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**ASSMANG (PTY) LTD BLACK
ROCK MINE OPERATIONS,
HOTAZEL, NORTHERN CAPE:**



BLACK ROCK MINE OPERATIONS

**ENVIRONMENTAL
MANAGEMENT PROGRAMME**

**[EXTRACT FOR CONSTRUCTION
CONTRACTORS]**

**Department of Mineral Resources:
NC 30/5/1/2/3/2/1/(203) MR**

19 September 2018

ENVIRONMENTAL MANAGEMENT PROGRAMME

ASSMANG (PTY) LTD BLACK ROCK MINE OPERATIONS, HOTAZEL, NORTHERN CAPE

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	DESCRIPTION OF PROCESS	2
2.1	BACKGROUND.....	2
2.2	SCOPE OF ACTIVITY	2
3	ENVIRONMENTAL MANAGEMENT PROGRAMME	4

LIST OF TABLES

Table 2-1:	Listed Activities that are triggered by the proposed expansion.....	2
Table 3-1:	General Requirements	4
Table 3-2:	Mitigation for Pre-construction, Planning and Design Phase	5
Table 3-3:	Construction Site Establishment and All Construction Activities	8
Table 3-4:	Heritage and Palaeontology	22
Table 3-5:	Civil- and Earthworks.....	23
Table 3-6:	Raw/Construction Material Stockpiles and Storage	24
Table 3-7:	Operation of all authorised activities.....	25
Table 3-8:	Ore Processing Plant	29
Table 3-9:	Manganese Product Stockpiles.....	30

1 INTRODUCTION

Assmang (Pty) Ltd mines manganese ore in the Black Rock area of the Kalahari, in the Northern Cape Province. The ore is mined from the Kalahari Manganese field. The Black Rock Mine Operations (BRMO) are approximately 80 kilometres (km) north-west of the town of Kuruman, in close proximity to the town of Hotazel.

In 1940, Assmang acquired a manganese ore outcrop on a small hillock known as Black Rock. Several large properties underlain by ore were subsequently found and acquired. Manganese ore mining operations were extended and today include 3 underground mining complexes:

- Gloria (commissioned in 1975) and producing medium grade carbonated ore
- Nchwaning II and Nchwaning III (commissioned in 1981 and 2004 respectively) and producing high grade oxide ore.

The manganese ores of the Kalahari Manganese field are contained within sediments of the Hotazel Formation of the Griqualand West

Sequence, a subdivision of the Proterozoic Transvaal Supergroup. The manganese ore bodies exhibit a complex mineralogy and more than

200 mineral species have been identified to date. The hydrothermal upgrading has resulted in a zoning of the orebody with regard to fault positions.

Distal areas exhibit more original and low-grade kutnohorite and braunite assemblages, while areas immediately adjacent to faults exhibit a very high-grade hausmannite ore. The intermediate areas exhibit a very complex mineralogy, which includes bixbyite, braunite and jacobsite amongst a host of other manganese-bearing minerals.

A similar type of zoning also exists in the vertical sense. At the top and bottom contacts it is common to have high iron (Fe) and low manganese (Mn) contents while the reverse is true towards the centre of the seam. This vertical zoning has given rise to a mining practice where only the centre portion of the seam is being mined. At the Gloria Mine the intensity of faulting is much less, which also explains the lower grade.

Two manganese seams are presently mined. The No. 1 seam is up to 6 metres (m) in thickness and approximately 400 m underground at Nchwaning II and 200 m underground at Gloria. No 2 seam is situated above No 1 seam and is accessed via the Nchwaning II mining infrastructure.

Appendix 1 Environmental Authorisation for BRMO's existing EMPr) will continue to manage the impacts at Gloria. As such this EMPr will not cover the operational, closure and or rehabilitation phases.

2 DESCRIPTION OF PROCESS

2.1 BACKGROUND

Mining has been undertaken since 1938, with the average grade of ore being approximately 42% manganese. The mine supplies high-grade manganese ore to both local and international markets. Only underground mining methods are presently utilised at BRMO. Black Rock Mine previously had open cast and underground operations, however these have ceased. The mining method for Gloria, as well as Nchwane II and III, is via underground bord and pillar methods, making use of trackless machines and underground conveyer systems. The mine has a projected maximum capacity of 6.3 mtpa.

Ore extraction activities are all undertaken below surface. There is no extraction of ore via opencast operations, with the exception of authorised borrow pits for construction purposes as part of on-going upgrades. Recovery of fines and low grade ore is also undertaken from surface stockpiles. The thickness of the mined seams in conjunction with underground crushing ensures that waste rock is not unnecessarily brought to surface. The ore is then further crushed, and separated into various grades which are stockpiled in preparation for transport off the site. Transport is via rail and road.

The general descriptions herein are intended to convey a broad understanding of the facilities and activities associated with the mining and proposed expansion. These descriptions are not exhaustive. It should be noted that infrastructure typical of such mining activities is encountered on the site which may not be covered in specific detail herein. These facilities and infrastructure are subject to repairs, general maintenance and upgrading in accordance with standard practices, and thus will be altered from time to time. Such infrastructure is within the footprint of existing, historical, and/or authorised activities.

2.2 SCOPE OF ACTIVITY

The proposed expansion at Gloria Mine proposes to upgrade BRMO ore handling and processing facilities and related infrastructure at the facility. The proposed upgrades will be undertaken within the existing disturbed footprint of the Gloria mine operations at Black Rock. The activities that will be triggered are set out in Table 2-1.

Table 2-1: Listed Activities that are triggered by the proposed expansion.			
NAME OF ACTIVITY	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution.	15ha (total footprint), however as large portions are linear activities the total area affected will be approximately 5ha.	Activity 34	Listing Notice 1 (GNR 983 of 2014 as amended by GN 327 of 2017).

The proposed expansion is set to include the construction of a new conveyor transporting ore from underground to the surface. Oversized rocks will be broken down into smaller sizes via a rock breaker and then transferred via new surface conveyors to Run of Mine (RoM) silos. The material from the RoM silos will then be crushed and screened using a newly installed crusher and wet screening and washing circuit. The underflow from the screening plant will then be pumped to a fines separation system. Treated water from the slimes, return water dam and vent shaft will be collected in an existing 1ML process water reservoir and will be augmented by the installation of tanks or reservoirs to increase capacity from 500m³ to 1000m³. Potable water storage will also be required to be expanded to take the current capacity from 100m³ to 200 m³.

3 ENVIRONMENTAL MANAGEMENT PROGRAMME

BRMO currently has an environmental authorisation for their existing EMPr that covers all mining operations at each of the three mines that include Black Rock, Nchwaning ii and Gloria.

Table 3-1: General Requirements					
Activity/Structure/Infrastructure	General requirements applicable to all phases of the authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Access to EMPr and permits	Awareness of the requirements of the EMPr and environmental permits	A copy of this EMPr (or relevant sections of it), and relevant environmental permits must be kept at the areas where the activity will be undertaken. These must be made available for inspection by any employee or contractor who works or undertakes work at the site.	All persons must have practical access to the EMPr and environmental permits relevant to their work/activities.	Environmental Officer	Continuous
Changing Circumstances	New legislation and updates of existing legislation	Where new legislation gazetted, or existing legislation is updated, and the new provisions are in conflict with the stipulations of the legislation, the legislation will take precedence unless otherwise indicated in the relevant transitional arrangements.	Compliance with current legislation at all times.	Environmental Specialist	Continuous
	Significant changes in planned or operational circumstances require that the EMPr be updated.	The competent authority must be informed of any significant changes to the activity descriptions, the proponent's details, or the EMPr.	The approved EMPr is kept up to date at all times	Environmental Specialist	Continuous

Table 3-1: General Requirements

Activity/Structure/Infrastructure	General requirements applicable to all phases of the authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Reporting and control of Environmental incidents	Reporting and control of Environmental incidents occurring on the site	<p>NEMA defines "incident" as an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property;</p> <p>The NWA defines an emergency incident as any incident or accident in which a substance –(a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.</p> <p>All incidents must be managed and reported as per the requirements of S30 of NEMA, and/or S20 of the NWA as applicable.</p>		Environmental Specialist	As soon as reasonably practicable after obtaining knowledge of the incident, Preferably within 24 hours.

Table 3-2: Mitigation for Pre-construction, Planning and Design Phase

ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	RESPONSIBILITY	DATE/FREQUENCY
1. Project Planning & Design Phase				
1.1 Management (Set-up structures and procedures for implementation of EMPr)	Review and update the EMPr after detailed design has been completed	The EMPr must be reviewed after completion of detailed design. If necessary this EMPr must be updated to ensure that it is relevant to the detailed design of all applicable site structures, supporting infrastructure and activities.	Environmental Specialist	Once-off prior to commencement
	Inform the competent authority	The competent authority must be informed of any significant changes to the project description or the EMPr	Internal Environmental Officer	As required

Table 3-2: Mitigation for Pre-construction, Planning and Design Phase				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	RESPONSIBILITY	DATE/FREQUENCY
	Update the EMPr to be congruent with the requirements of the DMR EMPr approval, and other relevant environmental permits.	This EMPr must be updated to ensure that the conditions of relevant approvals, licences and authorisations issued for this project are not in conflict with the EMPr.	Environmental Specialist and Internal Environmental Officer	Biennial
	Appointment and duties of Environmental Control Officer	The project proponent must appoint an independent Environmental Control Officer who must audit compliance with the EMPr during the construction phase for mine expansion and the sinter plant complex.	Environmental Specialist	Once-off prior to commencement
	Management of staff and contractors	The EMPr must be made binding to contractors and should be included in tender documentation for the contract.	Environmental Specialist	Once-off before contractor appointments
1.2 Training	Training of staff and contractors	Contractors and staff must be properly trained in all environmental aspects relating to their role in the project's construction and operation, as per requirements of the associated environmental awareness plan.	Internal Environmental Officer	Once-off prior to commencement & update as required
1.3 Legal Compliance	Environmental Authorisation	Obtain environmental authorisation, in terms of the National Environmental Management Act (107 of 1998), where activities listed in terms of Chapter 5 of the Act are triggered and not otherwise authorised.	Environmental Specialist with support of Internal	Once-off prior to commencement of listed activities
	Waste Management Licence	Obtain a Waste Management Licence in terms of the National Environmental Management: Waste Act (59 of 2008) where activities listed in terms of S19 of the act are triggered and not otherwise authorised.	Environmental Specialist with support of Internal Environmental	Once-off prior to commencement of listed activities
	Emissions to Air	Obtain an Atmospheric Emission Licence (AEL), in terms of the National Environment Management: Air Quality Act (39 Of 2004), from NCDENC for the operation of the sinter plant	Environmental Specialist with support of Internal Environmental Officer	Once-off prior to operation of the sinter plant

Table 3-2: Mitigation for Pre-construction, Planning and Design Phase				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	RESPONSIBILITY	DATE/FREQUENCY
	Removal/destruction of protected floral species	Permits applicable to the removal, relocation or destruction of protected plants must be obtained prior to undertaking any such activity.	Environmental Specialist with support of Internal Environmental Officer	Prior to removal
	Identify requirements for other environmental permitting	Identify the need for any other environmental permits and obtain these as required.	Environmental Specialist with support of Internal Environmental Officer and Environmental	As per legislated requirement
	Waste handling and storage	Facilities for the storage and hazardous waste must be incorporated into the project design to ensure that all hazardous waste will be handled and stored in compliance with the NEMWA National Norms and Standards for the Storage of Waste GN 926: 2013, or superseding equivalent.	Environmental Specialist	Once-off prior to commencement
1.4 Design specifications	Design processes and activities to meet requirements of the EMP and environmental permits	Design engineers and contractors must be informed of the required minimum standards as may be stipulated in permits relevant to the processes and activities they are designing such that these can be incorporated in the design.	Environmental Specialist	Prior to commencement of design where relevant

Table 3-3: Construction Site Establishment and All Construction Activities

Table 3-3: Construction Site Establishment and All Construction Activities					
Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Ambient air	Management of dust generation from unpaved surfaces subject to vehicle movement.	A dust palliative with at least 80% dust reduction efficiency must be applied to unpaved roads (See Appendix 5 for alternative palliative options). Roads paved with low grade ore or aggregate shall be considered as being paved.	National dust outfall standards are complied with. National ambient air quality standards are complied with.	Production manager, Contractors	Application as necessary to meet target on an on-going basis, or as per the manufacturer's instructions where applicable.
	Burning of waste.	Waste shall not be burnt unless in a waste management facility, or other facility, licenced for that purpose. Evidence of lawful disposal all wastes steams generated must be maintained.	No unlawful burning of waste on the site.	All personnel and Contractors	Continuous
Surface water, soil and Ground water	Management of ablutions.	Contractor/s must provide appropriate (capacity/effective containment of grey and black water), ablution/sanitary arrangements for employees, and maintain/service such for the duration of their sites activities in accordance with the MHSA as a minimum. Mobile facilities must be inspected on a daily basis for leaks and cleanliness, and emptied at frequency adequate to prevent overflow. Septic tank must be emptied at a frequency sufficient to prevent overflow. Caution must be taken to prevent leaks or spills during emptying of septic tanks. In the event of spill residue must be removed and the affected area must be treated with lime.	No contact between black/grey water and site soils. No offensive odours emanating from ablution facilities.	Contractors	Once-off, with maintenance thereafter as per specification of the equipment/service provider
	Concrete batching activities Storage of fuel, oil and other hazardous chemical substances.	Concrete preparation (i.e. including mixing) and batching must take place on durable, impermeable, bunded surfaces	No contact between contaminated water, cement powder, or cement additives, and site soils.	Contractor	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/ Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		Run-off from preparation (i.e. including mixing) activities must be effectively contained and prevented from entering the natural environment (i.e. soils, surface water, and groundwater).	No contact between potentially contaminated run-off and site soils or surface water.	Contractor	Continuous
		No underground (i.e. buried) fuel tanks may be established as part of the construction activities sites or anywhere else on site during construction, or operation.	No underground fuel tanks established on site	Proponent, Contractor	Continuous
		Bunded facilities must be compliant with specifications of the BRMO Spill Management and Specifications for Bund Walls procedure, as appended	Compliance with the BRMO bund specifications.	Engineering manager	Once-off
		Above ground fuel, or oil storage tanks, must be located within appropriately sized, impermeable, bunding that is constructed in accordance with BRMOs spill management procedure. Decanting must be undertaken within the bunded area or on an impermeable surface for this purpose.	All spillable hazardous substances stored in adequate bunds.	all persons storing and handling such substances	Continuous.
		Appropriate spill management kits must be kept and maintained on site wherever liquid hazardous materials are stored, and where refuelling and/or servicing of plant, vehicles and machinery takes place, in order to manage potential spillages effectively.	Spill management kits available on site and replenished as necessary.	All relevant supervisors	Continuous
		Training, in the use and maintenance of the abovementioned kits, as well as any contaminated waste products, must be provided to ALL staff either directly or indirectly involved in any of the activities identified above.	All relevant personnel trained. Records of training maintained.	All relevant supervisors	Once-off, with annual refresher training every year thereafter

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/ Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		Hazardous chemical containers must be stored within appropriately constructed bunds. Inspection of containers' integrity must be undertaken regularly, and compromised containers must be replaced.	Bund wall capacity sized to at least 110% of the volume of the largest chemical container stored therein.	All relevant supervisors	Continuous.
		Sorbents and contaminated soil must be immediately collected and placed within a water-tight, skip/container for subsequent disposal or treatment at an appropriately licensed hazardous waste management facility.	Appropriate skips/containers on site. Contents removed to appropriate facility. Safe disposal records available.	All relevant supervisors; Internal Environmental Officer to keep	Continuous
	Undesirable impacts resulting from vehicle/plant workshops and wash bays	All servicing of plant and vehicles is to take place strictly within dedicated workshops within construction site/s, or otherwise off-site at appropriate maintenance facilities.	No servicing of plant or vehicles outside of dedicated workshop areas	Engineering Manager, Contractors	Continuous
		Furthermore, servicing and maintenance of plant and vehicles must take place on impermeable surfaces with appropriate measures in place to contain contaminated run-off. Impermeable surfaces must be maintained.	Impermeable, platforms established for the servicing of vehicles and plant within the construction site/s	engineering Manager, Contractors	Continuous
		Where emergency/unplanned repairs are required during construction activities, or oil leaks are identified, suitable drip trays must be used to prevent contamination of soil and water.	Drip trays used for all leaks and in-situ repairs.	Engineering Manager, Contractors	
		Uncontaminated storm water run-off within the sites must be prevented from flowing through workshops and wash bays or any other contaminated areas.	Appropriate storm water management measures implemented, such that the generation of potentially contaminated surface water run-off is avoided	Engineering Manager, Contractors	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		Potentially contaminated water must be effectively diverted, contained and managed, such that no contaminants are ever in contact with site soils	No contact between potentially contaminated water and site soils or storm water systems	Engineering Manager, Contractors	Continuous
	Diminished ground water quality through poor waste management practices	Waste oil generated from vehicle workshops/drip trays must be immediately stored in sealable, water-tight, steel drums or containers within a bunded facility for subsequent removal from site for either recovery, or disposal thereof	Waste oil storage area/s appropriately bunded. Safe disposal/management certificates on record for all oil removed from site	Engineering Manager, Contractors	Once-off bund establishment. Continuous requirement for storage of waste oil.
		Waste oil storage areas may only be placed within relevant construction/contractor's sites, and BRMO workshop areas, before being moved to the BRMO hazardous waste storage area or direct removal by an appropriate waste removal or recycling company.	No waste oil storage outside of any dedicated contractor's sites, or BRMO workshop areas.	Engineering Manager, Contractors	Continuous
	Undesirable impacts due to inappropriate waste management	Sufficient, water-tight, skips/containers on site for the <u>separate</u> storage of general (including steel, rubble and other non-contaminated waste) and hazardous waste.	Sufficient skips provided for. No mixing of general and hazardous waste streams. No overflowing skips.	Engineering Manager, Contractors	Once-off
		Under no circumstances must waste be stored on site anywhere but in the appropriate skips/containers provided for such.	No waste storage or disposal on bare soil surfaces.	All	Continuous
		Waste skips/containers must be cleared when full, such that waste doesn't over-flow onto adjacent ground	No evidence of full, or over-flowing, waste skips/ins	Site supervisors.	Continuous
	Waste storage and handling	Waste management	Records of safe disposal must be obtained, and kept on file, for all waste removed from site; where the waste management facility/contractor used for such purposes must be appropriately licensed/permitted for such.	Records of safe disposal/management certificates kept on record	Internal Environmental Officer

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/ Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		The area supervisor is responsible for ensuring that wind-blown litter is collected from the sites on a daily basis.	No evidence of wind-blown litter. Records of daily collections/inspections kept on record.	Site supervisors, Internal Environmental Officer	Continuous
	Soil contamination through contact with waste material/s	Waste must not be temporarily stored on bare soil surfaces; <u>Except</u> where: <ul style="list-style-type: none"> ✓ The waste is regarded as being 'inert' (e.g. waste bricks, un-contaminated steel scrap, etc.), in terms of the definition provided for in the National Environmental Management: Waste Act (59 of 2008); ✓ The waste will be removed from site within 30 days of the generation thereof; and ✓ No component of the waste is susceptible to dispersal by wind 	No contact between site soils and potential contaminants in construction waste/s	All	Continuous
		Skips/containers must, therefore, be clearly marked for purpose	Waste skips clearly marked for applicable waste types to be discarded therein	Site supervisors,	Once-off
		Safe disposal/management certificates must be obtained for all waste removed from site	Safe disposal/management certificates kept on record	Site supervisors, Internal Environmental Officer	Continuous, for every incidence of waste removal from site
	Waste Disposal	Waste may only be taken to appropriately licensed/permitted waste management facilities.	Proof of facility licensing and waste manifests kept on record	Site supervisors, Internal Environmental Officer	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

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Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		Waste skip/container collection and replenishment schedules must be developed and managed pro-actively by the supervisors, in order to ensure that no skips/containers are left full and/or over-flowing for any extended period of time and that there is always appropriate temporary waste storage capacity on site	Temporary waste storage capacity available to the contractor/s	Site supervisors, Internal Environmental Officer	Continuous. No skip left full on site for more than a week.
	Unsustainable use of natural resources and unnecessary landfill airspace utilisation	Contractors will be required to provide a method statement specific to waste minimisation, reuse, recovery and recycling, as well as temporary storage and disposal; where such plans would need to be signed off by competent site environmental personnel/environmental control officer (Environmental Control Officer) prior to the start of construction activities.	Approved method statement/s on record	Site supervisors,	Once-off, prior to commencement
Surface water	Surface storm water contamination through contact with waste material/s	Surface storm water run-off must not be able to flow through any waste storage areas. Nor should skips/containers, or waste storage areas, be positioned where surface water may pond or flow preferentially during rainfall events	No contact between construction waste and surface water	Site supervisors,	Continuous
Biodiversity	Reduced biodiversity due to construction site/s establishment in green-field areas	Construction sites may only be established within the anticipated development footprints of the proposed project. E.g. proposed product stockpile floors.	No vegetation cleared, that will not already require clearing as part of the approved project.	Project Manager	Once-off
	Poaching/killing of indigenous site fauna	The poaching, or killing, of indigenous site fauna is prohibited.	No harm to indigenous site fauna. Records kept on file of applicable training by contractor.	All Records kept by site supervisor or Internal Environmental Officer	Continuous.: Once-off training, with annual refreshers every year thereafter

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/ Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
	Destruction of site flora through unauthorised 'harvesting' thereof	Under no circumstances are wood, or medicinal plants, to be 'harvested' without an appropriate permit or licence.	No destruction/'harvesting' indigenous site flora.	All Records kept by site supervisor or Internal Environment al Officer	Continuous: Once-off training, with annual refreshers every year thereafter
	Anthropogenic veld fires resulting in biodiversity loss	If open fires (i.e. not contained in a brazier or equipment designed for that purpose), for the purposes of cooking, are to be tolerated within the construction site/s, the following conditions are to apply: <ul style="list-style-type: none"> ✓ Must be well removed from fuel and hazardous material storage areas, in line with appropriate BRMO safety standards; ✓ Must be well removed from indigenous vegetation (at least 15m); ✓ Fire-extinguisher must be readily available; ✓ Must be screened from wind with non-flammable material/s; and ✓ Non-smouldering ash residues must be disposed of in general waste skip/s, or containers, on site. 	Well managed, clearly designated, area/s established for cooking fires.	Site supervisor	Continuous
	Infestation and propagation of alien invasive species	Contractors must ensure that alien invasive species within the bounds of their sites are managed in accordance with relevant provisions of the BRMO alien invasive species management plan (Appendix 10)	No alien invasive floral species infestation within sites	Site supervisors	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Table 3-3: Construction Site Establishment and All Construction Activities					
Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		All relevant personnel and contractors to receive training in regard to the above requirements.	Copy of BRMO alien invasive species management plan provided to contractor/s. Records available of relevant training	Internal Environmental Officer	Once-off
Socio- economics	Social impacts stemming from an influx of contractors and associated employees.	Only contractor/s and his/her employees, or sub-contractors, may be housed within, or gain access to the construction site/s and housing facilities.	Controlled access to sites	Security manager, Contractor	Continuous
		Access by the contractor and his/her employees to adjacent farms (i.e. other than those falling within the ambit of the project) is strictly forbidden; unless otherwise agreed upon, in writing, by the relevant landowner/s.	No trespassing	Contractor	Continuous
		The enhancement of benefits associated with the effects on employment lie in the potential to increase the employment opportunities for local communities in the JT Gaetsewe DM and supporting more jobs through the procurement of local goods than imported materials and inputs where feasible. In this	Maximum feasible procurement of local goods and services during the construction period	Project manager, Contractor	Continuous
		The negative impact on housing and service delivery provision pressures could be reduced by sourcing the majority of construction workers from local communities, thus reducing the need to bring new people into the local area.	Use of local labour sourced from the district to the greatest extent practical	Project manager, Contractor	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Table 3-3: Construction Site Establishment and All Construction Activities					
Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Topography	Soil erosion resulting from the creation of steep, unnatural, slopes	No slopes with gradient > 33° (i.e. 3H:1V) should be established on site; unless otherwise protected from erosion by appropriate storm water management measures, or slope stabilisation/re-vegetation	No visible erosion	Project Manager, Contractor	Continuous
Noise and Vibration	Increased ambient noise levels resulting from heavy vehicle operation during vegetation stripping	Vegetation and topsoil stripping to only be undertaken between 7:00am and 5:00pm.	No 'noisy' construction activities outside of stipulated work hours	Project Manager, Contractor	Continuous
		In terms of noise impact for various increases over the ambient, the National Noise Regulations define an increase of 7 dBA as "disturbing". Noise levels during construction must, therefore, be kept within 7 dBA of the baseline data at sensitive receptors.	Once off baseline noise monitoring must be undertaken. Monitoring must be undertaken should a noise complaint be received.	Environmental Specialist	Continuous.
	Noise complaints	Should noise complaints be received then the source of the noise causing the disturbance must be investigated and measures to reduce the noise level must be considered and implemented. Subsequent follow-up with the complainant must be undertaken to confirm elimination of the problem.	Investigation within 1 week of complaint. Rectification with 2 weeks or as soon as practical.	Environmental Specialist	Continuous.
	Nuisance and potential property damage resulting from vibration and air over pressure increases associated with blasting	Ground level vibrations resulting from blasting activities should not exceed 10 m/s beyond the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/ Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		Air over pressure from blasting activities should not exceed 134 dB at the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous
		No surface blasting to take place during windy conditions	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous
		Ground level vibrations resulting from blasting activities should not exceed 10 m/s beyond the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Proponent, Contractor	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Biodiversity	Anthropogenic veld fires resulting in biodiversity loss	<p>If open fires (i.e. not contained in a brazier or equipment designed for that purpose), for the purposes of cooking, are to be tolerated within the construction site/s, the following conditions are to apply:</p> <ul style="list-style-type: none"> ✓ Must be well removed from fuel and hazardous material storage areas, in line with appropriate BRMO safety standards; ✓ Must be well removed from indigenous vegetation (at least 15m); ✓ Fire-extinguisher must be readily available; ✓ Must be screened from wind with non-flammable material/s; and ✓ Non-smouldering ash residues must be disposed of in general waste skip/s, or containers, on site. 	Well managed, clearly designated, area/s established for cooking fires.	Site supervisor	Continuous
	Infestation and propagation of alien invasive species	Contractors must ensure that alien invasive species within the bounds of their sites are managed in accordance with relevant provisions of the BRMO alien invasive species management plan (Appendix 10)	No alien invasive floral species infestation within sites	Site supervisors	Continuous
		All relevant personnel and contractors to receive training in regard to the above requirements.	Copy of BRMO alien invasive species management plan provided to contractor/s. Records available of relevant training	Internal Environmental Officer	Once-off

Table 3-3: Construction Site Establishment and All Construction Activities

Table 3-3: Construction Site Establishment and All Construction Activities					
Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Socio- economics	Social impacts stemming from an influx of contractors and associated employees.	Only contractor/s and his/her employees, or sub-contractors, may be housed within, or gain access to the construction site/s and housing facilities.	Controlled access to sites	Security manager, Contractor	Continuous
		Access by the contractor and his/her employees to adjacent farms (i.e. other than those falling within the ambit of the project) is strictly forbidden; unless otherwise agreed upon, in writing, by the relevant landowner/s.	No trespassing	Contractor	Continuous
		The enhancement of benefits associated with the effects on employment lie in the potential to increase the employment opportunities for local communities in the JT Gaetsewe DM and supporting more jobs through the procurement of local goods than imported materials and inputs where feasible. In this context, the following should be considered, where possible: <ul style="list-style-type: none"> ✓ Employ labour-intensive methods in construction, where economically feasible; ✓ Employ local residents and communities, where possible; Sub-contract to local construction companies (in the JT Gaetsewe DM), where feasible; and utilise local suppliers, where feasible.	Maximum feasible procurement of local goods and services during the construction period	Project manager, Contractor	Continuous

Table 3-3: Construction Site Establishment and All Construction Activities

Table 3-3: Construction Site Establishment and All Construction Activities					
Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
		The negative impact on housing and service delivery provision pressures could be reduced by sourcing the majority of construction workers from local communities, thus reducing the need to bring new people into the local area.	Use of local labour sourced from the district to the greatest extent practical	Project manager, Contractor	Continuous
Topography	Soil erosion resulting from the creation of steep, unnatural, slopes	No slopes with gradient > 33° (i.e. 3H:1V) should be established on site; unless otherwise protected from erosion by appropriate storm water management measures, or slope stabilisation/re-vegetation	No visible erosion	Project Manager, Contractor	Continuous
Noise and Vibration	Increased ambient noise levels resulting from heavy vehicle operation during vegetation stripping	Vegetation and topsoil stripping to only be undertaken between 7:00am and 5:00pm.	No 'noisy' construction activities outside of stipulated work hours	Project Manager, Contractor	Continuous
		In terms of noise impact for various increases over the ambient, the National Noise Regulations define an increase of 7 dBA as "disturbing". Noise levels during construction must, therefore, be kept within 7 dBA of the baseline data at sensitive receptors.	Once off baseline noise monitoring must be undertaken. Monitoring should be undertaken should a noise complaint be received.	Environmental Specialist	Continuous.
Noise	Noise complaints	Should noise complaints be received then the source of the noise causing the disturbance must be investigated and measures to reduce the noise level must be considered and implemented. Subsequent follow-up with the complainant must be undertaken to confirm elimination of the problem.	Investigation within 1 week of complaint. Rectification within 2 weeks or as soon as practical.	Environmental Specialist	Continuous.

Table 3-3: Construction Site Establishment and All Construction Activities

Activity/Structure/Infrastructure	Establishment of temporary construction site facilities (Including administrative offices, ablution facilities, fuel storage, concrete/cement batching, vehicle workshops/wash bays, sleeping quarters and raw/construction material storage).				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
	Nuisance and potential property damage resulting from vibration and air over pressure increases associated with blasting	Ground level vibrations resulting from blasting activities should not exceed 10 m/s beyond the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous
		Air over pressure from blasting activities should not exceed 134 dB at the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous
		No surface blasting to take place during windy conditions	Compliance with USA Bureau of Mine Standards RU 8507	Project Manager	Continuous
		Ground level vibrations resulting from blasting activities should not exceed 10 m/s beyond the mine boundary	Compliance with USA Bureau of Mine Standards RU 8507	Proponent, Contractor	Continuous

Table 3-4: Heritage and Palaeontology

Activity/Structure/Infrastructure	The construction must comply with the conditions set out by SAHRA (South African Heritage Resource Agency)				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME-FRAME/FREQUENCY
Training and Awareness	Intercepting of stromatolites	The developer and the ECO must be made aware of the possible presence of stromatolites in the pre-Kalahari Formations and if recorded a palaeontologist must be informed, and appropriate actions taken in the event of future mining of the stratigraphic units.	Ensure that stromatolites are identified and preserved	Environmental Specialist	Continuous
		The ECO should study the photographs of stromatolites to familiarise him/herself with these structures to be able to identify them should they come across them;	Ensure that stromatolites are identified and preserved	Environmental Specialist	Continuous
Heritage/ Archaeological Finds	Intercepting of archaeological sites	If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted.	Ensure that archaeological sites are identified and preserved	Environmental Specialist	Continuous
	Intercepting of burial grounds	If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;	Ensure that burial grounds are identified and preserved	Environmental Specialist	Continuous
Burial Grounds and Graves Located	If unmarked human burials are Uncovered	Contact SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490)	Upon discovery of burial sites or graves	Environmental Specialist	Immediately
Submission to SAHRA	Confirmation of SAHRA's requirements incorporated in EMP	The Final EIR and EMP must be submitted to SAHRA for record purposes;	Submission to SAHRA	EAP	Upon finalisation of EMP

Table 3-5: Civil- and Earthworks					
Activity/Structure/Infrastructure	Establishment of structural and infrastructural foundations/founding conditions and associated, operational, compacted working 'floors'				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Topography	Soil erosion resulting from the creation of steep, unnatural, slopes	No slopes with gradient >33° (i.e. 3H:1V) should be established on site; unless otherwise protected from erosion by appropriate storm water management measures, or slope stabilisation/re-vegetation	No slopes >33°	Project Manager, Contractor	Continuous
Surface water	Generation of contaminated surface storm water flows during the operational phase of the project	Provision must be for the diversion of 'clean' storm water run-off away from or around potentially contaminated working surfaces	Appropriate storm water management infrastructure installed on site	Project Manager	Once-off, prior to commencement of operational activities
		Provision must be made for the diversion, and appropriate containment of 'dirty' storm water run-off generated within potentially contaminated mine works areas.	Appropriate storm water management infrastructure installed on site	Project Manager	Once-off, prior to commencement of operational activities
		All 'dirty' storm water containment dams must be lined with a durable, impermeable, liner system as required in the BRMO IWWMP (e.g. HDPE liner), such that 'dirty/potentially contaminated' storm water is effectively contained for ultimate return to the process water circuit.	Appropriate storm water management infrastructure installed on site	Project Manager	Once-off, prior to commencement of operational activities
		All civil- and earth work must ensure that no surface ponding of storm water ultimately occurs at the operational mine works areas	No surface ponding of rain/storm water	Project Manager, Contractor	Once-off, prior to commencement of operational activities
Biodiversity	Biodiversity loss through destruction of natural habitat	Civil- and earth works may only proceed where vegetation- and topsoil stripping have been effected in compliance with the provisions of the EMPr	No extension of the development footprint beyond that approved in terms of this EMPr addendum	Project Manager, Contractor	Continuous

Table 3-6: Raw/Construction Material Stockpiles and Storage

Activity/Structure/Infrastructure	Storage of raw/construction materials on site during the construction phase				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Topography	Alteration of site topography, such that preferential storm water flows, or sensitive ecological features, are disrupted/disturbed	Raw/construction material storage areas and stockpiles may not be established within 32 m of any prominent drainage lines on site. Nor within the buffer zone and delineated wetland/riparian zone of the Gamagara River, or within 100 m of the Gamagara river	No disturbances to prominent drainage lines. No construction activities within the Gamagara River and associated buffer zones (other than those authorised as part of railway bridge construction)	Project manager	Continuous
Biodiversity	Biodiversity loss through unnecessary habitat destruction	Raw/construction material storage may only take place within the development footprints of project structures and infrastructure, or designated construction site/s	No storage of materials in 'green-field' areas	Project Manager, Contractor	Continuous
Soils	Soil contamination through inappropriate storage of hazardous construction materials	Where daily quotas/stocks of hazardous materials are to be stored outside of the construction site/s, the materials must be stored such that there is no contact between the material and site soils	No soil contamination.	Project Manager, Contractor	Continuous

Table 3-7: Operation of all authorised activities

Operation of all authorised activities					
Activity/Structure/Infrastructure	Operation of all authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Resource Preservation	Waste Minimisation and Recycling	Waste generated on the site must be separated at sources into recyclable categories and non-recyclables.	All waste generated is separated at source.	All	Continuous
		Waste must be recovered, recycled and reused to the greatest practical extent.	Maximum practical recovery, recycling and re-use of waste.	All	Continuous
	Water use optimisation	Water abstraction, use and disposal must be monitored and BRMO must set targets and implement plans for optimisation of water used per tonne of product.	Continuous improvement of water use.	Environmental Specialist, Engineering Manager and Production Manager.	Continuous, Annual review.
	Energy Management	Electricity and fuel use must be monitored and energy improvement plans must be developed and implemented for optimisation of energy used per tonne of product.	Continuous improvement in energy efficiency.	Environmental Specialist, Engineering Manager and Production Manager.	Continuous, Annual review.
Waste Management	Accumulation and Storage of Waste	All areas where waste is generated must have suitable receptacles for source accumulation of separated waste.	All waste is accumulated in appropriate receptacles	All supervisors	Continuous
		Waste must be stored in accordance with the requirements of the National Norms and Standards for storage of waste	Compliance with the norms and standards	Internal Environmental Officer	Continuous
		All waste that must be treated and/or disposed of, must be treated and/or disposed at suitably licenced facilities.	Treatment and/or disposal at licenced facilities	Internal Environmental Officer	Continuous

Table 3-7: Operation of all authorised activities					
Activity/Structure/Infrastructure	Operation of all authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
	BRMO Landfill	The landfill must be managed in accordance with its Waste Management Licence.	Compliance with WML	Internal Environmental Officer	Continuous
Air Quality	Degraded ambient air quality resulting from operations.	National limits for ambient air quality, in terms of those published in Government Notice No. 1210 of 24 December 2009, in terms of S9(1) of NEMAQA, must be met by the proponent	Compliance with National ambient air quality limits/standards	Environmental Specialist	Continuous
		Cumulative dust deposition target thresholds, in terms of SANS 1292, 2009/11/17, at the BRMO site boundary must be met	Less than 600 mg/m ² /day at the BRMO Mine boundary – 30 day average	Environmental Specialist	Continuous
		Where the above standards are not met, the cause of this non-compliance must be investigated and subsequent corrective and preventative action must be implemented.	Causes for exceedances of the standards are determined and resolved.	Internal Environmental Officer to investigate. Responsible departmental manager to resolve.	Continuous
	Management of dust generation from unpaved surfaces subject to vehicle movement.	A dust palliative with at least 80% dust reduction efficiency must be applied to unpaved roads (See Appendix 5 for alternative palliative options). Roads paved with low grade ore or aggregate shall be considered as being paved.	National dust outfall standards are complied with. National ambient air quality standards are complied with.	Production manager,	Application as necessary to meet target on an on-going basis, or as per the manufacturer's instructions where applicable.
	Burning of waste.	Waste shall not be burnt unless in a waste management facility, or other facility, licenced for that purpose.	No unlawful burning of waste on the site.	All personnel Internal Environmental	Continuous

Table 3-7: Operation of all authorised activities

Operation of all authorised activities					
Activity/Structure/Infrastructure	Operation of all authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Record Keeping	Disposal Certificates	Evidence of lawful disposal all wastes steams generated must be maintained.		Officer to keep records.	
Surface Water, Soil and Ground Water	Storage of fuel, lubricants and other hazardous chemical substances.	Bunded facilities must be compliant with specifications of the BRMO Spill Management and Specifications for Bund Walls procedure, as appended	Compliance with the BRMO bund specifications.	Engineering manager	Once-off
		All liquid (including sludges and slurries) hazardous substances (including wastes) must be stored within bunded facilities.	All spillable hazardous substances stored in adequate bunds.	All persons storing and handling such substances	Continuous.
		Appropriate spill management kits must be kept and maintained on site wherever liquid hazardous materials are stored, and where refuelling and/or servicing of plant, vehicles and machinery takes place, in order to manage potential spillages effectively.	Spill management kits available on site and replenished as necessary.	All relevant supervisors	Continuous
		Training, in the use and maintenance of the abovementioned kits, as well as any contaminated waste products, must be provided to ALL staff either directly or indirectly involved in any of the activities identified above.	All relevant personnel trained. Records of training maintained.	All relevant supervisors	Once-off, with annual refresher training every year thereafter
		Sorbents and contaminated soil must be immediately collected and placed within a water-tight, skip/container for subsequent disposal or treatment at an appropriately licensed hazardous waste management facility.	Appropriate skips/containers on site. Contents removed to appropriate facility. Safe disposal records available.	All relevant supervisors. Internal Environmental Officer to keep records.	Continuous
	Equipment storage and maintenance	All equipment (e.g. gear boxes, portable generators) which may leak oil, liquid fuels, or hazardous chemical substances must be located on impermeable bases which can contain leaks or must have appropriately sized drip trays.	No contamination of soil or surface water from leaking equipment.	Relevant Foremen and artisans	Continuous

Table 3-7: Operation of all authorised activities					
Activity/Structure/Infrastructure	Operation of all authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
	Separation of clean and dirty water	Where storm water flow paths are identified, storm water management infrastructure must be installed (i.e. cut-off trenches, diversion berms, silt traps, etc.).	Records kept of required inspections, as well as any maintenance applied	Engineering manager	Continuous
Stormwater	Stormwater Management	Storm water management infrastructure must be regularly inspected and maintenance applied as necessary to ensure the efficient functioning thereof.	Records kept of required inspections, as well as any maintenance applied	Internal Environmental Officer – Inspections Engineering manager – Maintenance	Fort-nightly (October – March), monthly (April – September)
Noise	Increased ambient noise levels associated with operation	Noise caused by operations must not cause a nuisance. Any environmental noise complaints reported must be investigated and appropriate corrective and/or preventative action taken.	Compliance with SANS 10103 of 2008 and the ECA Noise regulations	Internal Environmental Officer – Investigation Relevant department manager – corrective and preventative actions	Continuous

Table 3-7: Operation of all authorised activities					
Activity/Structure/Infrastructure	Operation of all authorised activities				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Biodiversity	Alien invasive species infestation and point of propagation, leading to biodiversity loss on site	The potential presence of alien invasive species on, and adjacent to the operational sites must be monitored and appropriately managed, in accordance with the BRMO alien invasive species management plan (Appendix 10)	No evidence of alien invasive species occurrence within the vicinity of the TSF. Records kept of any remediation effected at the site (i.e. problematic species, nature of remedial efforts, date and party who effected remedial solution)	Internal Environmental Officer	Continuous
		The use of herbicides on site must be undertaken according to the BRMO environmental procedure for the use of herbicides, and in accordance with the manufacturers' instructions.	Compliance with applicable operational procedure	Environmental Specialist	Continuous
Preparation for Rehabilitation	Ensure adequacy of soil for rehabilitation	Current topsoil stockpile volumes at the time of updating the EMP are insufficient for rehabilitation of the entire disturbed area. BRMO must therefore undertake an assessment of subsoils for use in rehabilitation and determine suitable procedures for successful use thereof if found to be possible.	Adequate soil resources for rehabilitation	Environmental Specialist	Within 1 year of EMP approval.

Table 3-8: Ore Processing Plant					
Activity/Structure/Infrastructure	Processing plant operation				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY

Soil and Water contamination	Generation of potentially contaminated water	All water and storm water contaminated through process works must be collected into the process water circuit.	Records kept of required inspections, as well as any maintenance applied	Proponent	Monthly
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Table 3-9: Manganese Product Stockpiles					
Activity/Structure/Infrastructure	Product stockpile management (Including sinter, medium-ratio lumpy, high-grade small lumpy, fines - high-ratio, fines - medium ratio and Nchwaning products)				
ASPECT	ACTIVITY or IMPACT	MANAGEMENT ACTIONS	TARGET	RESPONSIBILITY	TIME- FRAME/FREQUENCY
Clearance of Land and Vegetation	Establishment of product stockpiles	Product stockpile areas must be contained to the designated footprints. No further land may be cleared without appropriate permitting and review of the EMPr.	No <i>ad hoc</i> establishment of stockpile areas or clearance of vegetation.	Production manager	Continuous
Generation of fugitive dust	Dust generated from unpaved roads and vehicles traversing stockpile areas.	Stockpile areas and road will be compacted and covered with ore to prevent generation of dust. Dust suppression will be applied to unpaved roads.	Compliance with national dust outfall and ambient air quality standards	Production manager	Continuous
Soil Erosion	Channelling of run-off resulting in soil erosion	Areas where significant runoff and subsequent erosion may occur must be identified and berms, cut-off trenches, soakaways and/or other suitable measures put in place to prevent erosion.	No significant observable soil erosion	Internal Environmental Officer	Continuous

