the WMF. The screen panels must be removal off site by Multotec (contractor) for recycling. 	Storage container(s)	<ul style="list-style-type: none"> Waste manifest. Volume of waste exiting the WMF on adhoc basis.
Ferrous and non-ferrous metals	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Steel must exit the Red Area after security clearance and be taken to the WMF. Steel should only be stored/ stockpiled in the designated steel laydown area within the WMF. Physical reduction: <ul style="list-style-type: none"> Steel must exit the Red Area after security clearance and be taken to the WMF. 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. Steel must exit the Red Area after security clearance and be taken to the WMF. Existing contract with recycling company must be continued. 	-	<ul style="list-style-type: none"> Waste manifest. Volume of waste exiting the WMF on adhoc basis.
		Blow torch/cutting torch and PPE	<ul style="list-style-type: none"> Waste manifest. Volume of waste exiting the WMF on adhoc basis.
		Skips for storage of steel	<ul style="list-style-type: none"> Waste manifest. Volume of waste exiting the WMF on adhoc basis.
Wood (pallets and boxes)	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> The use of wooden pallets must be phased out completely. Plastic pallets must be bought instead. 	-	<ul style="list-style-type: none"> Volume of wooden pallets exiting the WMF on adhoc basis.

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
RED AREA			
General Waste: Recyclable General Waste			
	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> 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	
	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> 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. 	-	
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Broken pallets must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Broken wooden pallets must exit the Red Area after security clearance and be taken to the WMF. Dismantled pallets should be buried under the WRD or disposed of at the closest licensed general landfill site. 	Storage skip.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of waste exiting the WMF on adhoc basis.
Conveyor belting	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Conveyor belts must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of conveyor belting exiting the WMF on adhoc basis.
Hard hats	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Hard hats must exit the Red Area after security clearance and be taken to the WMF. 	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of hard hats exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Hard hats must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of hard hats exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Hard hats must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of hard hats exiting the WMF on adhoc basis.
Safety boots	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> 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"> Volume of safety boots exiting the WMF on an ad hoc basis.
	<ul style="list-style-type: none"> Safety boots must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of safety boots exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Safety boots must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of safety boots exiting the WMF on adhoc basis.
Overalls	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Overalls must exit the Red Area after security clearance and be taken to the WMF. Cut up overalls to use as oil rags. 	Scissors.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of overalls exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Used overalls should be used as oil rags instead of purchasing oil rags. 	-	<ul style="list-style-type: none"> Volume of oil rags exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Overalls must exit the Red Area after security clearance and be taken to the WMF. Social upliftment programmes should be investigated whereby used overalls that are still in good 	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest.

Waste stream	Best Practicable Waste Management Option	Equipment/Technology	Monitoring
RED AREA			
General Waste: Recyclable General Waste			
	<ul style="list-style-type: none"> condition can be donated to communities surrounding the mine. Overalls must exit the Red Area after security clearance and be taken to the WMF. 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"> Volume of overalls exiting the WMF on adhoc basis. Monitoring and Measurements sheet. Waste manifest. Volume of overalls exiting the WMF on adhoc basis.
All cabling	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> All cabling must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of cabling exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> All cabling must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of cabling exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> All cabling must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
General Waste: Non-Recyclable Industrial Waste			
Redundant furniture	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Furniture must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of redundant furniture exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Furniture must exit the Red Area after security clearance and be taken to the WMF. 	Bale storage bags.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of redundant furniture exiting the WMF peon adhoc basis.
	<ul style="list-style-type: none"> Furniture must exit the Red Area after security clearance and be taken to the WMF. Material from dismantled furniture can be re-used as oil rags or absorbent material for spills. 	-	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of redundant furniture exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Furniture must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of redundant furniture exiting the WMF on adhoc basis.
General Waste: Building, Construction and Demolition Waste			
Building rubble, demolition and construction waste	<ul style="list-style-type: none"> Use building rubble, demolition and construction waste as filling, building foundations or compaction material. 	-	
	<ul style="list-style-type: none"> Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Building rubble that cannot be re-used in the Red Area must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of waste exiting the WMF on adhoc basis.

Hazardous Waste: Recyclable Hazardous Liquids			
Used oil	<ul style="list-style-type: none"> Behavioural change: <ul style="list-style-type: none"> Prevent contamination of oil with water and engine coolant as it decreases the volume that can be recycled. 	-	
	<ul style="list-style-type: none"> 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. Volume of used oil exiting the WMF on adhoc basis.
Hazardous Waste: Non-Recyclable Hazardous Liquids			
Grease	<ul style="list-style-type: none"> Grease must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of grease exiting the WMF on adhoc basis.
Battery Acid	<ul style="list-style-type: none"> Battery acid must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of battery acid exiting the WMF on adhoc basis.
Chemical containers with redundant chemicals - Liquid	<ul style="list-style-type: none"> Containers must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of redundant chemicals in containers exiting the WMF on adhoc basis.
Hazardous Waste: Recyclable Hazardous Solids			
Used Ink cartridges	<ul style="list-style-type: none"> Used ink cartridges must exit the Red Area after security clearance and be taken to the WMF. 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. Volume of used ink cartridges exiting the WMF on adhoc basis.
Sealed batteries	<ul style="list-style-type: none"> Sealed batteries must exit the Red Area after security clearance and be taken to the WMF. Recycling of batteries by supplier. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of sealed exiting the WMF on adhoc basis.
Un-sealed batteries	<ul style="list-style-type: none"> Procurement: <ul style="list-style-type: none"> Phase out un-sealed batteries and only use sealed batteries at the mine. 	-	<ul style="list-style-type: none"> Volume of unsealed batteries exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Un-sealed batteries must exit the Red Area after security clearance and be taken to the WMF. Recycling of batteries by supplier. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of un-sealed exiting the WMF on adhoc basis.
Empty (mostly 25l) chemical containers	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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. Volume of empty chemical containers exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Containers must exit the Red Area after security clearance and be taken to the WMF. Recycling of compressed plastic containers by a waste recycling contractor. 	Bunded storage area.	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Volume of empty chemical containers exiting the WMF on adhoc basis.
Empty 210l oil drums	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> Drums must exit the Red Area after security clearance and be taken to the WMF. In the WMF, compact/compress empty oil drums. 	Compactor/drum press	<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of empty 210l oil drums exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> Drums must exit the Red Area after security clearance and be taken to the WMF. Recycling of metal oil drums by scrap metal recycler. 		<ul style="list-style-type: none"> Monitoring and Measurements sheet. Waste manifest. Weight of 210l oil drums exiting the WMF on adhoc basis.
Fluorescent tubes, mercury vapour lamps and sodium	<ul style="list-style-type: none"> Physical reduction: <ul style="list-style-type: none"> 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 WMF. 	<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. Volume of waste exiting the WMF on adhoc basis.

lamps	<ul style="list-style-type: none"> ○ They must then be stored in weather-proof containers at the WMF. ○ Employees must wear the necessary PPE when crushing the lamps. 		
	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ The use of fluorescent tubes should be phased out and LED (light-emitting diodes) used throughout the mine. 	<ul style="list-style-type: none"> • - 	<ul style="list-style-type: none"> • Volume of wastes exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Crushed lamps must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of waste exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Crushed lamps must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of waste exiting the WMF on adhoc basis. •
Oil rags and oil filters	<ul style="list-style-type: none"> • Oil rags and oil filters must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of oil rags and filters exiting the WMF on adhoc basis.
Hazardous Waste: Non-Recyclable Hazardous Solids			
Material contaminated with oil, diesel or grease, empty oil/chemical containers	<ul style="list-style-type: none"> • The waste must exit the Red Area after security clearance and be taken to the WMF. • 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. • • Volume of waste exiting the WMF on adhoc basis.
Contaminated spillsorb	<ul style="list-style-type: none"> • The waste must exit the Red Area after security clearance and be taken to the WMF. • 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. 	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. • Volume of waste exiting the WMF on adhoc basis.
Contaminated soil not suitable for bioremediation due to levels of contamination	<ul style="list-style-type: none"> • The waste must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of waste exiting WMF on adhoc basis.
Sanitary waste generated in bathrooms and 'SHE' bins	<ul style="list-style-type: none"> • 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. • Volume of sanitary waste exiting the Mine on adhoc basis.
Empty chemical containers	<ul style="list-style-type: none"> • Procurement: <ul style="list-style-type: none"> ○ Buy chemicals in bulk wherever possible. ○ For example, IBC containers should be purchased instead of many small containers, e.g. 25 litre containers. 	-	
	<ul style="list-style-type: none"> • Physical reduction: <ul style="list-style-type: none"> ○ Containers must exit the Red Area after security clearance and be taken to the WMF. ○ Compact/compress empty containers in the WMF. 	Compactor/drum press.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of empty chemical containers exiting the WMF on adhoc basis.
	<ul style="list-style-type: none"> • Containers must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of empty chemical containers exiting the WMF on adhoc basis.
Chemical containers with redundant chemicals - Solid	<ul style="list-style-type: none"> • 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 	Chemicals register.	<ul style="list-style-type: none"> • Monitoring and Measurements sheet. • Waste manifest. • Volume of waste exiting the WMF on adhoc basis.

	determine if chemicals should be bought less often or in smaller quantities.		
	<ul style="list-style-type: none"> • Chemical containers with expired/redundant chemicals must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of waste exiting the WMF on adhoc basis.
Electronic waste	<ul style="list-style-type: none"> • Electronic waste must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of electronic wastes exiting the WMF on adhoc basis.
Incinerator ash	<ul style="list-style-type: none"> • Incinerator ash must exit the Red Area after security clearance and be taken to the WMF. • 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. • Volume of incinerator ash exiting the WMF an adhoc basis.

8.4 EDUCATION AND TRAINING

The objectives as defined by ISO14001:2004 are as follows:

8.4.1 Competence, Training and Awareness

- The organisation shall ensure that any person(s) performing tasks for it or on its behalf that have the potential to cause a significant environmental impact(s) identified by the organisation is (are) competent on the basis of appropriate education, training or experience, and shall retain associated records.
- The organisation shall identify training needs associated with its environmental aspects and its environmental management system. It shall provide training or take other action to meet these needs, and shall retain associated records.
- The organisation shall establish, implement and maintain a procedure(s) to make persons working for it or on its behalf aware of:
 - The importance of conformity with the environmental policy and procedures and with the requirements of the environmental management system;
 - The significant environmental aspects and related actual or potential impacts associated with their work, and the environmental benefits of improved personal performance;
 - Their roles and responsibilities in achieving conformity with the requirements of the environmental management system; and
 - The potential consequences of departure from specified procedures.

8.4.2 Revision

The responsible person will revise these environmental awareness procedures from time to time. The date of commencement of the revised procedure will always be indicated to prevent confusion.

Venetia Mine differentiates between two types of EMS-related training:

- awareness training; and
- competency training

Table 8.4 *Awareness and Competency Training*

Type	Description	Methodology	Applicability
AWARENESS TRAINING	Awareness training is not job-specific and is applicable to all employees, contractors and visitors within all employment levels on the mine. Awareness training addresses those issues regarding the EMS that are applicable to all employees, contractors and visitors towards maintaining a functional EMS.	Awareness training is implemented via the Venetia Mine Computer Based Training (CBT) Induction Programme.	All employees, contractors and visitors on mine within all employment levels.
COMPETENCY TRAINING	Competency training is job-specific training and is applicable to individuals as identified to be relevant for specific jobs, tasks or job descriptions.	Competency training shall be conducted by a competent person(s) related to a specific training need.	Selected employees and contractors across all employment levels of the workforce as identified to be relevant for specific jobs, tasks or job descriptions.

The identification of training needs associated training scheduling and training material / content for awareness and competency training are managed as documented in *Table 8.5*.

Table 8.5 Education and Training

Type	Criteria	Methodology	Responsibility	Records
AWARENESS TRAINING	Identification of training needs	The training needs for awareness training is determined by the environmental section and is communicated to the Skills Development Centre (SDC). The identification of training needs is determined by considering the requirements to implement a sustainable EMS as well as considering environmental risks and significant aspects applicable to the mine.	Senior Environmental Officer: Systems	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80
	Training material and content	Training material for awareness training (CBT induction programme) shall be developed by a competent person(s) knowledgeable of EMS requirements. The content shall be applicable to Venetia Mine and its employees, contractors and visitors. The content shall be such that the information is legible to all employees, contractors and visitors throughout the workforce.	Senior Environmental Officer: Systems	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80
COMPETENCY TRAINING	Identification of training needs	The training needs for competency training is determined by the environmental section and is communicated to the SDC and the Mine as per the EMS communication procedure (ENV-SP-07). The identification of training needs is determined by considering the requirements to implement a sustainable EMS as well as considering environmental risks and significant aspects applicable to specific sections / jobs. All departments and sections on mine shall populate the controlled training needs analysis template for all employees and contractors. The training needs analysis template shall be available in the departmental / section green files and shall be relevant and updated.	<p>Identification of courses / training needs:</p> <p>Senior Environmental Officer: Systems</p> <p>Identification of individuals eligible for competency training :</p> <p>Venetia mine supervisors and Senior Environmental Officer: Systems</p>	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80

	Training scheduling	Once all competency training has been identified for a section, the information shall be submitted to the SDC who, in collaboration with the Environment Section, will identify competent trainers and schedule the required training.	Business Partner: Technical Training Senior Environmental Officer: Systems	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80
	Training material and content	Training material for competency training shall be developed / provided by a competent person(s) knowledgeable in the relevant field related to a specific training content or need. The content shall be applicable to Venetia Mine and its employees / contractors. The content shall be such that the information is legible to all employees and contractors throughout the workforce.	Senior Environmental Officer: Systems	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80

The Table below documents the implementation of awareness and competency training programmes.

Table 8.6 Implementation of Training Programme

Type	Applicability	Methodology	Responsibility	Records
AWARENESS TRAINING	Visitors	All visitors shall complete the Venetia Mine visitor's induction prior to commencing with work activities.	Visitor host	Records to be retained according to procedure ENV-SP-12 and C-VE-HR-PR-6.80
	New employees and contractors (permanent and temporary)	All new employees and contractors shall complete Venetia Mine's general induction programme at the Venetia Mine SDC which includes applicable environmental awareness modules.	Business Partner: Technical Training	
		The general induction programme is scheduled simultaneously with the new employee or contractor medical examination.	HR: Business Partner	
		Awareness training evaluations are conducted after completing the induction modules. The new employee or contractor access cards will be blocked by the security department should schedule training not be attended or completed to ensure that follow up arrangements are made.	Skills Development Centre and Security Department	
	Existing employees and contractors (permanent and temporary)	All existing employees and contractors shall complete the refresher induction training at the Venetia Mine SDC which includes applicable revised environmental awareness modules as scheduled by the SDC and Wellness centre (every 1,2 or 3 years).	Employees, contractors and Skills Development Centre	
		The general induction programme is scheduled and communicated by the SDC for existing employees in line with the expiry of annual medical examination.	Business Partner: Technical Training	
		Awareness training evaluations are conducted after completing the induction modules. The existing employee or contractor access cards will be blocked by the security department should scheduled training not be attended or completed to ensure that follow up arrangements are made.	Skills Development Centre and Security Department	

In order to ensure the effective management of waste on the mine, every individual on the mine must take ownership of his/her responsibility in this regard. Once the waste management strategy (as per the Waste Management Optimisation Strategy and Programme, 2014) 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.

According to the Waste Management Optimisation Strategy and Programme (2014), which is attached as Annex A, training needs to be given to all stakeholders on the mine and 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 recognize 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; and
- Introduction to the reduction, re-use and recycling initiatives adopted by the mine.

The above specific training forms part of the Induction Training at Venetia.

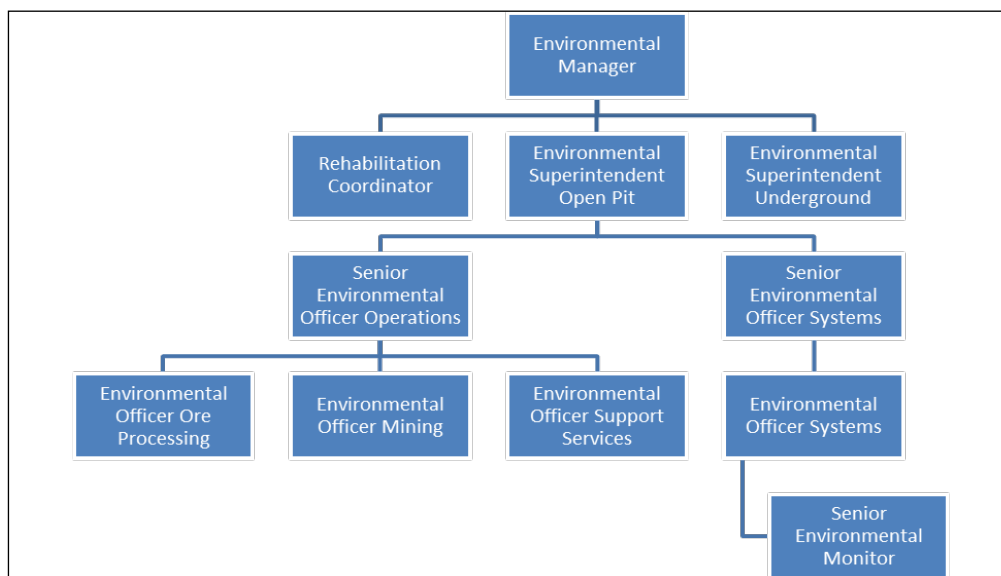
8.5

RESPONSIBILITY

The responsibility for overall implementation lies with the Environmental Manager of Venetia Mine.

Refer to Figure 8.2 for the Environmental Organisational Structure.

Figure 8.2 Environmental Organisational Structure



8.6 EMERGENCY RESPONSE

Environmental emergencies will be controlled as per the Emergency Preparedness and Response systems procedure (ENV-SP-09). Records required by this procedure will be controlled as per the Records and Control of Records procedure (ENV-SP-12); which is already in use by Venetia Mine. Records required by this procedure will be controlled as per the EMS Records and Control of Records procedure (ENV-SP-12).

9 **UNDERTAKING BY PROPONENT**

I _____ the undersigned, and duly authorised thereto by Venetia Mine, have studied and understand the contents of this document in its entirety and hereby duly undertake to adhere to the conditions as set out therein.

Signed at _____

this _____ day of _____, 2015

Applicant's name: _____

Designation: _____

Signature: _____

10 CONCLUSION

This EMP has been compiled in terms of the provisions of the NEMA, as amended and was undertaken to account for waste management activities proposed as per the Mine's revised waste management strategy.

This EMP comprehensively addresses potential impacts identified in the EIA with specific regard to the waste activities detailed herein and allows for continuous improvement through regular monitoring and reporting to IAP's and relevant spheres of Local, Provincial and National Government.

Future changes to the EMP due to site specific changes and developments will be addressed through an EMP amendment process. The development of this EMP was also subject to a comprehensive Stakeholder Engagement process and consideration of the views and concerns of those parties either directly or indirectly affected by the current mining activities at De Beers Venetia Mine, as well as the proposed additional developments.