PART B – ENVIRONMENTAL MANAGEMENT PROGRAMME

22.DETAILS OF THE EAP

The details of the EAPs who undertook the EIA process and prepared this EMPr are provided in Part A, Section 1.2.

23.DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The activities covered by this EMPr are fully described in Part A, Section 3.2.

24.COMPOSITE MAP

A composite map including all proposed surface infrastructure superimposed on environmentally sensitive areas of the preferred site is included in Figure 24-1.

18°56'0"E
18°58'0"E
29°12'0"S
29°14'0"S

N

Existing Tailings Storage Facility
Proposed Bulk Water Pipeline
Proposed Smelter Complex
Proposed Road to SLF
Proposed Secured Landfill Site
N14
Existing Concentrator Plant
Existing Contractors Camp
ROM
Proposed Transmission Line
Waste Rock Dump
Existing Open Pits

Legend

- Gamsberg Zinc Mine MRA
- Laydown Area
- Business Partner Camp
- Existing Contractors Camp
- Main Road
- Existing Infrastructure

Proposed Infrastructure

- Proposed Bulk Water Pipeline
- Access Road
- Transmission Line
- Secured Landfill Site
- Switch Yard
- Smelter Complex Footprint

Botanical Sensitivity

- Irreplaceable
- Irreplaceable (S Todd, 2020)
- Constrained
- Plant Species of Conservation Concern

0 500 1 000 Meters

Scale: 1:25 000 @ A3
Projection: Transverse Mercator
Datum: Lo 23 WGS 84

Gamsberg Smelter Project

Figure 24-1

Composite Map

SLR Consulting (Africa) (Pty) Ltd
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25. DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENT

25.1 DETERMINATION OF CLOSURE OBJECTIVES

25.1.1 Closure Vision

The primary objective is to strive towards achieving closure that would be widely accepted and cost-effective for the Gamsberg Zinc Mine. The BMM/ Gamsberg Zinc Mine Closure Vision aims to make sure the BMM/Gamsberg Zinc Mine zone of influence is a safe, stable, non-polluting and healthy environment with predominantly grazing potential supporting local biodiversity and small-scale, socio-economic enterprises (EVES, 2018a).

Note: This closure vision remains unchanged with the introduction of the proposed smelter complex and secured landfill facility.

25.1.2 Closure Objectives

The closure objectives should be achieved in a cost effective manner and the closure solution should be sustainable in the long-term. The following key objectives have been identified to make sure that the following commitments would be achieved as a minimum (EVES, 2018a):

- The site would be made safe for both humans and animals;
- The site would be rehabilitated to be physically safe, chemically stable and ecologically self-sustaining;
- The residual impacts would be managed to acceptable levels and not deteriorate over time; and
- Rehabilitation and socio-economic enterprises would fulfil the pre-determined end land use.

Note: These closure objectives remain unchanged with the introduction of the proposed smelter complex and secured landfill facility.

25.2 THE PROCESS FOR MANAGING ENVIRONMENTAL DAMAGE AS A RESULT OF UNDERTAKING THE ACTIVITY

The management actions outlined in Section 27 have been identified in order to manage and reduce impacts associated with the proposed Gamsberg Smelter Project in order to prevent unnecessary damage to the environment. In the event that unplanned incidents occur that may result in environmental or socio-economic impacts, the Emergency Preparedness and Response Plan (EPRP) as outlined in Section 30.2 would be implemented to avoid pollution or degradation.

25.3 POTENTIAL RISK OF ACID MINE DRAINAGE

With reference to Section 25.4, geochemical tests and analysis indicate that the amount of sulphur present in Jarosite is sufficient to potentially generate acidity, but this is largely balanced by the presence of calcite and lime in the Jarofix, which can neutralise the acidity. The calculated neutralising potential ratio (NPR) and net neutralising potential (NNP) values for Jarofix are within the ranges for which there is uncertainty as to whether acid would be produced. This is because of how close the acid potential (AP) and neutralising potential (NP) values are, meaning that the potential for acid generation of Jarofix would depend on the relative rates at which the Jarosite, lime and calcite react during the formation of Jarofix. The paste pH and net-acid generating capacity (NAG) pH do provide some confidence that the initial pH of leachate from Jarofix would be near neutral to slightly alkaline.

25.4 STEPS TAKEN TO INVESTIGATE, ASSESS AND EVALUATE THE IMPACT OF ACID MINE DRAINAGE

A geochemical and waste assessment was undertaken by Mills Water (2020) (Appendix G) to understand the geochemical makeup of the Jarosite and Jarofix. As part of this study the potential for acid rock potential (ARD) was assessed. Development of ARD is typically associated with the oxidation of sulphide minerals, in most cases pyrite:

$$FeS_2 + {}^{15}/_4\, O_2 + {}^{7}/_2\, H_2O \rightarrow Fe(OH)_3 + 2SO_4^{2-} + 4H^+$$

In the absence of sulphide minerals, as is the case with the Jarosite and Jarofix, ARD is unlikely to develop provided the Jarofix is disposed of separately from the existing tailings, as per the alternatives assessment in Section 6.1.4. However, some oxide minerals like Jarosite can store acidity. When Jarosite dissolves, it can release hydrogen ions causing the pH to decrease:

$$KFe_3^{3+}(OH)_6(SO_4)_2 + 3H_2O \rightarrow K^+ + 2SO_4^{2-} + 3Fe(OH)_3 + 3H^+$$

The addition of lime slurry ($Ca(OH)_2$) and cement to the Jarosite to form Jarofix results in a neutralising of the acidity:

$$Ca(OH)_2 + 2H^+ \rightarrow Ca^{2+} + 2H_2O$$
$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$
$$CaCO_3 + 2H^+ \rightarrow Ca^{2+} + 2H_2CO_3$$

The results of the acid base accounting (ABA) screening are presented in Table 25-1.

Table 25-1: Modified ABA Screening of Jarofix

Parameter	Units	Screening criteria				Average Jarofix (n=3)
		Type I: High	Type II: Possible/ uncertain	Type III: Low/ uncertain	Type IV: No risk	
Sulphur in jarosite	Wt%	>0.3	0.2 – 0.3	0.01 – 0.2	<0.1	4.0
Paste pH		<5	<7	>7	>7	8.9
NAG pH		<4.5	<4.5	<4.5	>4.5	7.9
NAG Acidity	kg/t H_2SO_4	>5	<5	<5	0	<0.01
Modified AP from jarosite S	kg/t H_2SO_4					87.8
NP	kg/t H_2SO_4					92.9
NPR		<1	1 - 2	2 - 4	>4	1.1
NNP		<-20	-20	0 - 20	>20	5.1

Note – Colours highlighted indicated waste type. Green – Type IV No risk, Yellow – Type III Low/ uncertain, Orange Type II Possible/ uncertain, Red Type I High.

25.5 ENGINEERING OR MINE DESIGN SOLUTIONS TO AVOID OR REMEDY ACID MINE DRAINAGE

A Class A liner has been included in the design of the secured landfill facility even though the potential for ARD resulting from the storage of Jarofix in the secured landfill facility is considered to be low. The reason for the planned Class A liner is for the other potential contaminants such as arsenic, antimony, lead, zinc and cadmium.

25.6 MEASURES IN PLACE TO REMEDY RESIDUAL OR CUMULATIVE IMPACT FROM ACID MINE DRAINAGE

As per Section 25.5 a Class A liner would be designed and installed for the secured landfill facility to minimise any potential contamination. Groundwater monitoring would also be required as per Section 29. Cumulative impacts from the entire mining activities within the mining right area are not anticipated. The other potential source of ARD is the TSF. It is, however, anticipated that impact on groundwater quality from the existing TSF will continue to be insignificant (SLR, 2020 – Appendix E).

25.7 VOLUMES AND RATE OF WATER USE FOR MINING

Water required for the Gamsberg Smelter Project, would include water for the process plant, drinking, sanitation and other miscellaneous uses such as the canteen, safety showers, etc. The individual water demand for the various consumers, the existing Gamsberg Zinc Mine activities including the concentrator plant as well as the proposed smelter complex and all associated activities is presented in Table 3-15 and in the water balance (Figure 3-7).

25.8 HAS A WATER USE LICENCE BEEN APPLIED FOR?

A water use license application (WULA) is required for the proposed Gamsberg Smelter Project. The DHSWS has been notified that a WULA will be submitted as part of the proposed project. A Pre-Application Water Use Enquiry was submitted on 10 September 2020 to the DHSWS and a case officer has been assigned (Reference: Gamsberg Smelter Project - WU17644).

25.9 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

The assessment of potential impacts is included in Section 8 and Appendix D. Management actions which would be implemented to avoid and minimise potential impacts are detailed in Section 27.

26.IMPACT MANAGEMENT OUTCOMES

Table 26-1 provides a description of the outcomes and objective of management actions in order to manage, remedy, control or modify potential impacts. The management actions identified to achieve these outcomes and objectives are described in Section 27.

Table 26-1 Description of Impact Management Outcomes

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
1	• Construction related clearing. • Additional surface infrastructure. • Changes to surface runoff. • Potential seepage from the secured landfill facility over time.	Change in groundwater levels and gradient	Groundwater	Construction Operational Decommissioning Closure	• Containment of contaminated water. • Implementation of storm water controls. • Containment of contaminated water and runoff via collection trenches and pollution control dam. • Implementation of storm water controls. • Installation of Class A liner in secured landfill facility. • Continuation of the mine and regional groundwater monitoring plan.	• To prevent changes in groundwater availability affecting third party water users.
2	• Potential spills from on-site activities. • Potential seepage from the secured landfill facility over time.	Deterioration of groundwater quality	Groundwater	Construction Operational Decommissioning Closure	• Construction of the secured landfill facility with a Class A liner. • Implement hazardous reagents and materials procedure to prevent spillage. • Implement mine incident management operating procedure to reduce impact of potential spills. • Remediation and rehabilitation of the footprint areas. • Continuation of the site and regional groundwater monitoring plan. • Update the numerical groundwater model and use as a predictive tool. • Good housekeeping practices on-site.	• To prevent pollution of groundwater resources and related harm to groundwater users.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
3	• Potential spills. • Contaminated discharges from the dirty water systems. • Residue from the dirty water circuit, chemicals, non-mineralised waste (hazardous, general, radioactive) and concrete wash water. • Contaminated runoff and seepage from the secured landfill facility. • Erosion from compacted surfaces due to decommissioning activities.	Contamination of surface water resources	Surface Water	Construction Operational Decommissioning Closure	• Implement hazardous reagents and materials procedure to prevent spillage • Implement current mine incident management operating procedure to reduce impact of potential spills. • Implement erosion prevention plan as part of decommissioning. • Implement Emergency Preparedness and Response Plan (EPRP) in case of an serious incident/disaster. • Water quality monitoring should be undertaken.	• To prevent surface water contamination and related impacts on downstream users.
4	• Clearance of surface areas for the secured landfill facility and smelter complex. • Construction of the secured landfill facility within 1:100 year flood line.	Flooding	Surface Water	Construction Operational Decommissioning	• Installation of a flood protection berm.	• To prevent flooding of the secured landfill facility and related impacts.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
5	• Clearance of surface areas for the secured landfill facility and smelter complex. • Diversion of runoff by stormwater controls. • Construction and operation of the secured landfill facility and smelter complex.	Alteration of natural drainage patterns	Surface Water	Construction Operational Decommissioning	• Berm designed to have the minimum impact on the natural drainage patterns. • Storm water management plan for separation of clean and dirty water.	• To prevent unacceptable alteration of drainage patterns and the reduction in the volume of runoff into the downstream catchment.
6	• Clearance of surface areas for secured landfill facility and smelter complex.	Impact on vegetation and flora due to construction phase site clearance	Biodiversity	Construction	• Minimise the development footprint. • Demarcate sensitive areas. • Search and rescue requirements. • Obtain relevant permits for vegetation clearing and the translocation of protected species. • Awareness training.	• To prevent the unacceptable disturbance and loss of biodiversity and related ecosystem functionality through physical and/ or general disturbance.
7	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site. • Movement of vehicles.	Impact on vegetation and flora due to construction-related dust	Biodiversity	Construction	• Implement dust suppression measures during construction. • Ongoing monitoring of dust and fallout on sensitive vegetation. • Limit vehicle speed to 40km/h.	• As for # 6
8	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site.	Impact on fauna due to construction phase site clearance	Biodiversity	Construction	• Minimise the development footprint as far as possible. • Demarcate sensitive areas. • Search and rescue requirements.	• To prevent unacceptable disturbance fauna.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
	• Movement of vehicles.				• Obtain relevant permits for vegetation clearing and the translocation of protected species. • Awareness training. • Limit vehicle speed to 40 km/h	
9	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site. • Movement of vehicles.	Impact on fauna due to construction phase noise and disturbance	Biodiversity	Construction	• Awareness training on fauna presence on property.	• As for # 8
10	• Movement of vehicles. • Cumulative impact with mining activities.	Impact on vegetation due to dust deposition during operational phase	Biodiversity	Operational	• Speed limit to 40 km/h.Implement dust suppression measures during construction. • Awareness training on fauna presence on property. • Ongoing monitoring.	• As for # 6
11	• Emissions from the stacks during smelter operations. • Vehicle emissions.	Impact on vegetation due to increased air emissions (SO_2, NO_2, Pb and Zn during operational phase	Biodiversity	Operational	• Installation of scrubbing systems to reduce and limit emissions. • An AEL must be applied for and all stipulated mitigation measures implemented. • Ongoing monitoring.	• As for # 6
12	• Potential seepage from the secured landfill facility over time.	Impact on vegetation due to groundwater contamination in	Biodiversity	Operational	• Design of secured landfill facility in accordance with regulatory requirements.	• As for # 6

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
	• Accidental spills during operational phase.	operational phase				
13	• Movement of vehicles. • Operational phase activities.	Faunal impacts due to operational activities: dust, noise, and traffic	Biodiversity	Operational	• Awareness training on animal presence on site Relocation of fauna by trained handlers where required. • Limit speed of vehicles to 40 km/h.	• As for # 8
14	• Dismantling and removal of infrastructure. • Movement of vehicles. • Accidental spills during decommissioning phase.	Ecological impacts during decommissioning phase	Biodiversity	Decommissioning	• A closure and decommissioning plan with detailed restoration plan and costing should be compiled and implemented. • All hard infrastructure should be removed from the site and recycled or disposed of in the appropriate manner. • Limit speed of vehicles to 40 km/h. • Implement current mine incident management operating procedure to reduce impact of potential spills.	• As for # 6
15	• Potential human health impacts due to construction and decommissioning related activities. • Potential human health impacts due to emissions from the smelter complex.	Potential human health impacts due to dust and emissions	Air Quality	Construction Operational Decommissioning	• Limit vehicle speed to 40 km/h.. • Concurrent rehabilitation and re-vegetation. • Best available technology should be implemented for the smelter complex. • An AEL must be applied for and all stipulated mitigation measures implemented. • Implementation of a grievance procedure.	• To prevent human health impacts due to reduced ambient air quality (remain within NAAQS and NDCR).

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
					• Occupational health monitoring programme for employees.	
16	• Noise generated due to construction and decommissioning activities i.e. vehicle and machinery noise. • Noise generated due to operational activities i.e. stacks, machinery, roaster and casting areas and vehicle noise.	Nuisance impact on surrounding landowners	Noise	Construction Operational Decommissioning	• Limit construction to recognised daytime periods as defined by DMRE.. • Implementation of a grievance procedure.	• To prevent noise related impacts (remain within IFC guidelines and SANS 10103).
17	• Soil erosion resulting from cleared and disturbed areas. • Soil compaction. • Loss of soil depth and volume due to excavation.	Loss of soil resources and land capability	Soils and Land Capability	Construction Decommissioning Closure	• Implement storm water control measures.. • Rehabilitation of disturbed areas. • Soil management procedures in place.	• To minimise the loss of soil resources to be used as part of rehabilitation and to support post closure land capability.
18	• Potential spills from construction activities. • Potential spills from operational activities. • Potential seepage from the secured landfill facility.	Loss of soil resources due to contamination	Soils and Land Capability	Construction Operational Decommissioning	• Implementation of hazardous reagents and materials procedure. Emergency Preparedness and Response Plan (EPRP) procedures for spills etc. • Soil management procedures in place. • Rehabilitation of affected areas.	• To minimise the loss of soil resources and related land capability through soil contamination.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
19	• Construction and decommissioning activities; and • Smelter complex.	Change in landscape and related visual impacts due to the smelter complex	Visual	Construction Operational Decommissioning Closure	• Rehabilitation of affected areas. • Good housekeeping practices. • Limit vehicle speed to 40 km/h and dust suppression. • Removal of all structures and stacks at decommissioning.	• To limit negative visual impacts.
20	• Construction, operational and decommissioning activities; and • Alteration of surface topography.	Change in landscape and related visual impacts due to the secured landfill facility	Visual	Construction Operational Decommissioning Closure	• Limit vehicle speed to 40 km/h and dust suppression. • Stacks to be painted or left a mid-grey colour. • Lights used for illumination should be faced inwards and shielded to avoid light spillage. • Continued rehabilitation of all disturbed areas. • Removal of all structures and stacks.	
21	• Use of construction equipment and other machinery during construction activities. • Smelter operation, materials handling and vehicle movement during operational phase	Impact of the project on climate change	Climate Change	Construction Operational	• Monitoring of Greenhouse Gas Emissions Use of fuel additives. • Consider the use of zero emission energy technologies like solar power and energy efficient technologies. • Regular servicing of vehicles and machinery through implementation of a maintenance schedule.	• To minimise the emissions of GHGs into the atmosphere.
22	• Effect of changing local climate on operational activities.	Impact of climate change on the project	Climate Change	Construction Operational	• The SLP to include impacts of climate change on its workforce, local communities and potential to support	• To minimise the risk of climate change on project activities.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
					climate resilience in the local municipality. • Closure and Rehabilitation Plan must consider climate change and climate modelling and the potential impacts thereof.	
23	• Expenditure on construction and operational activities.	Significance of project expenditure	Economic	Construction Operational	• Manage through implementing approved SLP. • Review current targets for local labour.	• To enhance positive impacts for the local economy.
24	• Increased foreign exchange earnings. • Balance-of-payments benefits resulting from import substitution. • Increased tax revenues.	Impacts on key macro-economic variables	Economic	Operational	• Manage through implementing approved SLP. • Local procurement.	• As for # 23
25	• Overall negative impact on spend in the local tourism economy.	Impact on tourism	Economic	Construction Operational Decommissioning	• Manage through implementing approved SLP. • Implement final closure and rehabilitation plan to establish sustainable post-operational landforms and land uses.	• To minimise impacts to local tourism related spend.
26	• Construction phase activities. • Operational phase activities. • Decommissioning phase activities.	Impacts on surrounding landowners and land uses	Economic	Construction Operational Decommissioning	• Manage through implementing approved SLP. • Implement a grievance procedure. • Implement final closure and rehabilitation plan to establish sustainable post-operational landforms and land uses.	• Minimise economic impacts on surrounding land users due to environmental impacts.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
27	• Net increases in rates and other income due to construction phase activities.	Impacts on municipal finances	Economic	Construction Operational Decommissioning	• Manage through implementing approved SLP. • Enhance local benefits from project expenditure and decrease risks to the municipality.	• As for # 23
28	• Increased vehicular movement during construction and decommissioning phases. • Increased traffic volumes due to movement of trucks carrying product and by-product from site to destination.	Road disturbance and traffic safety	Traffic	Construction Operational Decommissioning	• Ensure programmes to reinforce road traffic rules are implemented • Implementation of a grievance procedure.	• Minimise impacts on the safety of other road users.
29	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site.	Damage to or disturbance of heritage (including cultural)	Archaeology and Cultural Heritage	Construction	• Implement cultural heritage procedure and awareness programme. • Minimise the development footprint. • Demarcation of construction areas. • Implement a chance find procedure.	• Minimise impacts to local archaeology and cultural heritage.
30	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site.	Damage to or disturbance of palaeontological resources	Palaeontology	Construction	• Awareness training programme. • Implement a fossil find procedure.	• Minimise impacts to local palaeontology.
31	• Employment opportunities (direct and indirect).	Employment creation and economic stimulus	Social	Construction Operational Decommissioning	• Manage through implementing approved SLP. • Maximise local employment opportunities.	• To enhance positive impacts for the local economy and communities and minimise negative impacts.

#	Activity	Potential impact	Aspects affected	Phase	Management actions type	Standard to be Achieved (Impact management outcome/objectives)
					• Include consultative measures related to closure in the SLP.	
32	• Construction phase employment opportunities (direct and indirect).	Multiplier effect on the local and regional economy	Social	Construction	• Manage through implementing approved SLP. • Maximise local procurement opportunities.	• As for # 31
33	• Construction phase employment opportunities (direct and indirect).	Project-induced population influx	Social	Construction	• Manage through implementing approved SLP. • Implement measures to address population influx related social pathologies, crime and conflict.	• Minimise impacts due to population influx.
34	• Construction phase employment opportunities (direct and indirect).	Negative impacts related to the presence of construction workers	Social	Construction	• Manage through implementing approved SLP. • Develop a business partner management plan for construction workers. • Training and awareness on camp policies and safety requirements. • Implementation of a grievance procedure.	• Minimise impacts due to the presence of construction workers.
35	• Construction phase employment opportunities (direct and indirect).	Health, safety and security	Social	Construction Operational	• Manage through implementing approved SLP. • Develop and implement a project-specific community health, safety and security plan. • Establish efficient stakeholder engagement programme and a grievance procedure.	• Minimise health, safety and security incidents.

27.IMPACT MANAGEMENT ACTIONS

Management actions identified to prevent, reduce, control or remedy the assessed impacts for the planning and design, construction, operational and decommissioning phases are presented in Table 27-1, Table 27-2, Table 27-3 and Table 27-4.

The action plans include the timeframes for implementing the management actions together with a description of how management actions comply with relevant standards. Management actions and recommendations identified by specialists have been summarised in the tables. .

27.1 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

27.1.1 Management Structure

Details of the management structure for the construction phase are presented below. All official communication and reporting lines, including instructions, directives and information shall be channelled according to the organisational structure presented in Figure 27-1.

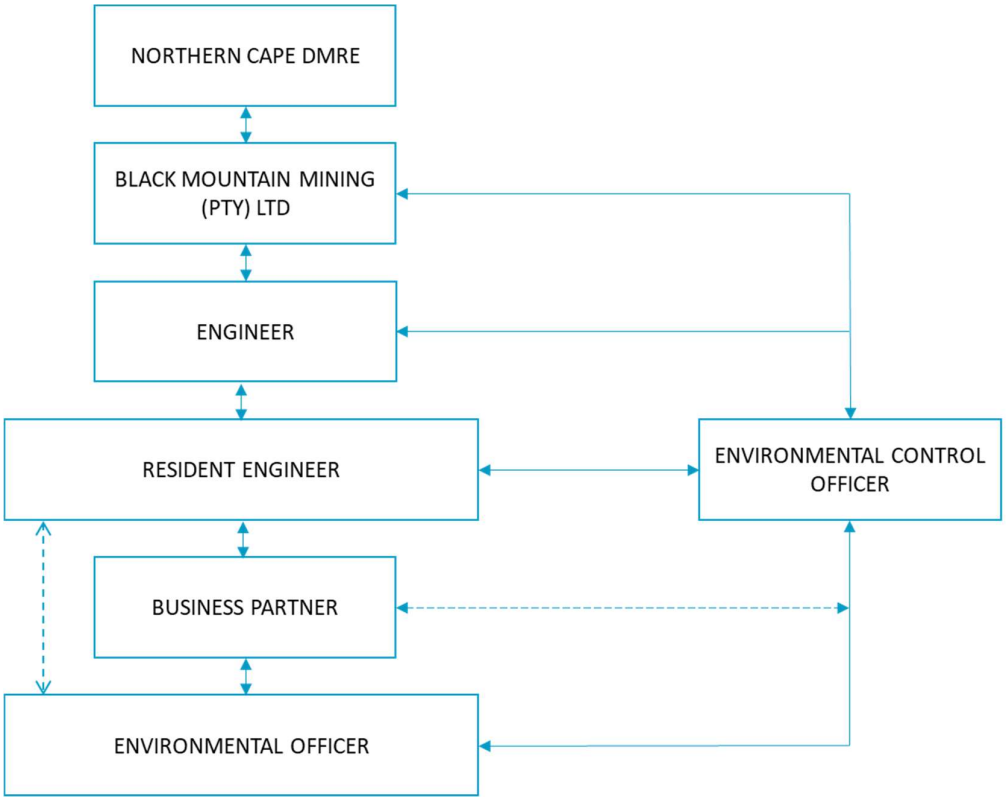


Figure 27-1 Construction Phase Organisational Structure

27.1.2 Roles and Responsibilities

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the planning and design, construction and operational phases.

Northern Cape Department of Mineral Resources and Energy (DMRE)

The DMRE is the designated Competent Authority responsible for authorising this EMPr. The DMRE has the authority to enforce legal action if Black Mountain Mining (Pty) Ltd does not comply with the relevant legislation, conditions of the Environmental Authorisation and this EMPr.

The DMRE will need to approve any amendments to the Environmental Outcomes set out in Section 26 of this EMPr, and may also perform inspections to assess compliance with the relevant legislation, the EA and the EMPr.

DMRE would also need to undertake a close out audit at the completion of the construction phase to ensure adherence to the EA and EMPr.

Developer

The Developer for the Gamsberg Smelter Project is Black Mountain Mining (Pty) Ltd who would ultimately be responsible for compliance with all conditions of the EA and EMPr.

Black Mountain Mining (Pty) Ltd would be responsible for the construction, operational and decommissioning phases of the Gamsberg Smelter Project.

With respect to the pre-construction phase, the Developer is to:

- Implement the planning and design recommendations outlined in the EMPr (Table 27-1);
- Implement all recommendations included in the EMPr that would lessen the total environmental impact of the proposed Gamsberg Smelter Project from the design stage (Section 27.2), through to construction (Section 27.3) and ultimately the operational (Section 27.4) and decommissioning (Section 27.5) phases; and
- Appoint required specialists (where relevant) to provide input into the pre-construction/ design phase.

With respect to the construction phase, the Developer is to:

- Ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on-site;
- Ensure that the EMPr has been approved by the DMRE prior to the start of construction activities on-site;
- Ensure that the DMRE has been notified of the date on which construction activities would be starting, prior to commencement of the activity;
- Ensure that all conditions of approval have been complied with;
- Appoint a suitably qualified or experienced ECO prior to the start of construction activities on-site, and for the duration of the construction phase; and
- appoint the Engineer, Resident Engineer, Business Partner and Environmental Control Officer (ECO) during the construction phase.

With respect to the operational phase, Black Mountain Mining (Pty) Ltd is to:

- Ensure that operation of the Gamsberg Smelter Project is undertaken in line with the requirements of the operational phase EMPr (Table 27-3) and the EA; and
- Continuously seek to improve performance to minimise any negative environmental and social impacts and enhance the benefits which result from the operational phase.

Engineer

The Engineer shall oversee the planning, design and construction phases of the project. The Engineer shall appoint a Resident Engineer or Engineer's Representative (referred to as the RE) to act as the on-site

implementing agent. The Engineer shall address any site issues pertaining to the environment at the request of the RE and/ or the ECO.

The responsibilities of the Engineer are to:

- Ensure that the Business Partner's contract contains relevant clauses requiring their compliance with this EMPr and all applicable environmental permits/ licences.
- Ensure that the requirements as set out in this EMPr and by the relevant Authorities are adhered to and implemented.
- Assist the ECO in ensuring that the conditions of the Construction EMPr are being adhered to and promptly issuing instructions requested by the ECO, to the Business Partner. All site instructions relating to environmental matters issued by the Engineer are to be copied to the ECO.
- Assist the ECO in making decisions and finding solutions to environmental issues that may arise during the construction phase.
- Review and approve construction Method Statements (Section 27.1.4) with input from the ECO.
- Recommend to the Developer the removal of person(s) and / or equipment not complying with the EMPr specifications.
- Provide input into the ECO's ongoing internal review of the EMPr.

Resident Engineer (RE)

The RE would act as Black Mountain Mining (Pty) Ltd's on-site implementing agent and carries the responsibility to ensure that the Business Partner undertakes their construction activities in such a way that Black Mountain Mining (Pty) Ltd's environmental responsibilities are not compromised and ensure that the Business Partner's activities are executed in compliance with the EMPr.

Any on-site decisions regarding environmental management are the responsibility of the Engineer and/ or RE in accordance with their delegated authorities. The RE shall assist the ECO where necessary, and shall have the following responsibilities in terms of the implementation of this EMPr:

- Conducting regular site inspections;
- Reviewing and approving the Business Partner's Method Statements (with input from the ECO where necessary);
- Monitoring and verifying that the EMPr and Method Statements are adhered to at all times and taking action if specifications are not followed;
- Keeping a daily photographic record of construction activities on-site;
- Assisting the Business Partner in finding environmentally responsible solutions to issues with input from the ECO where necessary;
- Recommending to the Engineer the removal of person(s) and / or equipment not complying with the EMPr specifications;
- Recommending to the Engineer the issuing of fines for transgressions of the EMPr;
- Recommending to the Engineer delaying any construction activity if he/ she believes the integrity of the environment has been or is likely to be seriously jeopardised;
- Providing input into the ECO's ongoing internal review of the EMPr;
- Communicating environmental issues to the ECO; and
- Reporting non-compliances to Black Mountain Mining (Pty) Ltd and the DMRE (where required).

Environmental Control Officer (ECO)

The ECO will be a qualified and suitably experienced environmental specialist appointed by the Engineer for the construction phase (after construction the Black Mountain Mining (Pty) Ltd environmental team takes responsibility) to objectively and regularly monitor the Business Partner's compliance with the conditions of the EAs issued for the Gamsberg Smelter Project and the approved EMPr. The ECO shall undertake site inspections, as agreed by the Employer, for the duration of the construction contract.

The ECO's duties shall include, inter alia, the following:

- Implementing the ECO responsibilities as outlined in the EA;
- Implementing specific actions assigned to the ECO in this EMPr;
- Ensuring the necessary EAs and permits, if any, have been obtained;
- Advising the Business Partner and/ or the RE on environmental issues within defined construction areas;
- Reviewing Method Statements;
- Undertaking site visits to assess compliance with the EMPr and EAs;
- Keeping a photographic record of progress on-site from an environmental perspective;
- Developing and maintaining a database of environmental incidents and non-compliances with the EMPr and to ensure that these are investigated and remediated within reasonable timeframes;
- Report any significant environmental incidents to the DMRE;
- Assisting the Business Partner and/ or the RE in finding environmentally acceptable solutions to construction issues;
- Recommending additional environmental protection measures should this be necessary; and
- Providing a report back on the environmental issues at site meetings.

The ECO shall communicate directly with the RE. Should issues arise on-site that cannot be resolved between the ECO and the RE, the ECO shall take the matter up with the Engineer and/ or Black Mountain Mining (Pty) Ltd. If Black Mountain Mining (Pty) Ltd does not respond the ECO shall take the matter up with DMRE.

Business Partner

The Business Partner shall have the following responsibilities:

- To implement all provisions of the EMPr (if the Business Partner encounters difficulties with specifications, they must discuss alternative approaches with the RE and the ECO prior to proceeding);
- To ensure that all staff are familiar with the EMPr;
- To monitor and verify that the environmental impacts are kept to a minimum;
- To make personnel aware of environmental issues and ensure they show adequate consideration of the environmental aspects of the project;
- To prepare the required Method Statements;
- To report any incidences of non-compliance with the EMPr to the RE and the ECO; and
- To rehabilitate any sensitive environments damaged due to the Business Partner's negligence (this shall be done in accordance with the Engineer's and ECO's specifications).

Failure to comply with the EMPr may result in fines and reported non-compliance may result in the Engineer suspending the operation causing the non-compliance.

Environmental Officer (EO)

Each Business Partner (where more than one Business Partner is appointed for components of the construction activities) shall appoint a competent individual as its on-site EO to ensure that the EMPr is implemented and that all environmental specifications and EMPr requirements are met at all times. The EO shall be responsible for monitoring, reviewing and verifying the Business Partner's compliance with the EMPr.

The EO's duties in this regard shall include, inter alia, the following:

- Daily site inspections;
- Monitoring and verifying that the EA, EMPr and Method Statements are adhered to at all times and reporting to the ECO if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Submission of regular written reports to the Engineer and ECO (at least once a month);
- Assisting the RE and ECO in finding environmentally responsible solutions to issues;
- Keeping accurate and detailed records of these inspections;
- Reporting any incidents of non-compliance with the EMPr to the RE and/ or the ECO; and
- Keeping a register of complaints on-site and recording community comments and issues, and the actions taken in response to these complaints.

Before the Business Partner begins each construction activity, the EO shall give to the RE a written method statement setting out the following:

- The type of construction activity about to be started;
- Locality where the activity will take place;
- Identification of the environmental aspects and impacts that might result from the activity;
- The methodology of impact prevention for each activity or aspect;
- The methodology of impact containment for each activity or aspect;
- Identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity; and
- Treatment and continued maintenance of impacted environment (where applicable).

27.1.3 EMPr Administration

The EA and EMPr shall be issued to all Business Partner/s prior to finalisation of any tender process in order to ensure that the appointed Business Partners make appropriate financial provision in their budgets to ensure compliance with the EA and this EMPr.

Copies of the EA and this EMPr shall be kept at the construction site office and shall be distributed to the EO and all other senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

The RE may order the Business Partner to suspend part or all of the works if the Business Partner fails to comply with the specifications set out in the EA, EMPr and Method Statements. Such suspension would be enforced until compliance is achieved. The construction contract shall make provision for such suspension and penalties.

During the operational phase copies of the EA and this EMPr will be kept at the main offices and the environmental section and shall be implemented by the Black Mountain Mining (Pty) Ltd environmental team.

27.1.4 Communication Structures

Method Statements

The Business Partner (through the EO) shall submit written Method Statements to the RE and ECO for all environmentally sensitive aspects of the work. Method Statements shall cover applicable details with regard to the following, as appropriate:

- Type of construction activity and construction procedures;
- Timing and location of the activity;
- Identification of the environmental aspects and impact that might result from the activity;
- The methodology for impact avoidance or minimisation for each activity or aspect;
- Materials and equipment to be used;
- Getting equipment to and from site;
- How the equipment/ material would be moved while on-site;
- How and where material would be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Treatment and continued maintenance of impacted environment (where applicable);
- Compliance/non-compliance with the EA and EMPr; and
- Any other information deemed necessary by the RE or ECO.

The MS's required are defined in Section 27.3.3. The RE and/ or the ECO may specify any additional Method Statements as may be required.

A Method Statement Control Sheet, signed by the Business Partner, must accompany each MS. Method Statements shall be submitted to the RE and ECO **at least ten (10) days prior** to the commencement of construction. It should be noted that Method Statements must contain sufficient information and detail to enable the RE and ECO to apply their minds to the potential impacts of the works on the environment. The Business Partner would also need to thoroughly understand what is required of him/her in order to undertake the works.

Work shall not commence until the RE and ECO has approved the Method Statements. Failure to submit Method Statements may cause the RE to order the Business Partner to suspend part or all of the works concerned until a MS has been submitted and approved. Any damage caused to the surrounding environment shall be rehabilitated at the Business Partner's cost.

Information Boards

The Business Partner shall be responsible for erecting general information boards at appropriate locations on-site. The general information board (in English and Afrikaans) shall provide the name and contact number of the EO, to ensure that the public has access to the RE to request information and/or to lodge any complaints. The EO shall report complaints to the Engineer, RE and ECO. One of these information boards shall be erected at the main site office.

Community Relations

Black Mountain Mining (Pty) Ltd should continue to engage with stakeholders throughout the project construction and operational phases. Communication with local communities (i.e. Pofadder, Pella, Aggeneys and Onseepkans) and other local stakeholders would be a key part of this engagement process. Development of a

Community Engagement Plan (CEP), or a review and update if there is an existing plan, is important to facilitate this communication.

The objectives of the CEP are the following:

- To provide residents in the vicinity of the proposed infrastructure and other interested stakeholders with regular information on the progress of work and its implications;
- To monitor the implementation of the EMPr and the impact on communities, in order to ensure that mitigation measures are implemented and the mitigation objectives achieved; and
- To manage any disputes between Black Mountain Mining (Pty) Ltd, the Business Partner's and local communities.

Grievance Procedure

The existing grievance procedure should be reviewed and amended. The grievance procedure should be based on the following principles and commitments:

- It should be transparent;
- It should seek to resolve all grievances timeously; and
- Full written records of each grievance case and the associated process of resolution, including the final outcome, should be maintained and used to facilitate transparent, external reporting.

The grievance procedure should also:

- Require the development and maintenance of an up to date and comprehensive complaints register which would include the following information:
    - The date on which the complaint was raised or received;
    - The name and contact details of the stakeholder/group who raised the complaint (if by group, then the names of all the group members should be included);
    - A brief description of the complaint;
    - The manager responsible for the resolution of the complaint (dependent on the nature of the complaint); and
    - Due date for completion of the appropriate action, based on the time period specified in the procedure.
- The complaints register should also be updated with the following;
    - The date on which the action or decision was taken;
    - All and any communication with the stakeholder (date, method, and purpose);
    - The person/s responsible for the action or decision;
    - Nature of the action or decision; and
    - Date on which the complaint was escalated or finalised.
- All complainants would be offered an option of requesting confidentiality. The personal details of complainants would only be made available to those involved in the resolution of the grievance in question, and Black Mountain Mining (Pty) Ltd employees and other groups must follow policies related to protecting personal data when handling grievances; and

- Black Mountain Mining (Pty) Ltd would accept, record and seek to address grievances that are contained in anonymous complaint forms, however, due to the anonymous source of the grievance, Black Mountain Mining (Pty) Ltd would not be able to respond directly to the complainant.

Black Mountain Mining (Pty) Ltd should prepare responses to grievances in a timeous manner; an initial acknowledgement must be made within five working days and a timeframe provided for resolution, not exceeding two weeks, unless the grievance warrants additional time for investigation. The response should consider the complainants' views about the process, as well as provide specific remedies. Where needed, a relevant manager would communicate with the stakeholder to better understand the nature of the complaint before formulating a response. If the case is complex and the stated resolution timeframe cannot be met, an interim response would;d be provided (oral or written) that informs the stakeholder of the delay, explains the reasons, and offers a revised date for next steps. In the case of a particularly sensitive complaint, Black Mountain Mining (Pty) Ltd would engage an external organisation/third party in a joint investigation, in order to demonstrate transparency in the process.

Environmental Awareness Training

Before the commencement of any work on-site, the Business Partner's site management staff shall attend an environmental awareness training course, presented by the ECO. The Business Partner shall liaise with the ECO prior to the commencement date to arrange a date and venue for the course. The Business Partner shall provide a suitable venue with facilities and ensure that the specified employees attend the course. No induction or course should be given until the Engineer has been afforded the opportunity to appraise it and provide comment.

The information presented at the course shall be communicated by the Business Partner site management staff to the rest of his employees on the site, to any new employees coming onto site after the initial training course and to their suppliers. The presentation shall be conducted, as far as is possible, in the employees' language of choice. As a minimum, training shall include:

- Explanation of the importance of complying with the EA and EMPr;
- Discussion of the potential environmental impacts of construction activities;
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when carrying out their activities; and
- Explanation of the requirements of the EA and EMPr.

The Business Partner shall keep records of all environmental training sessions, including names of attendees, dates of their attendance and the information presented to them. Records of environmental training sessions shall be submitted to the RE and ECO.

Meetings

The ECO shall meet (or otherwise connect) with the RE and EO on a monthly basis, or more frequently as may be required during the initial stages of the project. The ECO shall prepare a feedback report to be tabled at monthly site meetings and is not required to physically attend scheduled construction-site meetings (Business Partner/ Engineer /RE /EO) throughout the contract period.

27.1.5 Inspection Procedures

The day-to-day monitoring and verification that the EMPr is being adhered to shall be undertaken by the RE and the EO.

The ECO shall inspect the site on a monthly basis to ensure that correct procedures are being implemented and that the Business Partner is complying with the EA and requirements of the EMPr. Additional site inspections by the ECO may be needed during the initial stages of the project. The ECO shall address any queries to the Business Partner / RE/ EO. If the queries cannot be resolved at this level, they would be referred to the Engineer.

27.1.6 Record of Activities

The EO shall keep a record of activities on-site, including but not limited to:

- Meetings attended;
- Site inspections;
- Internal audits;
- Monitoring results;
- Method Statements;
- Issues arising on-site, cases of non-compliance with the EA and EMPr;
- Penalties issued;
- Complaints received and corrective action taken; and
- Environmental incidents and corrective actions taken.

The EO and RE shall undertake daily photographic monitoring of the site. This shall include a photographic record of all areas that would be impacted by the construction activities prior to construction activities commencing. The ECO shall monitor all sensitive work environments (e.g. watercourse crossings, site clearance activities in the vicinity of identified sensitive biodiversity areas), which may also include photographic monitoring.

27.1.7 Fines

A system of fines/ contractual penalties shall be implemented to ensure compliance with the EMPr. Where the Business Partner or their sub-Business Partners inflict damage on the environment or fail to comply with any of the environmental specifications of the EA or EMPr, the Business Partner may be liable to pay a fine / incur penalties in terms of the contract. The Business Partner is deemed to not have complied with the EMPr if:

- There is evidence of contravention of the EMPr specifications, including any non-compliance with an approved MS;
- Construction activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Business Partner fails to comply with corrective or other instructions issued by the RE/ECO within a specific time period; and/or
- The Business Partner fails to respond adequately to complaints.

Failure by any employee of the Business Partner or their sub-Business Partners to show adequate consideration to the environmental aspects of the contract shall be considered sufficient cause for the ECO to recommend to the RE to have that employee removed from the site. The ECO may, through the Engineer, also order the removal of any equipment that is causing environmental damage.

27.1.8 Internal Auditing and Review

The Business Partner shall establish an internal inspection and review procedure to monitor the day-to-day implementation of the EA and EMPr requirements. Internal inspections shall be conducted by the EO on a weekly basis. The EO audit reports shall be submitted to the RE and ECO. Internal audits and inspections shall include an assessment of performance against the requirements of other environmental licences or permits (e.g. water use authorisation, flammable substance certificates, integrated flora permits, Protected Tree permits, etc.).

The following shall be implemented to address non-compliances with the EMPr or other environmental issues related to construction activities. Timeous planning, intervention and corrective action to deal with EMPr non-compliance and key environmental issues is essential. All instructions and records of measures implemented to address the issues shall be kept on file.

- Where necessary, the ECO should issue EMPr instructions to Business Partners on-site to address and correct non-compliances with the EMPr and specific environmental issues pertaining to the project footprint and surroundings.
- The ECO should report environmental incidents and EMPr non-compliances (that could result in significant environmental damage or pollution) to the RE who would then be responsible for reporting to the Engineer and competent authorities.
- The EO is to report environmental incidents, complaints, and EMPr non-compliances (that could result in notable environmental damage or pollution) to the ECO.

The ECO shall undertake a monthly audit of compliance with the relevant environmental requirements and identify the need for any amendments to the EMPr in order to improve its effectiveness in avoiding or minimising any negative environmental impacts. Any recommended amendments to the EMPr outcomes must be approved by the DMRE and communicated to the relevant stakeholders, as per the requirements of the EIA Regulations, before the amendments to the EMPr are implemented. Any such amendments to the EMPr shall be registered in the daily records of the EO.

At the conclusion of the construction phase a final environmental audit report shall be compiled and submitted to DMRE. This report shall be compiled by the ECO in collaboration with the RE, EO and the Business Partner. It would outline the implementation of the EMPr and highlight any issues that arose during the construction period to report, on a formal basis, the lessons learned on the project.

27.2 PLANNING AND DESIGN PHASE ENVIRONMENTAL MANAGEMENT PROGRAMME

27.2.1 Introduction

The Planning and Design EMPr covers the phase prior to the start of construction and the various actions and activities that are required to be undertaken to minimise environmental damage and enhance social benefits once construction begins. The following sections highlight the various areas of focus.

27.2.2 Application

The roles and responsibilities in terms of the application and implementation of this EMPr have been outlined in Section 27.1.2.

27.2.3 Permit Requirements

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. Black Mountain Mining (Pty) Ltd is responsible for ensuring that they hold the necessary permits in order to comply with national and local regulations.

27.2.4 Tender Documentation

Black Mountain Mining (Pty) Ltd shall ensure that this EMPr is included within the tender documents for all Business Partners tendering to undertake any aspects of the construction phase of the project.

In the adjudication of any tenders to undertake any aspect of the construction or operation of the proposed project, Black Mountain Mining (Pty) Ltd must ensure that the costs of compliance with the EMPr have been adequately allowed for within the winning tender.

27.2.5 Additional Pre – Construction Requirements

The following requirements also need to be taken into consideration by Black Mountain Mining (Pty) Ltd:

- Notify all registered I&APs and key stakeholders of the opportunity for appeal of the Environmental Authorisation;
- Notify DMRE prior to commencement of construction;
- A Health and Safety Plan must be developed prior to the commencement of construction, to identify and avoid work-related accidents;
- Establish a recruitment and procurement policy which sets reasonable targets for the employment of local residents /suppliers;
- A Code of Conduct must be developed for all workers directly related to the project, the objective of which is to limit, where possible, social ills brought about by the construction of the facility;
- Develop and implement a grievance procedure as defined previously (as per Section 27.1.4); and
- Screen for threatened or protected plant species as well as protected trees and if recorded, submission of permit application to NCDENC and DAFF according to the relevant legislation.

27.2.6 Planning and Design Phase Actions and Outcomes

Key activities during the planning and design phase will include:

- Pre-construction monitoring;

- Notification of DMRE and other relevant authorities of final layout (if required) and additional mitigation/ management measures, where needed;
- Drafting of subsidiary plans, policies and procedures;
- Developing, with the Business Partner, the following:
    - A Site Layout Plan; and
    - Method Statements.

These activities are described in more detail in Table 27-1.

Table 27-1 Description of Impact Management Actions – Planning and Design Phase

Aspect		Objective/ Outcome	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
#	Description of Aspect		#	Management Actions			
1	Stakeholder engagement	Notify all registered Interested and Affected Parties of Environmental Authorisation.	1.1	Notify all registered I&APs and key stakeholders of the opportunity for appeal of the Environmental Authorisation.	EAP	Notices sent to relevant parties on the stakeholder database. List of those to whom it was sent on file.	Within 12 days from the issuing of the Environmental Authorisation.
2	Permit requirements	Ensure that all relevant permits/ licences have been issued.	2.1	Meet all relevant legal requirements.	Black Mountain Mining (Pty) Ltd (Smelter Project Manager)	Permits	Prior to construction
3	Finalisation of EMPr and Business Partner Compliance Standards	Update EMPr with EA conditions and other mitigation measures from monitoring.	3.1	Incorporate additional mitigation measures specified by DMRE in the EA into the EMPr and Business Partner Compliance Standards.	Black Mountain Mining (Pty) Ltd (EO& Environmental Manager)	EMPr and Business Partner Compliance Standards	Prior to construction
4	Authority notification	Notify DMRE of commencement date.	4.1	Notify DMRE prior to commencement of construction.	Black Mountain Mining (Pty) Ltd (Environmental Manager)	Proof of communication	At least 14-days in advance of commencement of construction.
		Keep DMRE (Compliance Department) informed of any aspects of non-compliance with EMPr or EA	4.2	Notify DMRE with reasons if any provisions of the EMPr or EA cannot be implemented, and provide alternative/s	Black Mountain Mining (Pty) Ltd (Environmental Manager)	DMRE notification	Prior to construction
		Keep DMRE informed of current contact details of applicant.	4.3	Notify DMRE of any change of contact details of the applicant	Black Mountain Mining (Pty) Ltd (Environmental Manager)	DMRE notification	Prior to construction
		Keep DMRE informed of contact details of ECO	4.4	Submit the name and contact details of the appointed ECO prior to construction	Black Mountain Mining (Pty) Ltd (Environmental Manager/EO)	DMRE notification	Prior to construction
5	Adherence to EMPr	EMPr included in Business Partner Contracts	5.1	Include approved EMPr in all tenders for Business Partners and the adherence thereto must be written into the Contract.	Black Mountain Mining (Pty) Ltd (EO & Environmental Manager)	Proof of EMPr in Contract with Business Partner	Prior to construction
6	Subsidiary Plans	Develop Subsidiary Plans to minimise environmental and social risks	6.1	The following subsidiary plans should be developed (if required) prior to construction: • Biodiversity Management Plan (qualified botanist required); • Traffic Management Plan; • HIV Policy and Awareness Plan; • Rehabilitation Plan; • Policy for assessing damages and losses to resources; • Recruitment Policy; • Procurement Policy; • Code of Conduct; • Community Engagement Plan; • Waste Management Plan (Waste management specialist required); • Emergency response and Preparedness Plan; • Storm Water Management Plan; • Grievance Procedure; • Comprehensive Water Balance Plan; • Soil Erosion and Sediment Control Management Procedure;	Black Mountain Mining (Pty) Ltd (EO & Environmental Manager)	Relevant Plans	Prior to construction

Aspect		Objective/ Outcome	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
#	Description of Aspect		#	Management Actions			
				• Air Quality Monitoring Plan, including dust suppression (air quality specialist required); • Chance Finds Procedure; • Soil Contamination and Management Plan; • Health and Safety Plan (include requirements in terms of the Operational, Health and Safety Act); and • Groundwater Monitoring Plan, for implementation prior to construction. Where these plans or policies already exist, they need to be updated to incorporate the Gamsberg Smelter Project requirements.			
7	Employment and procurement of services and tender procedures	Ensure that employment and procurement of local, regional and national services is maximised.	7.1	Agree local employment requirements with the local authority and Business Partner upon advertising for jobs. Before any project commencement in Khâi-Ma Local Municipality all Business Partners must meet with the local authority to discuss employment and local business opportunities.	Black Mountain Mining (Pty) Ltd (Stakeholder Relations Manager & HR Manager)	Meeting minutes / advertisements	Prior to construction
			7.2	Appointed project Business Partners and suppliers must have access to Health, Safety, Environmental and Quality training as required by the project.	Black Mountain Mining (Pty) Ltd (Safety Manager)	Procurement contract and Recruitment policy	Prior to construction
			7.3	Implement existing Procurement Policy and ensure it includes reasonable targets for the procurement of goods and services from South African residents /suppliers, particularly local residents as far as possible; and identifies and invites bids from local suppliers.	Black Mountain Mining (Pty) Ltd (Commercial Manager)	Procurement policy	Prior to construction
			7.4	Adopt transparent adjudication process for tender awards.	Black Mountain Mining (Pty) Ltd (Commercial Manager)	Demonstrate transparent process of adjudicating tenders	Prior to construction
			7.5	Identify local Namakwa suppliers (as a first preference) with the appropriate level of capacity to supply goods and services over the operational lifetime of the project (specifically BBBEE companies).	Black Mountain Mining (Pty) Ltd (Stakeholder Relations Manager)	Proof of suppliers	Prior to construction
8	Social ills and disruption	To limit, where possible, social ills brought about by the construction phase	8.1	Develop an induction programme, including a Code of Conduct, for all workers.	Black Mountain Mining (Pty) Ltd (HR Manager & Training Manager)	Code of Conduct	Prior to construction
			8.2	All workers will agree to the Code of Conduct and be aware that contravention of the Code could lead to dismissal.	Black Mountain Mining (Pty) Ltd (HR Manager)	Code of Conduct	Prior to construction
			8.3	A Grievance Procedure will be established whereby complaints are recorded and responded to.	Black Mountain Mining (Pty) Ltd (Stakeholder Relations Manager & HR Manager)	Grievance Procedure	Prior to construction
			8.4	Implement the existing Black Mountain Mining (Pty) Ltd HIV Policy and Awareness Plan.	Black Mountain Mining (Pty) Ltd (HR Manager & VOH Manager)	HIV Policy	Prior to construction
9	Groundwater Impacts	To minimize impacts on the groundwater	9.1	Design and install a Class A Liner in the secured landfill facility.	Black Mountain Mining (Pty) Ltd (Project Manager & Engineer)	Proof of liner design and installation	Prior to construction
			9.2	Drill specific monitoring boreholes at the secured landfill facility to detect any potential groundwater plumes from the secured landfill facility (Table 29-1).	Black Mountain Mining (Pty) Ltd (Environmental Manager)	Proof of additional monitoring boreholes	Prior to construction

Aspect		Objective/ Outcome	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
#	Description of Aspect		#	Management Actions			
10	Surface water impacts	Minimise alteration of natural drainage patterns	10.1	Design and construct a berm between the secured landfill facility and the ephemeral stream to the west to minimise flooding of the secured landfill facility.	Engineer/ RE/ EO/ Environmental Manager	Signed engineering designs Approved Integrated Water Use Licence (IWUL)	Prior to construction and operation of the secured landfill facility
11	Traffic impact	Minimise negative effects associated with the increase in traffic.	11.1	Develop and implement a Traffic Management Plan (TMP) including strict controls over driver training and qualifications, vehicle maintenance, vehicle certifications, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures. Ensure that this TMP includes measures to reduce the need to drive at night and during peak traffic times, as well as to ensure vehicular activities are staggered as much as possible.	Black Mountain Mining (Pty) Ltd (Safety Manager)	TMP	Prior to construction
			11.2	Apply for and obtain all necessary transportation permits from the relevant authorities, including permits for abnormal loads if required. Oversee acquisition of permits required by Business Partners.	Black Mountain Mining (Pty) Ltd (Project Manager)	Permits	Prior to construction
12	Visual impact	Minimise visual impacts	12.1	Reviewed design of the smelter complex to incorporate more external cladding for the structures located on the N14 side of the development to help reduce visual contrast. The cladding should make use of desert grey-brown hues and needs to incorporate a two-toned grey-brown colouring for the cladding. The Vedanta Blue branding should not be incorporated into the cladding design.	Black Mountain Mining (Pty) Ltd (Project Manager/ EO/ Environmental Manager)	Final design of smelter complex	Prior to construction
			12.2	Other than required aircraft warning colours specified, stacks should be painted with a rough mid-grey colour.	Black Mountain Mining (Pty) Ltd (Project Manager/ EO/Environmental Manager)	Final design of smelter complex	Prior to construction
13	Waste management	Prevent soil and/or groundwater contamination from waste.	13.1	Update the existing Gamsberg Waste Management Plan (WMP) to include the Gamsberg Smelter Project. This will follow the principles of waste minimisation at source, segregation for reuse, recycling, treatment or disposal. The WMP should include the following: • Waste quantities and types; • Waste recycling; • Temporary waste storage; and • Waste treatment and disposal.	/ Engineer/EO	Waste Management Plan	Prior to construction
14	Impacts on vegetation	Screening and translocation of threatened or protected species and protected trees	14.1	Undertake pre-construction surveys of the approved footprints (by a qualified botanist that is familiar with the area) to identify Red Listed and protected plant species and confirm search and rescue requirements, or other avoidance measures, where possible. Search and rescue of species of conservation concern should be conducted prior to clearing activities which shall include the above-mentioned species. The plant translocation programme should be aligned with ongoing search and rescue protocols developed for the Gamsberg Zinc Mine.	/ Engineer / /EO	Search and Rescue Protocol Relevant permits obtained	Prior to and throughout construction
			14.2	Obtain permits for vegetation clearing and the translocation of protected species from NCDENC prior to initiating site clearance. Removal of any protected trees within the footprint requires an additional permit from the Department of Environment, Forestry and Fisheries (DEFF) for which the lead time is about three months.	Engineer / EO/Biodiversity Manager	Relevant permits obtained	Prior to and throughout construction
			14.3	Locate any lay-down or other temporary infrastructure sites within low biodiversity sensitivity areas.	Engineer / EO / Biodiversity Manager	Search and Rescue Protocol Relevant permits obtained	Prior to and throughout construction
			14.4	Minimise the development footprint as far as possible and rehabilitate construction-affected areas that are no longer required before the operational phase of the development.	Engineer / EO/ Environmental Manager/ Biodiversity Manager	Visual inspection	Prior to and throughout construction

Aspect		Objective/ Outcome	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
#	Description of Aspect		#	Management Actions			
			14.4	Fence the development area to avoid movement of construction vehicles into sensitive calcrete areas.	Engineer / EO/ Biodiversity Manager	Visual inspection	Prior to and throughout construction
			14.6	Demarcate sensitive areas or individual trees in close proximity to the development footprint as no-go areas with construction tape, temporary fencing or signage and mark these on site development plans for construction staff.	Engineer / EO/ Biodiversity Manager	Visual inspection Relevant permits obtained	Prior to and throughout construction
			14.7	Clearly mark vehicle routes and turning points and ensure all vehicle operators are made aware of restrictions on off-road driving in undesignated areas.	Engineer / EO	Visual inspection	Prior to and throughout construction
			14.8	Undertake awareness training for construction workers on the prohibition on collecting succulent or other plants (e.g. through induction and toolbox talks).	Engineer / EO/ Biodiversity Manager	Proof of Awareness Training	Prior to and throughout construction
15	Rehabilitation Plan	Successful site rehabilitation	15.1	Take detailed electronic colour photographs of the proposed site before any clearing may commence. These records of the site should be kept by the EO, ECO, RE and Engineer for consultation during rehabilitation of the site in order to ensure that rehabilitation is, as a minimum, done to a standard similar to pre-construction (as far as is practically possible). A rehabilitation plan must be compiled for the Gamsberg Smelter Project, to be implemented from the onset of the activities. The plan must: • Provide detailed electronic colour photographs of the proposed site before any clearing may commence; • These records of the site must be kept by the EO, ECO, RE and Engineer for consultation during rehabilitation of the site in order to ensure that rehabilitation is, as a minimum, done to a standard similar to pre-construction (as far as is practically possible); • Provide guidelines on how to restore the disturbed area to (as close as possible to) its natural state. The plan must also include the incorporation of natural vegetation, sloping plans as well as storm water management; • Rehabilitation of the disturbed areas within the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;; and • Areas must be stabilised using appropriate indigenous vegetation and geotextile matting (in areas with a gradient exceeding 20°). Indigenous grasses and shrubs found within the project area and surrounds would sustain the arid environment and are the preferred options. During the first year of establishment, these plants should be watered as often as possible to ensure their establishment. The first two to three weeks should be daily, thereafter weekly is recommended. This is subject to how the vegetation fairs during this time and should be adapted accordingly.	Business Partner/ RE/ EO	Photographs	Prior to construction

27.3 CONSTRUCTION PHASE IMPACT MANAGEMENT ACTIONS

27.3.1 Introduction

The Construction EMPr (CEMPr) covers the construction phase and the various actions and activities that are required to be undertaken in this phase to minimise environmental damage and enhance social benefits. All construction activities shall observe the requirements of this CEMPr as well as any relevant environmental legislation. The CEMPr matrix is included in Table 27-2.

27.3.2 Application

The roles and responsibilities in terms of the application and implementation of this CEMPr have been outlined in Section 27.1.2.

27.3.3 Method Statements and Site Management

Any Method Statements (as defined in Section 27.1.4) required shall be produced by the applicable Business Partner prior to the start of construction. The Business Partners shall not commence any activity until the relevant Method Statements have been approved and shall, except in the case of emergency activities, allow a period of two weeks for approval of the MS by the Engineer. Such approval shall not be unreasonably withheld.

The Engineer or ECO may request any additional Method Statements for any activity they believe may impact on the environment.

The Business Partners shall ensure that copies of all approved Method Statements are readily available on the site and shall be communicated to all relevant personnel. The Business Partners shall carry out the Works in accordance with the approved MS. Approval of the MS shall not absolve the Business Partners from any of their obligations or responsibilities in terms of their Contracts.

The following Method Statements (amongst others if required) shall be provided by the Business Partner and submitted to the Engineer, RE and ECO before site establishment:

- Temporary Laydown Areas;
- Protection of Flora and Fauna;
- Erosion and Sedimentation Control;
- Dust Control;
- Materials Handling, Use and Storage;
- Fuel (Petrol and Diesel) and Oil Use and Storage;
- Solid Waste Management (General and Hazardous);
- Ablution Facilities;
- Eating Areas;
- Drinking Water;
- Contaminated Water;
- Hazardous Substances;
- Site Structures;
- Workshop, Equipment Maintenance and Storage;
- Noise;
- Environmental Awareness Training;

- Fire Control;
- Concrete and Cement Work;
- Emergency Procedures;
- Safety;
- Security;
- Community Relations;
- Protection of Natural Features;
- Working Hours;
- Excavation and Trenching; and
- Temporary Site Closure.

27.3.4 Construction Phase Impact Management Actions

The impact management actions that have been identified for the construction phase of the Gamsberg Smelter Project are summarised in Table 27-2.

Table 27-2 Description of Impact Management Actions – Construction Phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
1	• Compliance with EMPr and EA	Confirm commitment to adherence to EMPr and Business Partner Compliance Standards	1.1	The EMPr, Business Partner Compliance Standards and EA must be available on-site throughout construction and must be implemented by the Business Partners.	Project Manager	Copy of signed EMPr and EA with Business Partner	Prior to construction and ongoing throughout construction
		Auditing of compliance with EMPr and EA	1.2	An audit shall be undertaken by an independent auditor at the end of the construction phase, and a report shall be submitted to DMRE. The audit report shall indicate the date of the audit, name of auditor, and outcome of the audit in terms of compliance with the environmental authorisation and conditions of the EMPr.	Project Manager/ RE/ EO	Audit report and proof of submission to DMRE	Upon completion of construction
2	• Health and Safety of employees during construction related activities	Ensure the health and safety of Business Partners and site users	2.1	Adhere to the Health and Safety Plan to avoid work related accidents.	Business Partner/ Safety Officer	Signed Health and Safety Plan All incidents recorded in an Incident Report.	Throughout construction
			2.2	Appropriate Personal Protective Equipment (PPE) must be worn by all construction personnel. This shall include the use of ear protection in areas where the 8-hour ambient noise levels exceed 75dBA.	Business Partner/ Safety Officer	Signed Health and Safety Plan,	Throughout construction
			2.3	Audit the implementation of measures outlined in all health and safety related management plans.	Business Partner/ Safety Officer	Health and Safety Audit reports	Bi-annual audits
3	• All construction related activities resulting in environmental impacts	General site requirements	3.1	Good housekeeping, and adherence to good health and safety practices on site during construction.	Business Partner/ ECO/Safety Officer	All incidents recorded in an Incident Report.	Weekly inspections throughout construction
			3.2	Establish good waste management practices on site, to include recycling, separation and storage of hazardous waste at suitable lined/bunded areas. All wastes that cannot be reused or recycled shall be collected by approved waste Business Partners and disposed of in a registered landfill or licensed hazardous waste site.	Business Partner/ ECO/EO	Waste Management Plan compliance report	Weekly inspections throughout construction
4	• Minimise potential environmental impacts throughout the construction phase.	Progressive/ concurrent rehabilitation	4.1	Implement the Rehabilitation Plan to progressively/ concurrently rehabilitate areas as soon as construction is complete in those areas.	Business Partner/ EO	Compliance with Rehabilitation Plan	Weekly inspections throughout construction
5	• Potential spills/ contamination from construction activities.	Deterioration of groundwater/ surface water quality	5.1	Supply chemical toilets, which should be regularly, maintained at sites where worker/ contractor numbers are high.	Business Partner	Proof of maintenance and cleaning schedules	Weekly inspections throughout construction
			5.2	Make oil spill kits available on site in case of spills of hydrocarbon chemicals and the relevant training on the use of spill kits must be provided.	Business Partner/ EO	Proof of spill kits on site Signed awareness training register	Weekly inspections throughout construction
			5.3	Implement the EPRP in case of a discharge incident that could result in the pollution of surface water resources.	Business Partner/ EO	Record of incidents	Daily inspections throughout construction
			5.4	Control traffic and movement (minimised and kept to certain paths) over stabilised areas , and damage to stabilised areas should be repaired timeously and maintained.	Business Partner/ EO	Compliance with TMP	Daily inspections throughout construction
			5.5	Construct and operate smelter complex infrastructure so as to comply with the NWA to include: • Clean water systems should be separated from dirty water systems; • Clean runoff and rainfall water should be diverted around dirty areas and back into the environment; and	Engineer/ RE/ Business Partner/ EO	Signed engineering designs Approved IWUL	Prior to construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
				• The size of contaminated water generating areas should be minimised, and contaminated water contained in systems that allow for the reuse and/or recycling of this contaminated water.			
			5.6	Install lining systems in all surface water holding facilities within the smelter complex, such as storm water dams to minimise any potential seepage of poor water quality to the underlying groundwater systems.	Engineer/ RE/ Business Partner	Records of liners installed	Prior to construction
			5.7	Undertake water quality monitoring as per Table 29-1.	EO	Compliance with quality standard for surface and ground water as per the WUL and parameters as per Section 29	Quarterly throughout construction
6	• Clearance of surface areas for the secured landfill facility and smelter complex. • Diversion of runoff by stormwater controls. • Construction and operation of the secured landfill facility and smelter complex.	Alteration of natural drainage patterns	6.1	Maintain the berm between the secured landfill facility and the ephemeral stream to the west to minimise flooding of the secured landfill facility.	Engineer/ RE/ EO	Signed engineering designs Approved IWUL	After storm events to check berm integrity
			6.2	Develop and implement a storm water management plan according to the NWA to ensure the separation of clean and dirty water around the smelter complex and the secured landfill facility. The flow must be diverted around the infrastructure then allowed to enter preferential flow areas into the environment.	Engineer/ RE/ EO	Signed engineering designs Approved IWUL	Weekly inspections throughout construction to ensure integrity
7	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site. • Movement of vehicles.	Impact on vegetation and flora due to construction-related dust	7.1	Implement all measures as per Table 27-1 Section 14.	Business Partner/ EO	Search and Rescue Protocol implemented and signed off Relevant permits obtained	Weekly inspections throughout construction
			7.2	Implement dust suppression measures during construction and erect screening devices to minimise impacts of dust when clearing footprints adjacent to sensitive habitats and flora, such as calcrete gravel patches.	Business Partner/ EO	Visual inspection of dust suppression measures implemented ECO weekly report Incident report in case of non-compliance	Daily inspections throughout construction
			7.3	Clearly mark vehicle routes and turning points and ensure all vehicle operators are made aware of restrictions on off-road driving in undesignated areas.	Business Partner/ EO	TMP ECO weekly report Incident report in case of non-compliance	Daily inspections throughout construction
			7.4	Undertake regular daily or weekly checks of the proposed smelter complex and secured landfill facility areas to record evidence of the extent of dust generation from unvegetated/bare areas to confirm the need for additional mitigation.	Business Partner/ EO	Visual inspection of dust suppression measures implemented ECO weekly report Incident report in case of non-compliance	Daily inspections throughout construction
			7.5	Cover, shield or protect all stockpiles or other sources that could generate dust from wind, where possible.	Business Partner/ EO	ECO weekly report Incident report in case of non-compliance with NDCR	Daily inspections throughout construction
			7.6	Ongoing dust monitoring must be undertaken as per Table 29-1.	Business Partner/ EO	Dust monitoring data	Monthly inspections throughout construction
8	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site. • Movement of vehicles.	Impact on fauna due to construction phase site clearance and disturbances	8.1.	Conduct search and rescue for any reptiles prior to site clearance. Particular attention should be paid to tortoises and clearing of bush clumps, stone/rubble piles and any other areas where reptiles are likely to be sheltering. Snakes to be removed by trained snake handlers and records maintained of snakes removed.	Business Partner/ Biodiversity Manager	Record of any fauna relocated	Duration of construction
			8.2.	Remove any fauna directly threatened by the construction activities to a safe location.	Business Partner/ Biodiversity Manager	Record of any fauna relocated	Duration of construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			8.3.	All construction vehicles using internal roads should adhere to a low speed limit (40 km/h) to avoid collisions with susceptible species such as snakes, tortoises, rabbits or hares. Speed monitoring of construction vehicles and regular awareness raising of staff on this issue should be implemented.	Business Partner/ EO	Speed limit testing Record of incidents	Duration of construction
			8.4	Where fences are installed, no electrified strands should be placed within 30 cm of the ground as some species such as tortoises are susceptible to electrocution as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of such fenced areas and not the outside.	Business Partner/ EO	Visual inspection	Weekly inspections throughout construction
			8.5	Implement awareness training for construction workers on prohibitions on collecting fauna such as lizards, tortoises or snakes, and are restricted from free movement outside of the construction sites.	Business Partner/ EO	Record of training Signed Code of Conduct	Duration of construction
			8.6	Lighting should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.	Business Partner/Engineer/ EO	Proof of lighting installed	Weekly inspections throughout construction
			8.7	A qualified ecologist should be on site when species that will be directly disturbed and which need to be relocated i.e. fauna (including nests of SCCs) are found during the project activities. Daily inspection of trenches needs to be conducted and any faunal species trapped in trenches shall be relocated by a qualified ecologist. In the case of snakes, a trained snake handler needs to appointed onsite. Training of employees onsite by registered snake handler companies can also be considered. Records of faunal species translocation and/or faunal mortalities must be kept on a daily basis and weekly translocating and mortalities shall be reported to the ECO for record keeping.	Business Partner/ EO/ Biodiversity Manager	Proof of EO on site Daily EO records Proof of reports of the ECO	Throughout construction
9	• Movement of construction equipment and other vehicle during construction activities. • Clearance of vegetation during the construction phase.	Potential human health impacts due to dust and emissions	9.1	Concurrent rehabilitation and re-vegetation of all areas to be undertaken as construction activities are completed, as far as possible.	RE/ EO	Compliance with Rehabilitation Plan	Conduct post-rehabilitation inspections throughout construction
			9.2	Construction related vehicles should adhere to a low speed limit (40 km/h).	Business Partner/ EO	Speed testing of vehicles travelling	Daily inspections throughout construction
			9.3	Dust suppression should be used on areas where there is significant vehicle movement and dust generating activities through application of chemical binding agents and/or water sprays.	Business Partner/ EO	Visual inspection of dust suppression cover and duration Record of incidents	Daily inspections throughout construction
			9.4	Operation and maintenance of any generators and vehicles/equipment according to supplier specification at maintenance workshops.	Business Partner/ EO	Maintenance records	Weekly inspections throughout construction
			9.5	Implement a grievance procedure whereby air quality issues can be raised/ reported and transparently and timeously addressed.	Business Partner/ EO	Grievance mechanism Proof of close out of grievance	As required
10	• Noise generated due to construction activities i.e. vehicle and machinery noise.	Nuisance impact on surrounding landowners	10.1	Limit construction activities to day-time hours as defined by DMRE as far as possible.	Business Partner/ EO	Construction activities between the hours of 06h00 and 19h00 or as specified in the EA Grievance mechanism	Daily inspections throughout construction
			10.2	Review equipment to ensure the quietest available technology is used. Equipment with lower sound power levels should be selected in such instances and vendors/contractors should be required to guarantee optimised equipment design noise levels.	Business Partner/Engineer/ EO	Proof of equipment specifications	Duration of construction
			10.3	Machines and mobile equipment used intermittently should be shut down between work periods or throttled down to a minimum and not left running unnecessarily. This will reduce noise and conserve energy.	Business Partner/ EO	Visual inspection	Daily inspections throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			10.4	Keep acoustic covers of engines closed when in use or idling.	Business Partner/ EO	Visual inspection	Daily inspections throughout construction
			10.5	Keep doors to pump houses and generators closed when in use.	Business Partner/ EO	Visual inspection	Daily inspections throughout construction
			10.6	Maintain equipment regularly as per specifications.	Business Partner/Engineer /EO	Maintenance records	Duration of construction
			10.7	Implement a grievance procedure whereby issues associated with noise can be raised/ reported and transparently and timeously addressed.	Business Partner/ EO	Grievance mechanism Proof of close out of grievance	As required
11	• Soil erosion resulting from cleared and disturbed areas. • Soil compaction from construction vehicles. • Loss of soil depth and volume due to excavation.	Loss of soil resources and land capability	11.1	Only strip areas where soils are to be disturbed by activities and infrastructure that are described in this EMPr, and where a clearly defined end rehabilitation use for the stripped soil has been identified. Soil stripping should be conducted as short a period before construction as possible. Topsoil should be stripped (according to current stripping to a depth of approximately 375 mm – where possible).	Business Partner/ EO	Visual inspection of progress against the Soil stripping plan Soil stripping plan	Daily inspections throughout construction
			11.2	Protect exposed soils to suppress dust during the construction phase. Plans for soil stripping should be compiled on the basis that certain soils are inherently suitable for rehabilitation purposes, whilst others are not.	Business Partner/ EO	Visual inspection of dust suppression effectiveness Soil stripping plan	Daily inspections throughout construction
			11.3	Re-vegetate all disturbed areas adjacent to the infrastructure complexes with an indigenous grass mix, if necessary, to re-establish a protective cover, in order to minimise soil erosion and dust emission.	Business Partner/ Environmental Manager	Concurrent rehabilitation plan	Completion of construction
			11.4	Limit excavation and long-term stockpiling of soil as far as practically possible. Stockpiled soils should be stored and used for rehabilitation and landscaping around the site once construction activities have been completed. Concurrent rehabilitation should be conducted where practically possible to reduce the duration of stockpile storage in order to ensure that the quality of stored soil material does not deteriorate excessively.	Business Partner/ EO	Concurrent rehabilitation plan Top soil plan Soil stripping plan	Monthly inspections throughout construction
			11.5	Identify areas for stockpiling in close proximity to the source of the soil to limit handling and to promote reuse of soils in the correct areas.	Business Partner/ EO	Top Soil Plan Soil stripping plan	Monthly inspections throughout construction
			11.6	Re-vegetate stockpiles to establish a vegetation cover as an erosion control measure, as far as possible. These stockpiles should also be kept free of alien vegetation at all times to prevent loss of soil quality.	Business Partner/ EO	Concurrent rehabilitation plan Top soil plan	Completion of construction
12	• Potential spills from construction activities.	Loss of soil resources due to contamination	12.1	Store all hazardous liquids within a bunded facility which will be designed to contain up to 110% of the volume of hazardous liquids stored within.	Business Partner/ EO	Visual inspection of bund wall or storage facility integrity	Weekly inspections throughout construction
			12.2	Maintain vehicles and equipment either on impermeable surfaces or drip trays should be used.	Business Partner/ EO	Visual inspection of vehicle maintenance sites Record of non-compliance	Daily inspections throughout construction
			12.3	Store all waste in specified areas according to the Waste Management Plan and should be on impermeable surfaces where specified.	Business Partner/ EO	Visual inspection of integrity of storage facilities and capacity of containers Compliance with Waste Management Plan	Daily inspections throughout construction
			12.4	Spill kits must be available on site to ensure that any fuel or oil spills are cleaned up immediately and disposed of correctly.	Business Partner/ EO	Visual inspection of spill kit availability and contents	Daily inspections throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			12.5	Provide awareness training to all workers (temporary and permanent) on the required steps to enable fast reaction to contain and remediate pollution incidents. In situ treatment is generally considered to be the preferred option because with successful in situ remediation the soil resource can be retained in the correct place. The in-situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are returned	Business Partner/ EO	Training records	Duration of construction
			12.6	Undertake post rehabilitation audits to ascertain whether the remediation of any polluted soils and re-establishment of soil functionality has been successful and if not, to recommend and implement further measures.	Business Partner/ EO/Environmental Manager	Audit findings	Duration of construction
13	• Land clearance; • Alteration of surface topography; • Vehicular movement; • Lighting; and • Construction activities.	Change in landscape and related visual impacts	13.1	Demarcate specific areas within which all construction activities must be undertaken.	Business Partner/ EO	Survey plan indicating construction area and regularly updating plans	Throughout construction
			13.2	Stockpile excess material from the cut platform for the smelter complex to the north of the cut platform and shaped into a low screening berm. The berms should be naturally shaped with crests rounded off and rehabilitated to natural veld grass (as far as possible).	Business Partner/ EO	Surface plan Inspections of facility against the designs of the berms	Inspections throughout construction
			13.3	Rehabilitate all disturbed areas as soon as possible after construction is complete in an area.	Business Partner/ EO	Rehabilitation plan	Throughout construction
			13.4	If very dry conditions prevail and dust becomes a nuisance, water should be sprayed on the road surface or areas cleared of vegetation (or other dust suppression measures implemented), without creating undue runoff.	Business Partner/ EO	Visual inspection of dust suppression activities Dust suppression schedule	Daily inspections throughout construction
			13.5	Implement soil stabilisation measures as soon as possible to ensure that erosion does not take place.	Business Partner/ EO	Visual inspection of integrity of stabilisation infrastructure	Daily inspections throughout construction
			13.6	Keep the construction sites neat and tidy at all times with litter and dust management measures in place.	Business Partner/ EO	Housekeeping reports	Daily inspections throughout construction
			13.6	Screen material storage yards and laydown areas through the use of material fencing.	Business Partner/ EO	Visual inspection of screen integrity	Daily inspections throughout construction
			13.8	All lights used for Ilumination, and within safety limitations, should be faced inwards and be shielded to avoid light spillage to the surrounding areas.	Business Partner/ EO	Visual inspection to ensure illumination installed correctly	Weekly inspections throughout construction
			132.9	Make use of motion detectors on security lighting, in office and maintenance areas, to reduce unnecessary illumination	Business Partner/ EO	Signed off design As built signoff	Throughout construction
			13.10	Schedule construction commencement as soon as possible after vegetation removal to reduce the amount of time during which surfaces are exposed.	Business Partner/ EO	Construction schedule	Throughout construction
			13.11	No large signage or advertising should be painted onto the cladding or roof sheeting.	Business Partner/ EO	Visual verification	Weekly inspections throughout construction
14	• Use of construction equipment and other machinery during construction activities.	Impact of the project on climate change	14.1	Investigate the use of fuel additives which improve fuel economy for vehicles and machinery.	Business Partner/ EO	GHG modelling Records of fuel additives purchase/ used	Throughout construction
			14.2	Regularly service vehicles and machinery to ensure optimal fuel efficiency.	Business Partner/ EO	Maintenance records	Weekly inspections throughout construction
			14.3	Limit speed of vehicles to 40 km/h.	Business Partner/ EO	TMP Incident report	Throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
15	• Increased heavy traffic and vehicular movement	Road disturbance and traffic safety	15.1	Implement appropriate technical measures, where required, to provide continued access to facilities, and to minimise traffic disruptions.	Business Partner/ EO	Visual inspection Design reports Grievance mechanism	Weekly inspections throughout construction
			15.2	Erect suitable traffic and construction signage to control traffic, raise awareness of potential risks/hazards and indicate alternative access routes, if needed.	Business Partner/ EO/Safety Officer	Visual inspection of signage presence Grievance mechanism Awareness training records	Weekly inspections throughout construction
			15.3	Implement suitable consultation procedures to ensure that potentially affected parties are informed about pending construction activities and potential disruptions.	Business Partner/ EO/Stakeholder Relations Manager	Record of consultation Grievance mechanism	Throughout construction
			15.4	All project related transport associated with the construction activities must adhere to stipulated national speed limits as displayed.	Business Partner/ ECO/Safety Officer	Grievance mechanism	Throughout construction
			15.5	Peak traffic periods should be avoided as far as possible by heavy delivery vehicles.	Business Partner/ EO	Transport schedules and planning records Grievance mechanism	Monthly inspections throughout construction
			15.6	Implement a transport safety programme to achieve the mitigation objectives. Key components of the programme include: • Education and awareness training; • Speed limit enforcement; • Maintenance of the transport system where appropriate; and • Use of dedicated loading and off-loading areas on site.	Business Partner/ EO	Training records	Throughout construction
			15.8	Develop and implement a road safety awareness campaign and TMP .	Business Partner/ Safety Officer/Safety Manager	Awareness training schedule and material Training records	Throughout construction
			15.9	Implement a grievance procedure whereby traffic related issues can be raised/ reported and transparently and timeously addressed.	Business Partner/ ECO	Grievance mechanism	As required throughout construction
16	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site.	Damage to or disturbance of archaeology and/ or heritage resources	16.1	Train personnel to ensure that employees are alert as to the potential occurrence of fossil bones, archaeological material and of unrecorded burials.	Business Partner/ EO/ECO	Training material and schedule Record of training	Throughout construction

			16.2	Develop and implement a Chance Finds Procedure to include:
				• Should chance finds be encountered, work must cease at the site immediately and the works foreman and the ECO for the project must be immediately informed. Scattered, unearthed parts/fragments of the find must be retrieved and returned to the main find site which must be protected from further disturbance.
				• The South African Heritage Resources Agency (SAHRA), must be informed and supplied with contextual information:
				  • A description of the nature of the find.
				  • Detailed images of the finds (with scale included).
				  • Position of the find (GPS) and depth.
				  • Digital images of the context. i.e. the excavation (with scales).
				• SAHRA and an appropriate specialist should assess the information and liaise with Black Mountain Mining (Pty) Ltd, the environmental consultants and the ECO and a suitable response should be established.
					Business Partner/ EO Archaeological specialist	Visual inspection of open trenches to determine presence of artefacts
						Record of findings
						Chance Finds Procedure
							Weekly inspections of newly opened trenches throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
				• In the event of a significant find, a professional archaeologist must be appointed to undertake the excavation and to record their contexts.			
17	• Clearance of surface areas for secured landfill facility and smelter complex. • Earthworks on-site.	Damage to or disturbance of palaeontological resources	17.1	Train personnel to ensure that employees are alert as to the potential occurrence of fossil bones, archaeological material and of unrecorded burials.	Business Partner/ EO	Record of training	Throughout construction

			17.2	Develop and implement a Fossil Finds Procedure to include:
				• Should fossil bones and teeth be encountered in the deposits, work must cease at the site immediately and the works foreman and the ECO for the project must be immediately informed. Scattered, unearthed parts/fragments of the find must be retrieved and returned to the main find site which must be protected from further disturbance.
				• The South African Heritage Resources Agency (SAHRA), must be informed and supplied with contextual information:
				  • A description of the nature of the find.
				  • Detailed images of the finds (with scale included).
				  • Position of the find (GPS) and depth.
				  • Digital images of the context. i.e. the excavation (with scales).
				• SAHRA and an appropriate specialist palaeontologist should assess the information and liaise with Black Mountain Mining (Pty) Ltd, the environmental consultants and the ECO and a suitable response should be established.
				• In the event of a significant fossil find, a professional palaeontologist must be appointed to undertake the excavation of the fossils and to record their contexts. The palaeontologist must also undertake the recording of the stratigraphy and sedimentary geometry of the exposures, must attempt sampling of the ambient small fossil content and must undertake the compilation of the detailed report.
				• A permit from SAHRA is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit will immediately be made to SAHRA. The application requires details of the registered owners of the sites, their permission and a site-plan map. All fossil finds must be recorded and the fossils and their contextual information (a report) must be deposited at a SAHRA-approved institution.
					RE/ EO
					Palaeontological specialist
						Visual inspection of excavations for fossils
						Record of findings
						Fossil Finds Procedure
						Permit for excavation
							Weekly inspections of newly opened trenches throughout construction

18	• Construction phase employment opportunities (direct and indirect). • Expenditure on construction activities.	Employment creation and economic stimulus Multiplier effect on the local and regional economy Economic benefits Significance of project expenditure	18.1	Identify required core skills and extend employee skills audits to investigate the prevalence of required skills in the municipal towns/ communities, and structure skills development endeavours accordingly.	Business Partner/ /HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.2	Review current targets for how much local labour should be used based on the needs of the Gamsberg Smelter Project and the availability of existing skills and people that are willing to undergo training.	Business Partner/ /HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.3	Ensure, through a structured stakeholder engagement programme, that communities are aware of local employment requirements and opportunities that are available. Where required, the local resident status of applicants should be verified in consultation with community representatives and municipal structures.	Business Partner/ /Stakeholder Relations Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			18.4	Clearly advertise the nature and numbers of jobs available during the project phases in surrounding communities, and ensure that communities understand the local recruitment procedures. Eligibility criteria should be informed by local authorities, or similar, and clearly communicated to any potential beneficiaries.	Business Partner/ /HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.5	Co-ordinate recruitment through local offices set up in Pofadder for recruitment from local communities. If this is not feasible, locate the recruitment offices at a central point (but not on-site) to control access and movement of jobseekers. A recruitment registry should be created for jobseekers to record relevant qualifications, work experience and contact details.	HR Manager/ Business Partner/ Stakeholder Relations Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.6	Formalise preferential employment of women and youth in the company recruitment policy. Performance indicators for promoting the employment of women and youth should be developed and implemented by the Gamsberg Smelter Project and its Business Partners. The positions reserved for these groups may only be filled with persons outside of these categories when it can be clearly demonstrated that no suitable persons are available.	HR Manager/ Business Partner/	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.7	An up-to-date skills database would greatly facilitate local employment. It is suggested that the Gamsberg Smelter Project engage with the relevant municipal departments and/or active NGOs in developing this database. The database should be in place in advance of the Business Partners being appointed. The database should include documentation verifying the eligibility status of applicants.	HR Manager/ Business Partner/ Stakeholder Relations Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.8	Labour-based methods of construction (e.g. digging of trenches), should be used, where possible, to maximise the Gamsberg Smelter Project's requirements for unskilled labour. If feasible, offer appropriate training and skills development to improve the ability of local community members to take advantage of employment opportunities arising.	Engineer/ Business Partner/ Stakeholder Relations Manager/HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
			18.9	Provide employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for on-the-job training.	HR Manager/ Business Partner/	Reference letters/ certificates	Throughout construction
			18.10	Inform the local authorities, community representatives, and organisations on the interested and affected party database of the final decision regarding the potential job opportunities for locals and the employment procedures that the Gamberg Smelter Project intends following for both the construction and operational phases of the project.	Stakeholder Relations Manager/ Business Partner/	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout construction
	• Local procurement		18.11	Review current targets for the use of local suppliers and sub-contractors where possible requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment.	Commercial Manager/ Business Partner/ Stakeholder Relations Manager	Local Procurement Policy Record of local procurement	Throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			18.12	Assist smaller enterprises where possible in tendering for contracts and in accessing finance for their participation in projects. Tender forms need to be kept as simple as possible so as not to act as a barrier to entry and the Gamberg Smelter Project must be willing to provide assistance with tendering where required.	Stakeholder Relations Manager/ Business Partner/	Local Procurement Policy Record of local procurement	Throughout construction
			18.13	Consider the unbundling of suitable tenders to provide opportunities for local service providers.	Commercial Manager/ Business Partner/	Local Procurement Policy Record of local procurement	Throughout construction
			18.14	Tender criteria should require the relevant Business Partners to provide training and skills development to the locally recruited workforce. Where possible, training should be aimed at providing skills to employees that might enable them to apply for some permanent positions that become available once construction is complete, or at other construction companies active in the local and regional study area.	Commercial Manager/ Business Partner/ Stakeholder Relations Manager	Local Procurement Policy Record of local procurement	Throughout construction
			18.15	Identify procurement opportunities and goods/services that could be supplied by local contractors and service providers.	Commercial Manager/ Business Partner/	Local Procurement Policy Record of local procurement	Throughout construction
			18.16	Give preference to suitable sub-contractors or SMMEs located firstly in the surrounding towns/ settlements, then in Namakwa District and then to contractors located outside the Namakwa District.	Stakeholder Relations Manager/ Business Partner/	Local Procurement Policy Record of local procurement	Throughout construction
			18.17	Develop a register of SMMEs and the types of goods and services they provide. Work with local municipalities to develop SMMEs through relevant forums and committees. Where SMMEs do not exist locally, investigate the possibility of launching a training/ skills development initiative under the auspices of the skills development programme required for the SLP.	Commercial Manager/ Business Partner/ Stakeholder Relations Manager	Local Procurement Policy Record of local procurement	Throughout construction
			18.18	Include local procurement requirements/ targets in procurement policies and Business Partner agreements. Monitor the procurement practices of Business Partners and enforce requirements. If contracts are awarded to non-local service providers, Business Partners should demonstrate that reasonable action was taken to identify a local service provider.	Commercial Manager/ Business Partner/ Stakeholder Relations Manager	Local Procurement Policy Record of local procurement	Throughout construction
			18.19	Clearly advertise the nature and extent of local procurement opportunities during all project phases.	Commercial Manager/ Business Partner/ Stakeholder Relations Manager	Local Procurement Policy Record of local procurement	Throughout construction
	• Local training		18.21	Continue with established training programmes based on the skills needs and gaps identified for the Gamsberg Smelter Project. Training should preferably be National Qualifications Framework (NQF) accredited and training providers must be registered with the relevant Sector Education and Training Authority (SETA).	HR Manager/ Business Partner/	Training records Records of trainee places of origin.	Annually throughout construction
			18.22	Develop and implement an Adult Basic Education and Training (ABET) Programme, for both workers and people from local communities. Such programmes could be incorporated into the	Stakeholder Relations Manager/	Training records Records of trainee places of origin.	Annually throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
				SLP. Prioritise inclusion of women and vulnerable people in ABET programmes and other training programmes available to the local community.	Business Partner/ Training Manager		
			18.23	Provide opportunities for those locals who received ABET training to be employed on the Gamsberg Smelter Project or be considered for procurement contracts with the Gamsberg Smelter Project.	HR Manager/ Business Partner/	Training records Records of trainee places of origin.	Annually throughout construction
			18.24	Identify suitable students from local schools to participate in company bursaries and internships programmes (if any), through extending the SLP Skills Development Plan to include people from the local area.	HR Manager/ Business Partner/	Training records Records of trainee places of origin Updated SLP	Annually throughout construction
19	• Project-induced population influx • Negative impacts related to the presence of construction workers • Health, safety and security of communities	Measures to address population influx:	19.1	Depending on the severity of the impact, the Gamsberg Smelter Project could financially assist the municipalities in undertaking a high-level situation analysis and, depending on the findings of this analysis, commission a detailed management plan together with Government role players. The Gamsberg Smelter Project may also be in a position to provide technical support.	Developer	Minutes of meetings with local municipalities Record of	Annually throughout construction
			19.2	Robust regulatory measures must be instated to manage informal settlement, unlawful land occupation at/ near the Gamsberg Smelter Project site, as well as unauthorised sub-letting of houses in Aggeneys. Suitable protocols should be instated to identify and manage instances where unlawful occupation and overcrowding of houses occur.	Developer	Record of incidents Grievance mechanism	Throughout construction
			19.3	Communication of recruitment policies to discourage influx of jobseekers from other areas and to prevent potential community conflict.	Stakeholder Relations Manager/ Business Partner/ HR Manager	Record of communication	Throughout construction
			19.4	Involve the local municipality and community structures (e.g. ward councillors) to assist in communicating the intention to give preference to local labour, and to assist in identifying the recruitment stations and protocol.	Stakeholder Relations/ Business Partner/	Record of communication	Throughout construction
			19.5	Liaise with the local municipality to ensure that housing shortages and expected population influx are taken into account in the SLP and LED programmes.	Stakeholder Relation Manager/ Business Partner/	Record of communication	Throughout construction
		Measures to minimise the occurrence of social pathologies:	19.6	Implement the existing HIV/AIDS awareness and prevention programme amongst all employees, and make this a condition of contract for any suppliers and sub-contractors.	HR Manager/ Business Partner/ Occupational Hygiene Manager	Record awareness training Supplier/ Business Partner contracts	Throughout construction
			19.7	Provide an adequate supply of free condoms (male and female) to workers.	Developer/ Business Partner/ ECO	Visual verification of availability	Weekly checks throughout construction
			19.8	Control access at the construction sites and Business Partner camp to prevent sex workers and petty traders from visiting and/or loitering near the construction camps.	Security Manager/ Business Partner/ ECO	Security logs Record of incidents	Daily checks throughout construction
			19.9	Support suitable government agencies, clinics, schools and NGOs involved in raising community awareness and education on sexually transmitted diseases (STDs) and substance abuse.	Community Relations Manager/ Business Partner/ ECO	Record of community awareness campaigns	Throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
		Measures to address crime include:	19.10	Construction workers should be clearly identifiable by wearing construction uniforms displaying the logo of the Business Partner company. This could prevent opportunistic persons wandering near the sites under the guise of being construction employees.	Project Manager/Engineer/ Business Partner/ ECO	Visual inspection PPE records	Daily checks throughout construction
			19.11	Black Mountain Mining (Pty) Ltd should consult with the South African Police Service (SAPS) and/ or security firms active in the area to establish standard operating procedures for the control and removal of loiterers at the aforementioned sites.	Security Manager/ Business Partner/	Record of communication	As required throughout construction
			19.12	Appropriate liaison structures should be established with local police services to monitor changes in crime patterns. Liaison should also be established with existing crime control organisations, such as community policing forums.	Security Manager/ Business Partner/	Record of communication	As required throughout construction
			19.13	Through the abovementioned forums, identify if recorded criminal activities (for example housebreaking) has any connection with the Gamsberg Smelter Project workforce. Verify claims of surrounding communities in this regard and take appropriate action.	Security Manager/ Business Partner/	Record of communication Data analysis	As required throughout construction
		Measures to address potential conflict between locals and non-locals:	19.14	The Gamsberg Smelter Project's recruitment and employment policies should be fair, transparent and readily available.	HR Manager/ Business Partner/	Recruitment Policy	Throughout construction
			19.15	Establish a grievance procedure and mechanism to lodge complaints at a location that is accessible to aggrieved members of the surrounding communities.	Stakeholder Relations Manager/ Business Partner/	Grievance mechanism	As required throughout construction
			19.16	Develop standby procedures with the local police and private security services to assist with any security incidents. These procedures should be aligned with the UN Voluntary Principles on Security and Human Rights.	Security Manager/ Business Partner/	Relevant Procedures on record	Quarterly checks throughout construction
			19.17	In the event of notable friction/ conflict between locals and non-locals, a conflict management plan may have to be developed and implemented in conjunction with other key stakeholders.	Security Manager/ Business Partner/ Stakeholder Relations Manager	Relevant Procedures on record	Quarterly checks throughout construction
		Health, safety & security of communities	19.18	Implement a Business Partner Management Plan which must include requirements with regard to health and safety, as well as conduct and controls for construction workers. This plan should be aligned with the UN Voluntary Principles on Security and Human Rights.	Safety Manager/ Business Partner/ Security Manager	Business Partner Management Plan on file	Annual audits
			19.19	Inform workers of camp policies and safety requirements and educate them with regard to their conduct in local communities.	Security Manager/ Business Partner/ HR Manager	Record of training Signed Code of Conduct	Quarterly checks throughout construction
			19.20	Rules of conduct must be enforced with regard to sanitation, water and waste.	Occupational Hygiene Manager/ Business Partner/ ECO	Record of training Signed Code of Conduct	Quarterly checks throughout construction

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			19.21	Implement a fire safety and firefighting plan which should describe actions to be taken in case of a fire starting on site or at the construction camp. Construction workers must be trained in the use of firefighting equipment, which should be available on site and in good working order at all times.	Occupational Hygiene Manager/Safety Manager / Business Partner/ ECO	Record of training in fire fighting Signed Code of Conduct	Quarterly checks throughout construction
			19.22	Discard refuse on site in sealed bins and/or covered refuse containers. Refuse should be removed from the site at regular intervals and disposed of at the approved BMM waste disposal sites.	Business Partner/ ECO/EO	Waste Management Plan Signed Code of Conduct	Weekly checks throughout construction
			19.23	Security must monitor and control worker movement in terms of environmental, crime and related occurrences.	Security Manager/ Business Partner/ ECO	Record of incidents	Weekly checks throughout construction
			19.24	Establish efficient communication strategies or stakeholder engagement programme and establish a grievance procedure and mechanism at a location that is accessible to aggrieved members of the surrounding communities.	Stakeholder relations Manager/ Business Partner/ ECO	Grievance mechanism	As required throughout construction

27.4 OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT PLAN

27.4.1 Introduction

This Operational EMPr (OEMPr) covers the requirements for controlling the impact on the environment of operational activities. This OEMPr aims to provide Black Mountain Mining (Pty) Ltd with the necessary tools to ensure that the potential impacts on the environment during the operation and maintenance of the Gamsberg Smelter Project are minimised and the social benefits enhanced. It also aims to ensure that the infrastructure is operated and maintained according to Good Practice.

This OEMPr is a working document that may be amended to enhance its effectiveness for environmental control.

27.4.2 Application

The application and implementation of the OEMPr shall be the responsibility of Black Mountain Mining (Pty) Ltd. Black Mountain Mining (Pty) Ltd is to designate an EO to ensure that relevant requirements of the OEMPr are implemented, and that the site is suitably managed. Black Mountain Mining (Pty) Ltd may appoint a suitably qualified and experienced person from within the existing staff to fulfil the role of EO.

Should Black Mountain Mining (Pty) Ltd sub-contract any portion of the operational activities to a third party, the OEMPr must be part of the contract and must be binding.

The roles and responsibilities of each of the above-mentioned environmental management bodies have been detailed below:

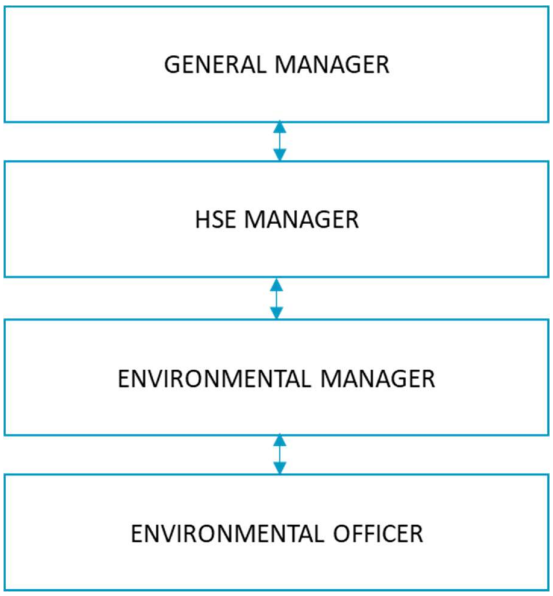


Figure 27-2 Operational Phase Roles and Responsibilities

Environmental Manager

The Environmental Manager would act as Black Mountain Mining (Pty) Ltd's on-site implementing agent and carries the responsibility to ensure that operational construction activities are executed in compliance with the EMPr.

Any on-site decisions regarding environmental management are the responsibility of the Environmental Manager in accordance with their delegated authorities. The Environmental Manager shall oversee the EO and ensure their responsibilities are fulfilled.

Environmental Officer

A suitably qualified and trained individual appointed by Black Mountain Mining (Pty) Ltd prior to the operational phase of the project, would fulfil the role of the EO. The primary roles and responsibilities of the EO will be:

- To oversee the implementation of the OEMPR on site in accordance with the OEMPR and Black Mountain Mining (Pty) Ltd' internal environmental management systems;
- To visit the site on a monthly basis (or as required) and advise on areas of environmental management, or compliance with the OEMPr requiring attention;
- To visit the site more regularly during the first three months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;
- To be called to site in the case of any emergency situation which may impact on the local environment;
- To liaise with various specialists and the local authorities if required, regarding issues relating to environmental management;
- To report on compliance with the OEMPr specifications to Black Mountain Mining (Pty) Ltd;
- To facilitate environmental audits and ensure that they are undertaken, as required;
- To keep a comprehensive record of environmental management, issues of non-compliance and minutes of meetings for audit purposes;
- To ensure monitoring programmes are implemented during the operational phase; and
- To undertake any other tasks outlined in this document, on the behalf of Black Mountain Mining (Pty) Ltd.

Independent Environmental Auditor (IEA)

Since provision has been made for the EO to be an internal Black Mountain Mining (Pty) Ltd appointment, Black Mountain Mining (Pty) Ltd shall employ an independent Environmental Professional with a post graduate degree in environmental studies and a minimum of five years relevant experience to act as the independent environmental auditor for the site. The IEA is to be employed upon completion of the first year of operation, and is to perform an annual formal audit on the OEMPr, and its implementation by the relevant parties at intervals as indicated in the environmental authorisation . Specific audit requirements are contained within Section 27.4.4.

27.4.3 Financing for Environmental Management

The budget for the implementation of the OEMPr shall come out of Black Mountain Mining (Pty) Ltd's Gamsberg Mine operational budget. Black Mountain Mining (Pty) Ltd must review the OEMPr and allocate the requisite funds to facilitate compliance. The majority of the items addressed in the OEMPr relate to required preventative maintenance, operator legal compliance, and responsible environmental management. Monitoring costs are also to be included. These budgets are to be reviewed annually and adjusted based on operational requirements and the results of compliance audits.

27.4.4 OEMPr Review and Audit

OEMPr Audit

Audits of the OEMPr implementation should be undertaken on an annual basis. Internal audits (by the EO) should be done on a quarterly basis with an external audit conducted by the IEA undertaken as specified below.

Each audit is to be based on site visits by the auditor as well as a review of any records of environmental management and monitoring to be kept by the EO. The audit must also determine whether the OEMPr is adequately dealing with the range of environmental impacts on the site, i.e. whether the plan is still appropriate, or whether it needs to be extended.

The audit report is to include recommendations of changes required to the OEMPr document, management practices, etc., to improve environmental management of the site. The results of this audit are to be submitted to the Northern Cape DMRE.

OEMPr Review

A schedule for the review of the OEMPr should be established by Black Mountain Mining (Pty) Ltd. It is recommended that the effectiveness of the OEMPr be reviewed on an annual basis, and possibly bi-annually in the first year of operation. The need for review would be identified during the annual audits. The review process should be aligned with the scheduling of the Management Review process defined in the mine's ISO 14001 environmental management system.

Any proposed changes are to be submitted by the EO to Northern Cape DMRE for approval prior to implementation. Amendments or additions made to the document (with the approval of the relevant authorities) are to be included as annexures, distributed to all relevant parties, and should be considered as OEMPr specifications to which all relevant parties are bound.

Results of internal environmental audits are to inform Black Mountain Mining (Pty) Ltd of changes required to the OEMPr documentation.

27.4.5 Operational Phase Impact Management Actions

The impact management actions that have been identified for the operational phase of the Gamsberg Smelter Project are summarised in Table 27-3.

Table 27-3 Description of Impact Management Actions – Operational Phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
1	• Compliance with EMPr and EA	Confirm commitment to adherence to EMPr and Business Partner Compliance Standards	1.1	Ensure that the EMPr, Business Partner Compliance Standards and EA are available on- site throughout the operational phase.	EO/Environmental Manager	Copy of signed EMPr and EA on-site	Throughout operational phase
		Auditing of compliance with EMPr and EA	1.2	An annual audit shall be undertaken by an independent auditor, and a report shall be submitted to DMRE. The audit report shall indicate the date of the audit, name of auditor, and outcome of audit in terms of compliance with the environmental authorisation and conditions of the EMPr.	Environmental Manager/ EO	Audit report and proof of submission to DMRE	Annually throughout operational phase
2	• Health and Safety of employees during operational activities	Ensure the health and safety of all employees and site users	2.1	Update the existing Occupational Health and Safety Plan to include the Gamsberg Smelter Project and develop specific procedures on chemical hazards, fire and explosions, heavy lifting, work at heights, confined spaces and on site-traffic hazards in accordance with the Mine Health and Safety Act, requirements.	Safety Manager/ Occupational Hygiene Manager	Updated Health & Safety Plan	Throughout operational phase
			2.2	Install firefighting equipment (e.g. fire hydrants, fire hose reels and an automatic sprinkler system) in buildings and maintain to meet the minimum requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHS Act, 1993).	Safety Manager/ Occupational Hygiene Manager	Visual Inspection of equipment availability and condition Weekly Safety Reports Maintenance records	Throughout operational phase
			2.3	Appropriate PPE must be worn by all personnel (e.g. footwear, earplugs, masks, protective clothing and goggles) in areas where these are deemed applicable and as defined in the Gamsberg Smelter safety management system.	Smelter Manager/ Safety Manager	Occupational safety inspection reports	Throughout operational phase
			2.4	Implement Health and Safety communication and training programmes to prepare workers to recognise and respond to workplace hazards. Programmes will include, as a minimum, aspects of hazard identification, safe operating and materials handling procedures, safe work practices, basic emergency procedures and special hazards unique to their jobs.	Safety Manager/ Training Manager	Signed training registers	Throughout operational phase
			2.6	Undertake a job safety analysis (Risk Assessment) to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards.	Occupational Hygiene Manager	Records of safety analysis	Throughout operational phase
			2.7	Display safety signage in prominent areas at the entrance to designated high-risk zones. All employees' working conditions shall comply with the requirements of the Mine Health and Safety Act.	Plant Manager/Safety Manager	Safety Officer inspection reports Incident Reports	Throughout operational phase
			2.8	Conduct regular medical surveillance (which includes employee hearing tests and monitoring) for all employees working in designated noise zones.	Occupational Hygiene Manager/ Safety Manager	Medical Reports	Throughout operational phase
			2.9	Develop and implement an EPRP that is commensurate with the risks of the facility.	Safety Manger/ Occupational Hygiene Manager	EPRP on site Proof of training	Throughout operational phase
3	• All operational related activities resulting in environmental impacts	General site requirements	3.1	Adhere to good health and safety and good housekeeping practices on site.	EO	Site inspection reports Incident report	Throughout operational phase
			3.2	Establish good waste management practices on site, to include recycling, separation and storage of hazardous waste at suitable lined/bunded areas.	EO	Waste volume records Site inspection reports Waste management procedure	Throughout operational phase
			3.3	Implement a grievance procedure whereby any issues can be raised / reported and transparently and timeously addressed.	EO	Grievance mechanism Proof of close out of grievance Grievance register	Throughout operational phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
4	• Potential contamination from secured landfill facility and other operational activities.	Deterioration of groundwater quality	4.1	Oil spill kits must be available on site in case of spills of hydrocarbon chemicals and the relevant training on the use of spill kits must be provided.	Engineer/ EO	Report on Spill kit availability and conditions	Throughout operational phase
			4.2	Implement the EPRP in case of a discharge incident that could result in the pollution of surface water resources.	Environmental Manager/ EO	Record of incidents	Throughout operational phase
			4.3	Regularly inspect leak detection measures to identify and spills/ leaks.	SLF Engineer/ EO	EO weekly report Groundwater monitoring report Monthly reports	Throughout operational phase
			4.4	Update the water balance for the secured landfill facility on an annual, this data will benefit future groundwater modelling updates and predictions.	Environmental Manager/ EO	Updated water balance	Throughout operational phase
			4.5	Use and update the existing numerical groundwater model as a management and predictive tool.	Environmental Manager/ EO/ Groundwater specialist	Updated numerical model	Every 2 years throughout operational phase
			4.6	Undertake a detailed geochemical analysis of Jarofix and ETP cake (at least 5 representative samples) produced in the local plant as soon as this becomes available to improve the geochemical model developed for this EIA. The following analyses should be undertaken: • Chemical composition (whole sample and elemental analysis); • Mineralogical analysis of the material to understand changes in composition as the Jarofix ages; • Acid-base accounting (ABA) and net acid generation (NAG); • Water extraction tests; • Kinetic leach tests of at least two representative Jarofix samples to confirm how the leachate quality would change with time; and • a detailed mineralogical analysis of the material to understand changes in composition as the Jarofix ages.	Environmental Manager/ EO/ Geochemical specialist	Jarofix and ETP cake analysis Updated geochemical model	1st Quarter after start-up of plant
			4.7	Undertake water quality monitoring as per Table 29-1.	EO	Surface and process water monitoring report	Throughout operational phase
5	• Potential spills/ contamination from operational activities.	Deterioration of surface water quality	5.1	Store all chemicals and toxins in bunded areas with sufficient capacity to retain 110% of the volume of material stored in the bund.	EO	Environmental Monitoring Report Record of spills and proof of safe disposal	Throughout operational phase
			5.2	Material Safety Data Sheets for all applicable materials stored on site must be readily available to on site personnel.	EO	MSDS on site	Throughout operational phase
			5.3	Maintain stormwater systems on a monthly basis.	Plant Manager/ EO	Storm water maintenance schedule Environmental inspection reports	Monthly checks and after storm events throughout operational phase
			5.4	Oil spill kits should be available on site in case of spills of hydrocarbon chemicals and the relevant training on the use of spill kits must be provided.	Engineer/ EO	Report on spill kit availability and conditions	Weekly inspections throughout operational phase
			5.5	Implement the EPRP in case of a discharge incident that could result in the pollution of surface water resources.	EO/Environmental Manager	Close out reportRecord of incident investigation Proof of submission to DWS	Throughout operational phase
			5.6	Monitor and maintain the flood protection berm as required.	EO	Visual inspections of status and condition of berm	Monthly checks and after storm events throughout operational phase
6	• Smelter emissions; and • Operational activities.	Impact on vegetation and flora due to	6.1	Undertake ongoing dust and ambient air quality monitoring as per Table 29-1.	EO	Dust monitoring data Ambient air quality data	Throughout operational phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
		operational-related dust and other emissions	6.2	Undertake ongoing monitoring of sensitive flora and vegetation as per Table 29-1 (Section 4).	Biodiversity Manager	Monitoring data and analysis	Throughout operational phase
7	• Presence of workers; and • Movement of vehicles.	Impact on fauna due to operational phase disturbances	7.1.	Catch and remove any fauna such as snakes, lizards or small mammals that are trapped or otherwise threatened by operational activities to a safe location by trained snake handlers who should be available on site at all times.	Biodiversity Manager	Record of any fauna relocated	Throughout operational phase
			7.2.	Maintain night lighting using low-UV type lights (such as most LEDs) to minimise attracting insects, bats and nocturnal birds.	EO/Engineer	Visual inspection	Throughout operational phase
			7.3.	All construction vehicles using internal roads should adhere to a low speed limit (40 km/h) to avoid collisions with susceptible species such as snakes, tortoises, rabbits or hares. Speed monitoring of construction vehicles and regular awareness raising of staff on this issue should be implemented.	EO/Engineer	Speed monitoring report Record of incidents	Throughout operational phase
8	• Movement of construction equipment and other vehicle during construction activities. • Clearance of vegetation during the construction phase.	Potential human health impacts due to dust and emissions	8.1	Operate the smelter in compliance with the AEL.	Plant Manager/ EO	Air quality monitoring data and analyses	Throughout operational phase
			8.2	Sweep the road surface from the smelter complex to the secured landfill facility, or similar, on a regular basis to minimise the vehicle entrainment of dust from this surface.	Plant Manager/EO	Maintenance schedule Environmental inspection reports	Throughout operational phase
9	• Noise generated due to construction activities i.e. vehicle and machinery noise.	Nuisance impact on surrounding landowners	9.1	Limit non-routine noise generating activities such as start-up and maintenance to day-time hours.	Plant Manager/EO	Shutdown and Start-up schedules Weekly reports	Throughout operational phase
			9.2	Shut down (or throttled down to a minimum) machines and mobile equipment used intermittently between work periods . This will reduce noise and conserve energy.	Engineer	Weekly reports	Throughout operational phase
			9.3	Keep acoustic covers of engines closed when in use or idling.	EO/Safety Officer	Environmental and Safety Reports	Throughout operational phase
			9.4	Keep doors to pump houses and generators closed when in use.	EO/Safety Officer	Environmental and Safety Reports	Throughout operational phase
			9.5	Equipment should be regularly and effectively maintained.	Engineer	Visual inspection Maintenance records	Throughout operational phase
10	• Potential spills from operational activities.	Loss of soil resources due to contamination	10.1	Store all chemicals and toxins in a bunded area with sufficient capacity to retain 110% of the volume of the stored substances.	Plant Manager/EO	Environmental inspection report	Throughout operational phase
			10.2	Maintain vehicles and equipment either on impermeable surfaces or drip trays should be used.	Engineer/EO	Inspection report	Throughout operational phase
			10.3	Store all waste in specified areas and should be on impermeable surfaces where required.	EO/Plant Manager	Visual verification and Report	Throughout operational phase
			10.4	Spill kits must be available on site to ensure that any fuel or oil spills are cleaned up immediately and disposed of correctly.	Plant Manager/EO	Report on Spill kit availability and conditions	Throughout operational phase
			10.5	Provide aareness training to all workers (temporary and permanent) on the required steps to enable fast reaction to contain and remediate pollution incidents. In situ treatment is generally considered to be the preferred option because with successful in situ remediation the soil resource can be retained in the correct place. The in-situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are returned	EO	Incident Report Waste volume reports to bioremediation site Training records	Throughout operational phase
			10.6	Undertake post rehabilitation audits to ascertain whether the remediation of any polluted soils and re-establishment of soil functionality has been successful and if not, to recommend and implement further measures.	EO/Biodiversity Manager	Audit findings	Throughout operational phase
11	• Smelter complex; and		11.1	Undertake continued rehabilitation of areas not being used for operational phase activities.	EO/Environmental Manager	Concurrent rehabilitation design report	Until rehabilitation is complete.

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
	• Secured landfill facility.	Change in landscape and related visual impacts	11.2	Spray water on the road surface or areas cleared of vegetation (or implement other dust suppression measures implemented), without creating undue runoff if very dry conditions prevail and dust becomes a nuisance.	Plant Manager/EO	Dust suppression schedule Maintenance Schedule	Throughout operational phase
			11.6	Keep project sites neat and tidy at all times with litter and dust management measures in place.	Plant Manager/EO	Housekeeping Inspection report	Throughout operational phase
			11.6	Screen material storage yards and laydown areas through the use of material fencing.	Plant Manager/EO	Inspection Report	Throughout operational phase
			11.8	Undertake bi-annual inspections of lighting to ensure light spill is minimised.	EO	Visual inspection	Bi-annually throughout operational phase
12	• Use of construction equipment and other machinery during construction activities.	Impact of the project on climate change	12.1	Investigate the potential for use of zero emission energy technologies like solar power and energy efficient technologies.	Black Mountain Mining (Pty) Ltd/	Research on potential alternative sources of power Cost benefit analysis	Annually throughout operational phase
			12.2	Regularly service ehicles and machinery to ensure optimal fuel efficiency.	Engineer	Maintenance Schedule Maintenance records	Annually throughout operational phase
13	• Increased heavy traffic and vehicular movement	Road disturbance and traffic safety	13.1	Avoid transport of product/ by-product during peak traffic periods as far as possible.	Logistics Manager	Logistics Schedule Grievance mechanism	Throughout operational phase
			13.2	Implement a transport safety programme to achieve the mitigation objectives. Key components of the programme include: • Education and awareness training; • Speed limit enforcement; • Maintenance of the transport system where appropriate; and • Use of dedicated loading and off-loading areas on site.	Safety Manager/Commercial Manager/EO	Training records	Throughout operational phase
			13.3	Implement a road safety awareness campaign and TMP which should be updated throughout the operational phase.	Black Mountain Mining (Pty) Ltd/ Safety Manager	TMP Grievance mechanism	Throughout operational phase
14	• Operational phase employment opportunities (direct and indirect). • Project expenditure. • Local procurement	Employment creation and economic stimulus Multiplier effect on the local and regional economy Economic benefits Significance of project expenditure	14.1	Through a structured stakeholder engagement programme, ensure that communities are aware of local employment requirements and opportunities that are available. Where required, the local resident status of applicants should be verified in consultation with community representatives and municipal structures.	Stakeholder Relations Manager/ HR Manager	Local Employment Policy on file Recruitment records Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout operational phase
			14.2	Clearly advertise the nature and numbers of jobs available in surrounding communities, and ensure that communities understand the local recruitment procedures. Eligibility criteria should be informed by local authorities, or similar, and clearly communicated to any potential beneficiaries.	HR Manager	Local Employment Policy on file Recruitment records Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout operational phase
			14.3	Co-ordinate recruitment through local offices set up in Pofadder for recruitment from local communities. If this is not feasible, locate the recruitment offices at a central point (but not on-site) to control access and movement of jobseekers. A recruitment registry should be created for jobseekers to record relevant qualifications, work experience and contact details.	HR Manager	Local Employment Policy on file Recruitment records Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout operational phase
			14.4	Formalise preferential employment of women and youth in the company recruitment policy. Performance indicators for promoting the employment of women and youth should be developed and implemented by the Gamsberg Smelter Project and its Business Partners. The positions reserved for these groups may only be filled with persons outside of these categories when it can be clearly demonstrated that no suitable persons are available.	HR Manager	Local Employment Policy on file Recruitment records Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout operational phase
			14.5	Engage with the relevant municipal departments and/or active NGOs in developing and updating a skills database. The database should include documentation verifying the eligibility status of applicants.	HR Manager	Local Employment Policy on file Recruitment records Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout operational phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			14.6	Include local procurement targets in the Gamsberg Smelter Project's procurement policy and Business Partner contract agreements.	Commercial manager	Procurement policy Business Partner contracts	Throughout operational phase
			14.7	Develop procedures for the procurement policy to ensure preferential procurement in accordance with BBBEE and the Mining Charter requirements.	Commercial Manager	Procurement policy Business Partner contracts	Throughout operational phase
			14.8	Develop a Procurement Progression Plan as required in terms of the SLP to benefit local procurement.	Commercial Manager	Procurement Progression Plan	Update every 5 years with the SLP
			14.9	Develop and implement skills development and training targets for local procurement and include these in Business Partner contracts.	Stakeholder Relations Manager/HR Manager	Skills development and training targets Business Partner contracts	Annually throughout operational phase
			14.10	Procure from local suppliers throughout the life of the project to maximise the empowerment of Historically Disadvantaged South African's companies (and sharing in project benefits by disadvantaged communities in general).	Commercial Manager	Procurement policy Business Partner contracts	Throughout operational phase
			14.11	Compile/ update a database of local and district service providers, and issue new contracts to service providers who show an interest in the provision of specific services. A business survey could be conducted to inform this database. Where applicable, use databases from projects within the local area and municipalities.	Stakeholder Relations Manager/Commercial Manager	Database of local and district service providers Record of suppliers used	Throughout operational phase
			14.12	Update existing supplier database to include suppliers that may qualify for procurement opportunities after receiving training/ support. Identify procurement opportunities and goods/ services that could be supplied by local Business Partners.	Stakeholder Relations Manager/Commercial Manager	Database of local and district service providers Record of suppliers used	Throughout operational phase
			14.13	Develop internal mechanisms for unbundling contracts where possible to realise the above opportunities.	Commercial manager	Record of suppliers used	Throughout operational phase
			14.14	Ensure that local businesses are aware of the procurement needs of the Gamsberg Smelter Project and have sufficient information to prepare tenders.	Stakeholder Relations Manager	Proof of communication/ advertisements	Throughout operational phase
	• Social investment		14.15	Update Corporate Social Investment (CSI) initiatives, to participate in activities that would contribute to addressing underlying development issues such as education and health (including HIV/AIDS). CSI initiatives make provision for including vulnerable groups.	Stakeholder Relations Manager	Record of CSI initiatives	Throughout operational phase
			14.16	Promote establishment and upgrading of services and infrastructure, where feasible, through Black Mountain Mining (Pty) Ltd SLP and LED priorities.	Stakeholder Relations Manager	Updated SLP/ LED	Throughout operational phase
			14.17	Identify and invest in projects that meet the criteria of Black Mountain Mining (Pty) Ltd and relevant legislation (e.g. poverty eradication, infrastructure development and welfare creation projects). Projects could include providing financial support to higher education institutions, as well as providing bursaries to qualifying employees.	Stakeholder Relations Manager	Record of projects invested in	Update annually throughout operational phase
			14.18	Continually assess the projected Integrated Development Plan (IDP) and LED initiatives of local municipalities to ensure that the SLP commitments remain relevant in terms of the above initiatives. Liaise with relevant local and district planning departments responsible for integrated development planning and LED to assess if partnerships could be created as part of Black Mountain Mining (Pty) Ltd IDP and LED initiatives.	Stakeholder Relations Manager	Updated SLP	Update SLP every 5 years throughout operational phase
15	• Impacts due to operational phase related activities	Community and local landowner health, safety and security	15.1	Develop and implement a project-specific Health, Safety and Security Plan (if not already in existence) which should include measures to mitigate on adjacent farms.	HSE Manager	Health, Safety and Security Plan Record of incidents	Throughout construction
			15.2	Establish efficient communication strategies or stakeholder engagement programme and establish a grievance procedure and mechanism at a location that is accessible to aggrieved members of the surrounding communities.	Stakeholder Relations Manager/ EO	Grievance mechanism	Throughout construction

27.5 DECOMMISSIONING/ CLOSURE PHASE IMPACT MANAGEMENT ACTIONS

The impact management actions that have been identified for the decommissioning phase of the Gamsberg Smelter Project are summarised in Table 27-4

Table 27-4 Description of Impact Management Actions – Decommissioning/ Closure Phase

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
1	• Compliance with EMPr and EA	Confirm commitment to adherence to EMPr and Business Partner Compliance Standards	1.1	Ensure that the EMPr, Business Partner Compliance Standards and EA are available on- site throughout decommissioning and are implemented.	EO	Copy of signed EMPr and EA with Business Partner	Throughout decommissioning
		Ensure that all relevant permits/ licences have been issued.	1.2	Meet all relevant legal requirements.	Smelter Project Manager	Permits	Prior to decommissioning
		Auditing of compliance with EMPr and EA	1.3	An audit shall be undertaken by an independent auditor at the end of the decommissioning phase, and a report shall be submitted to DMRE. The audit report shall indicate the date of the audit, name of auditor, and outcome of audit in terms of compliance with the environmental authorisation and conditions of the EMPr.	Environmental Manager/ EO	Audit report and proof of submission to DMRE	Once decommissioning has been completed
2	• Compliance with Closure Plan	Auditing of compliance with Closure Plan	2.1	An audit shall be undertaken by an independent auditor at the end of the closure phase, and a report shall be submitted to DMRE. The audit report shall indicate the date of the audit, name of auditor, and outcome of audit in terms of compliance with the Closure Plan and conditions of the EMPr.	Environmental Manager/ EO	Audit report and proof of submission to DMRE	Once closure is completed
3	• Health and Safety of employees during construction related activities	Ensure the health and safety of Business Partners and site users	3.1	Adhere to the Health and Safety Plan to avoid work related accidents.	Business Partner/ EO/ Environmental Manager/ Closure project Manager	Signed Health and Safety Plan	Throughout decommissioning
			3.2	Appropriate PPE must be worn by all construction personnel. This shall include the use of ear protection in areas where the 8-hour ambient noise levels exceed 75dBA.	Business Partner/ EO/ Environmental Manager/ Closure project Manager	Signed Health and Safety Plan, Incident report	Throughout decommissioning
			3.3	Undertake a bi-annual audit of all health and safety related management plans.	Business Partner/ EO/ Environmental Manager/ Closure project Manager	Health and Safety Audit reports	Bi-annually during decommissioning
4	• All decommissioning related activities resulting in environmental impacts	General site requirements	4.1	Adhere to good health and safety and good housekeeping practices on site during decommissioning.	Business Partner/ EO	All incidents recorded in an Incident Report.	Throughout decommissioning
			5.2	Establish good waste management practices on site, to include recycling, separation and storage of hazardous waste at suitable lined/bunded areas. All wastes that cannot be reused or recycled shall be collected by approved waste Business Partners and disposed of in a registered landfill or licensed hazardous waste site.	Business Partner/ EO	Waste Management Plan compliance report	Throughout decommissioning
			4.3	Implement a grievance procedure whereby any issues can be raised / reported and transparently and timeously addressed.	Closure Project Manager/ ECO	Grievance mechanism Proof of close out of grievance	Throughout operational phase
5	• Rehabilitation of all disturbed areas once decommissioning is complete	Rehabilitation of site	5.1	Implement the Decommissioning and Rehabilitation Plan to rehabilitate the site. The Rehabilitation Plan shall include: • Smelter complex infrastructure not required to support post-closure land use(s) should be demolished and removed. • The secured landfill facility should be capped and will remain in perpetuity.	Black Mountain Mining (Pty) Ltd/ Environmental Manager/ Ecologist	Progress reports Rehabilitation plan Rehabilitation schedule Monitoring reports	Site audits to continue until it is concluded that rehabilitation is successful.

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
				• The bulk water pipeline from the Horseshoe water reservoir to the smelter complex should be dismantled and removed (for recycling / scrap). • The laydown area, Business Partners camp infrastructure should be demolished and removed. • The 132 Kv transmission line to the smelter complex should be dismantled and removed (for recycling / scrap). • Roads no longer required for post closure use should have any engineered layers removed, and then deep ripped to promote the re-establishment of vegetation. • Fencing and gates no longer required should be dismantled and removed (for recycling / scrap). • It is currently anticipated that the stormwater dam (for the smelter complex) would not be required post closure, and hence this facility should be decommissioned, any liners removed and natural flow paths restored. • Areas where surface infrastructure has been removed should be levelled and restored in terms of soil horizons, vegetation and drainage (as far as practical). • Material that can be recycled/ has a scrap value should be de-contaminated, stockpiled and removed from site. • Inert rubble and non-recyclable decommissioning/demolition waste (including concrete, plastic liners, brickwork, conveyor belting etc.) should be disposed of on-site at a dedicated dump site, or within the TSF (subject to approval from authorities). • Hazardous material should be appropriately disposed of, otherwise removed from site for disposal at an approved hazardous landfill facility. The LOM rehabilitation plan involves the following: • Decommissioned infrastructure areas should be landscaped and levelled so that the areas are free-draining and that there is no ponding of water. • Any remaining slopes should be modified to at least 1V:3H (or flatter) to minimise erosion, and long slopes may require energy/flow breakers to curb the velocity of stormwater runoff. • Decommissioned infrastructure areas should be deep ripped and revegetated with indigenous species to align to the surrounding natural environment as far as practical. • Topsoil that was stripped and stockpiled as part of construction works, should be replaced (presumably 375 mm – similar to existing mining areas). • Planting with a mix of indigenous grasses (dry seeding), shallow rooted pioneer species and deep-rooted species, where appropriate, such as trees/shrubs (hand planting of seedlings). Deep rooted species are typically not suitable for areas that have covers (e.g. secured landfill facility).			
6	• Potential spills/ contamination from decommissioning activities.	Deterioration of groundwater quality	6.1	Supply chemical toilets for use by personnel undertaking decommissioning works, which should be regularly, maintained at sites where worker/ contractor numbers are high.	Business Partner/ EO	Proof of maintenance and cleaning schedules	Throughout decommissioning
			6.2	Oil spill kits should be available on site in case of spills of hydrocarbon chemicals and the relevant training on the use of spill kits must be provided.	Business Partner/ EO	Proof of spill kits on site Signed awareness training register	Throughout decommissioning
			6.3	Develop and implement a decommissioning phase EPRP in case of a discharge incident that could result in the pollution of surface water resources.	Business Partner/ EO	Record of incidents	Throughout decommissioning
			6.4	Traffic and movement over stabilised areas should be controlled (minimised and kept to certain paths), and damage to stabilised areas should be repaired timeously and maintained.	Business Partner/ EO	Compliance with TMP	Throughout decommissioning
			6.5	Rehabilitate the smelter complex site and secured landfill facility according to the approved site closure and rehabilitation plan and relevant legislation to avoid subsequent negative environmental impacts that may occur.	Business Partner/ EO/ ECO	Rehabilitation Plan	Site audits to continue until it is concluded that rehabilitation is successful.
			6.6	Conduct a site hydrogeological closure assessment to include: • The general closure objective would be to implement an environmental protection strategy to prevent any residual impacts on the environment, restore the land so that it may be suitable for the proposed end land use and obtain expedient closure.	Environmental Manager/ hydrogeological specialist	Hydrogeological closure assessment	Post-decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
				• All rehabilitation measures should be designed to facilitate a gradual reduction in the potential and identified hydrogeological environmental impacts caused by the entire Gamsberg Zinc Mine operation, including the smelter complex and secure landfill facility.			
			6.7	Update the numerical groundwater model as a management and predictive tool to include the following: • Long-term monitoring data and optimised groundwater monitoring network would provide valuable information to update and re-run the model at least every two years during closure. • The updated groundwater model should be used in the closure modelling and closure planning. process. • Updates to the model would have to include mining plan, infrastructure data, and rehabilitation and closure options. Regular updates would increase the prediction accuracy as well as providing long-term trends and allowing for intervention and timeous prevention measures. • The update of the numerical groundwater model for closure modelling and planning should include an updated geochemical assessment and model to characterise the closure source terms more accurately.	Environmental Manager/ hydrogeological specialist	Updated numerical groundwater model Updated geochemical assessment	Every 2 years during closure
			6.8	Water quality monitoring must be undertaken as per Table 29-1.	EO	Monitoring report	Monthly throughout decommissioning
7	• Potential spills/ contamination from decommissioning activities.	Deterioration of surface water quality	7.1	Implement the decommissioning phase EPRP in case of a discharge incident that could result in the pollution of surface water resources, the EPRP should be implemented.	Business Partner/ EO	Incident Investigation report Record of incidents	Throughout decommissioning
			7.2	Phase/ schedule earthworks in order to minimise the footprint that is at risk of erosion at any given time, or schedule works according to the season.	Business Partner/ EO	Earthworks schedule Record of incidents	Throughout decommissioning
			7.3	Phase working areas and progressive rehabilitation in case of linear earthworks to minimise the footprint and the extent of the disturbance at any given time.	Business Partner/ EO	Earthworks schedule Record of incidents	Throughout decommissioning
			7.4	Water quality monitoring should be undertaken as per the monitoring programme in Section 29.	EO	Monitoring Report	Throughout decommissioning
			7.5	A post rehabilitation audit should be undertaken at the end of life of mine to ascertain whether the remediation has been successful and if not, further measures should be recommended and implemented.	Environmental Manager/ Auditor	Audit Report	At end of decommissioning
8	• Decommissioning activities. • Earthworks on-site. • Movement of vehicles.	Impact on fauna and flora	8.1	Compile a Closure and Decommissioning Plan with a detailed plan for restoration including associated costing for the Gamsberg Zinc Mine and Gamsberg Smelter Project with a goal of restoring the affected land back to a condition to be agreed with relevant authorities and stakeholders.	Environmental Manager/ ecologist	Closure and Decommissioning Plan	At start of decommissioning
			8.2	All hard infrastructure should be removed from the site and recycled or disposed of in the appropriate manner.	Business Partner/ EO	Proof of disposal	Throughout decommissioning
			8.3	Removal of any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities by appropriately trained persons to a safe location (such as secured offset properties in the Gamsberg Nature Reserve) prior to the commencement of decommissioning activities.	Business Partner/ EO	Record of relocations	Throughout decommissioning
			8.4	Store all hazardous materials such as fuel, oil, etc. in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills or contaminated soils should be cleaned up in the appropriate manner and disposed of as hazardous waste.	Business Partner/ EO	Record of incidents	Throughout decommissioning
			8.5	All vehicles accessing the site should adhere to a low speed limit (40 km/h) to avoid collisions with susceptible species such as snakes and tortoises.	Business Partner/ EO	TMP Speed limit testing Record of incidents	Throughout decommissioning
			8.6	No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped.	Business Partner/ EO	Visual inspections of trenches/ excavations for fauna Incident report	Throughout decommissioning
			8.7	Rip or scarify hardened soils and reseed or revegetate bare areas to allow regrowth and colonisation of a near natural ground cover of indigenous plants. Decompaction and other earthworks to mitigate further dust generating impacts.	Business Partner/ EO	Rehabilitation plan	Throughout decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			8.8	All cleared and disturbed areas remaining after decommissioning should be rehabilitated with locally occurring species. Due to the arid nature of the area, active rehabilitation may be impractical in some areas and more passive approaches such as using seed traps and increasing surface roughness may yield acceptable results.	EO/ Ecologist if required	Rehabilitation plan Visual inspections against closure plan and design	Throughout decommissioning
			8.9	Any alien vegetation or erosion problems observed should be rectified as soon as possible using the appropriate revegetation and erosion control works.	EO/ Ecologist if required	Rehabilitation plan Photographic records	Throughout decommissioning
9	• Movement of construction equipment and other vehicle during construction activities. • Clearance of vegetation during the construction phase.	Potential human health impacts due to dust and emissions	9.1	Land clearance must be limited to what is required and should only be undertaken when necessary to limit land being left open for extended periods of time.	Business Partner/ EO	Land clearance schedule	Throughout decommissioning
			9.2	Vehicles should adhere to a low speed limit (40 km/h).	Business Partner/ EO	TMP Speed limit testing Record of incidents	Throughout decommissioning
			9.3	Dust suppression should be used on areas where there is significant vehicle movement and dust generating activities through chemical binding agents and/or water sprays.	Business Partner/ EO	Record of incidents	Throughout decommissioning
			9.4	Operate and maintain any generators and vehicles/equipment according to supplier specification at maintenance workshops.	Business Partner/ EO	Maintenance records	Throughout decommissioning
			9.5	Develop a comprehensive Rehabilitation Plan requiring rehabilitation to be undertaken as soon as decommissioning activities have been completed.	Environmental Manager/ EO	Rehabilitation Plan	Throughout decommissioning
10	• Noise generated due to decommissioning activities i.e. vehicle and machinery noise.	Nuisance impact on surrounding landowners	10.1	Limit decommissioning activities to day-time hours as defined by DMRE as far as possible.	Business Partner/ EO	Construction activities between the hours of 06h00 and 19h00 or as specified in the EA Grievance mechanism	Throughout decommissioning
			10.2	Review equipment to ensure the quietest available technology is used. Equipment with lower sound power levels should be selected in such instances and vendors/contractors should be required to guarantee optimised equipment design noise levels.	Business Partner/ EO	Proof of equipment specifications	Throughout decommissioning
			10.3	Shut down or throttle down to a minimum machines and mobile equipment used intermittently to reduce noise and conserve energy.	Business Partner/ EO	Grievance mechanism Incident report	Throughout decommissioning
			10.4	Acoustic covers of engines should be kept closed when in use or idling.	Business Partner/ EO	Grievance mechanism Incident report	Throughout decommissioning
			10.5	Doors to pump houses and generators should be kept closed when in use.	Business Partner/ EO	Grievance mechanism Incident report	Throughout decommissioning
			10.6	Equipment should be regularly and effectively maintained.	Business Partner/ EO	Maintenance records	Throughout decommissioning
11	• Soil erosion resulting from cleared and disturbed areas. • Soil compaction from decommissioning vehicles.	Loss of soil resources and land capability	11.1	Demarcate the footprint for the proposed decommissioning activities sh to restrict soil clearing activities as far as practically possible.	Business Partner/ EO	Visual verification of demarcated areas	Throughout decommissioning
			11.2	Implement dust suppression measures on exposed soils .	Business Partner/ EO	Visual inspection of dust suppression effectiveness Soil stripping plan	Throughout decommissioning
			11.3	Replace soils to appropriate soil depths in the correct order, and cover areas to achieve an appropriate topographic aspect and attitude so as to achieve a free draining landscape that is as close as possible to the previous land capability rating, in compliance with the rehabilitation plan.	Business Partner/ EO	Rehabilitation plan	Throughout decommissioning
			11.4	Rip infrastructure footprint areas to alleviate compaction post closure before rehabilitation.	Business Partner/ EO	Visual verification Rehabilitation plan	Throughout decommissioning
			11.5	Re-vegetate infrastructure footprints according to the rehabilitation plan, preferably in spring and early summer to stabilize the soil and prevent soil loss during the rainy season .	Business Partner/ EO	Compliance with rehabilitation plan	Throughout decommissioning
12	• Potential spills from construction activities.	Loss of soil resources due to contamination	12.1	Store all chemicals and toxins in a bunded area with sufficient capacity to retain 110% of the volume of the substances contained in the bunded area.	Business Partner/ EO	Visual inspection of bund wall or storage facility integrity Incident report	Throughout decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			12.2	Maintain vehicles and equipment either on impermeable surfaces or drip trays should be used.	Business Partner/ EO	Visual inspection of vehicle maintenance sites Record of non-compliance	Throughout decommissioning
			12.3	Store all waste in specified areas and on impermeable surfaces where required.	Business Partner/ EO	Visual inspection of integrity of storage facilities and capacity of containers Compliance with Waste Management Plan	Throughout decommissioning
			12.4	Spill kits must be available on site to ensure that any fuel or oil spills are cleaned up immediately and disposed of correctly.	Business Partner/ EO	Visual inspection of spill kit availability and contents	Throughout decommissioning
			12.5	Awareness training should be provided to all workers (temporary and permanent) on the required steps to enable fast reaction to contain and remediate pollution incidents. In situ treatment is generally considered to be the preferred option because with successful in situ remediation the soil resource can be retained in the correct place. The in-situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are returned	Business Partner/ EO	Training records	Throughout decommissioning
			12.6	Undertake post rehabilitation audits to ascertain whether the remediation of any polluted soils and re-establishment of soil functionality has been successful and if not, to recommend and implement further measures.	Business Partner/ Environmental Manager	Audit findings	Throughout decommissioning
13	• Presence of infrastructure; • Vehicular movement; • Lighting; and • Decommissioning activities.	Change in landscape and related visual impacts	13.1	Break down and remove all structures and stacks constructed for the operational phase. Rubble generated from the deconstruction should be spread across the cut platform (unless contaminated) and covered with the excess cut material stockpiles. Any contaminated material would need to be processed in terms of applicable South African waste management Norms and Standards.	Business Partner/ EO	Proof of disposal of contaminated material	Throughout decommissioning
			13.2	Rehabilitate all tarred roads as per the Closure Plan and tar removed as far as possible. The road should be ripped to 0.5m below surface to reduce compaction prior to rehabilitation.	Business Partner/ EO	Closure plan	Throughout decommissioning
			13.3	Rehabilitate all disturbed areas as soon as possible after deconstruction is complete in an area.	Business Partner/ EO	Rehabilitation Plan	Throughout decommissioning
			13.4	Implement dust suppression measures if during deconstruction, very dry conditions prevail and dust becomes a nuisance, without creating undue runoff.	Business Partner/ EO	Visual inspection of dust suppression activities Dust suppression schedule	Throughout decommissioning
			13.5	Implement soil stabilisation measures to ensure that erosion does not take place.	Business Partner/ EO	Visual inspection of integrity of stabilisation infrastructure	Throughout decommissioning
			13.6	Keep deconstruction sites neat and tidy at all times with litter and dust management measures.	Business Partner/ EO	Housekeeping reports	Throughout decommissioning
			13.7	All lights used for illumination during deconstruction should be faced inwards and shielded to avoid light spillage to the surrounding areas.	Business Partner/ EO	Visual inspection to ensure illumination installed correctly	Throughout decommissioning
14	• Use of construction equipment and other machinery during construction activities.	Impact of the project on climate change	14.1	The use of fuel additives which improve fuel economy should be investigated for vehicles and machinery.	Business Partner/ EO	GHG reporting and modelling Records of fuel additives purchase/ used	Throughout decommissioning
			14.2	Vehicles and machinery should be regularly serviced to ensure optimal fuel efficiency.	Business Partner/ EO	Visual inspection Maintenance records	Throughout decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			14.3	Limit speed of vehicles to 40 km/h.	Business Partner/ ECO	TMP Incident report	Throughout decommissioning
15	• Increased heavy traffic and vehicular movement	Road disturbance and traffic safety	15.1	Iimplement appropriate technical measures, where required, to provide continued access to facilities, and to minimise traffic disruptions.	Business Partner/ EO	Visual verification Design reports Grievance mechanism	Throughout decommissioning
			15.2	Erect suitable traffic and construction signage to control traffic, raise awareness of potential risks/hazards and indicate alternative access routes, if needed.	Business Partner/ EO	Visual verification of signage presence Grievance mechanism Awareness training records	Throughout decommissioning
			15.3	Implement suitable consultation procedures to ensure that potentially affected parties are informed about pending decommissioning activities and potential disruptions.	Business Partner/ Environmental manager	Record of consultation Grievance mechanism	Throughout decommissioning
			15.4	All project related transport associated with the decommissioning activities must adhere to stipulated national speed limits as displayed.	Business Partner/ EO	Grievance mechanism	Throughout decommissioning
			15.5	Peak traffic periods should be avoided as far as possible by heavy delivery vehicles.	Business Partner/ EO	Grievance mechanism	Throughout decommissioning
			15.6	Implement a transport safety programme to achieve the mitigation objectives. Key components of the programme include: • Education and awareness training; • Speed limit enforcement; • Maintenance of the transport system where appropriate; and • Use of dedicated loading and off-loading areas on site.	Business Partner/ EO	Training records	Throughout decommissioning
			15.7	Implement a road safety awareness campaign and TMP.	Business Partner/ EO	Awareness training schedule and material Training records	Throughout decommissioning
16	• Decommissioning phase employment opportunities (direct and indirect). • Expenditure on construction activities.	Employment during decommissioning Economic benefits Multiplier effect on the local and regional economy Significance of project expenditure	16.1	Identify required core skills and extend employee skills audits to investigate the prevalence of required skills in the municipal towns/ communities, and structure skills development endeavours accordingly.	HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout decommissioning
			16.2	Ensure, through a structured stakeholder engagement programme, that communities are aware of local employment requirements and opportunities that are available. Where required, the local resident status of applicants should be verified in consultation with community representatives and municipal structures.	HR Manager/Stake holder relations manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout decommissioning
			16.3	Clearly advertise the nature and numbers of jobs available during the project phases in surrounding communities, and ensure that communities understand the local recruitment procedures. Eligibility criteria should be informed by local authorities, or similar, and clearly communicated to any potential beneficiaries.	Business Partner/HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			16.4	Recruitment shall be coordinated through local offices set up in Pofadder for recruitment from local communities. If this is not feasible, locate the recruitment offices at a central point (but not on-site) to control access and movement of jobseekers. A recruitment registry should be created for jobseekers to record relevant qualifications, work experience and contact details.	Business Partner/ HR Manager	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout decommissioning
			16.5	Provide employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for on-the-job training.	Business Partner/ HR Mananger	Local Employment Policy on file Recruitment records Business Partner Management Plans on file Labour pool database developed and kept up-to-date Records of employee places of origin	Throughout decommissioning
17	• Construction phase employment opportunities (direct and indirect). • Expenditure on construction activities.	Loss of employment due to closure	17.1	Develop a Social Closure Plan (which includes socio-economic measures) at the start of the Gamsberg Smelter Project to include the following: • Predict the likely socio-economic impact of closure on employee households, local communities and the region, and recommended measures to address these impacts; • Identify critical issues which could affect the on-going sustainability of employees and communities during closure, by means of a detailed consultation process; • Identify alternative livelihood and socio-economic development opportunities for employees, as well as community-based projects which may become sustainable over the long-term; and • Provide financial and/ or technical support for the establishment of sustainable community projects.	HR Manager/ Stakeholder Relations Manager	Social Closure Plan Proof of relevant stakeholder engagement	Prior to and throughout closure
			17.2	It is recommended that the Closure Plan provide more detail on how the Gamsberg Smelter Project would assess and mitigate/manage the social and economic impacts on individuals, communities and the local economy when retrenchments and closure is certain. When downscaling and/or retrenchment take place, the Gamsberg Smelter Project should assist affected employees in finding alternative employment or livelihood opportunities. This should be done if workers cannot be integrated or redeployed to other operations or if they are not of a retirement age.	HR Manager/Stakeholder Engagement Manager	Closure Plan Proof of relevant stakeholder engagement	Prior to and throughout closure
			17.3	Establish of a Future Forum for the purposes of: • Promoting on-going discussions between employer and employee regarding the future of the Gamsberg Smelter Project; • Identifying solutions to problems/challenges which could arise and impact on the operation of the Gamsberg Smelter Project; • Discussing issues concerning retrenchment and downscaling, and identifying turnaround strategies; • Developing and implementing prevention and/or redeployment strategies in the management of retrenchments; • Coordinating the notification process during retrenchments or closure; and • Mobilising the Department of Labour Social Plan Services for technical assistance on job advice, and retrenchment during retrenchment and closure.	HR Mananger	Establishment of Future Forum	Prior to decommissioning and closure
			17.4	Implementation of a consultation process in terms of Sections 189 and 189 (A) of the Labour Relations Act. Project management and members of the Future Forum would administer this consultation process.	HR Manager	Proof of consultation	Consultation process would commence when the Gamsberg Smelter Project decides to reduce its operational activities.

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			17.5	Approach the Department of Labour for the utilisation of its resources and support services, such as counselling services and placement services offered by its Labour Centres.	HR Manager	Proof of consultation	Consultation process would commence when the Gamsberg Smelter Project decides to reduce its operational activities.
			17.6	Inform affected areas, such as the local municipality and labour sending areas, of imminent retrenchments. The full impact of such retrenchments would be disclosed to the municipalities and possible solutions discussed.	Stakeholder Relations Manager	Proof of consultation	Consultation process would commence when the Gamsberg Smelter Project decides to reduce its operational activities.
			17.7	Integration of the workforce into various LED projects, if required, would be done in collaboration with local municipalities, and other stakeholders serving on the LED Forum. Where workers cannot be absorbed into LED initiatives, they should be furnished with skills training opportunities, enabling them to find alternative employment after decommissioning or retrenchment. Other initiatives could focus on assessment and counselling services for affected individuals.	HR Manager	List of LED projects and employee integration into these projects.	Throughout decommissioning
			17.8	Liaise with institutions (for example the National Productivity Institute) to identify other economic sectors and ventures that could absorb employees. This would involve the development of alternative livelihoods over a number of years to ensure that these livelihoods are well developed by the time the Gamsberg Smelter Project is decommissioned.	HR Manager	Proof of consultation	Consultation process would commence when the Gamsberg Smelter Project decides to reduce its operational activities.
			17.9	Partner with LED programmes of other projects and the local municipalities, as this would strengthen project initiatives, whereas initiatives funded by the Gamsberg Smelter Project alone may not be as effective.	HR Manager	Proof of partnerships in LED programmes	Throughout decommissioning
			17.10	Ensure that employees are trained in alternative skills and link this training to the initiatives described above.	HR Manager	Training Programme Proof of training	Throughout decommissioning
			17.11	Provide financial life skills to employees.	Black Mountain Mining (Pty) Ltd)/ ECO	Proof of training	Throughout decommissioning
			17.12	Develop an exit plan for the hand-over of Aggeneys post closure. This should be done in conjunction with the Northern Cape Provincial Government and local authorities. Other large development projects in the area could participate in this process if they would consider taking over some of the accommodation for their staff.	Environmental Manager/Stake holder Relations Manager	Exit Plan Proof of consultation with relevant government departments	Prior to closure
18	• Health, safety and security of communities	Health, safety & security of communities	18.1	Implement Business Partner Management Plan to include requirements with regard to health and safety, as well as conduct and controls for decommissioning phase workers.	Closure Project Manager	Business Partner Management Plan on file	Prior to decommissioning
			18.2	Inform workers of camp policies and safety requirements and educate them with regard to their conduct in local communities.	Closure Project Manager	Record of training Signed Code of Conduct	Throughout decommissioning
			18.3	Rules of conduct must be enforced with regard to sanitation, water and waste.	Closure Project Manager	Record of training Signed Code of Conduct	Throughout decommissioning
			18.4	A fire safety and firefighting plan should describe actions to be taken in case of a fire starting on site or at the construction camp. Construction workers must be trained in the use of firefighting equipment, which should be available on site.	Closure Project Manager	Record of training in fire fighting Signed Code of Conduct	Throughout decommissioning
			18.5	Refuse on site should be discarded in sealed bins and/or covered refuse containers. Refuse should be removed from the site at regular intervals and disposed of at the approved BMM waste disposal site.	Closure Project Manager	Waste Management Plan Signed Code of Conduct	Throughout decommissioning
			18.6	Security must monitor and control worker movement in terms of environmental, crime and related occurrences.	Closure Project Manager	Record of incidents	Throughout decommissioning

#	Activity	Potential Impact	Mitigation Measures		Responsible parties	Compliance with Standards/ Parameters for Monitoring	Time Period for Implementation
			#	Management Actions			
			18.7	Establish efficient communication strategies or stakeholder engagement programme and establish a grievance procedure and mechanism at a location that is accessible to aggrieved members of the surrounding communities.	Closure Project Manager/Stake holder relations Manager	Grievance mechanism	Throughout decommissioning

28.FINANCIAL PROVISION

28.1 DETERMINATION OF THE AMOUNT OF THE FINANCIAL PROVISION

28.1.1 Closure Objectives Description and the Alignment with the Baseline Environment

Closure Objectives

The closure objectives should be achieved in as cost effective a manner as possible and the closure solution should be sustainable in the long-term. The following key objectives are identified to make sure that the following commitments would be achieved as a minimum (EVES, 2018a):

- The site would be made safe for both humans and animals;
- The site would be rehabilitated to be physically safe, chemically stable and ecologically self-sustaining;
- The residual impacts would be managed to acceptable levels and not deteriorate over time; and
- Rehabilitation and socio-economic enterprises would fulfil the pre-determined end land use.

Note: These closure objectives remain unchanged with the introduction of the proposed smelter complex and secured landfill facility.

Post Closure Land Use

Possible options identified for post closure land-use at BMM (including the Gamsberg Zinc Mine) from all the data collected include five options ranked from most suitable to least suitable (EVES, 2018a):

- Establish a nature reserve on suitable areas, use functional infrastructure for alternative uses where possible and demolish the rest. The remaining infrastructure could be used for accommodation and facilities for eco-tourism (viz. battlefield tours, special species, flowers and game viewing trails).
- Leasing all land on a permanent basis.
- Possible multiple closure enterprises/ land uses:
    - Sell some property and/or infrastructure for industrial purposes;
    - Sell some houses to employees or other willing buyers;
    - Establish Aggeneys as a functional town run by Khâi-Ma Local Municipality;
    - Outsource all other services (waste management, sewage, water etc.);
    - Establish parts of Aggeneys as a Retirement Village;
    - Transfer ownership of contracting companies, township and other workshops, training centre and general use facilities to highest bidder;
    - Investigate alternative industries (e.g. algae farming at sewage farms; reprocessing of tailings); and
    - Maximise local conditions for solar energy plants.
- Agricultural development (specialist farming/small farming projects).
- Demolish town and mining infrastructure and rehabilitate for grazing by game and livestock (in the event that the municipality decides not to assume responsibility for the town after a thorough consultation process).

Note: With the introduction of the proposed smelter complex and secured landfill facility, the most suitable post closure land use is still considered wilderness/nature reserve and the promotion of eco-tourism in the area. It is,

however, important to recognise that the Gamsberg Smelter Project would extend the current projected life of the Gamsberg Zinc Mine.

28.1.2 Confirmation that Closure Objectives have been Consulted with I&APs

The closure objectives are outlined in this report will be made available to I&APs for review and comment (Table 6-3). In addition to this, the public participation process of 2010 indicated the following post closure land use options as appropriate:

- Game ranching (or farming); and
- Agricultural projects mixed with conservation and eco-tourism activities.

28.1.3 Rehabilitation Plan

Progressive Rehabilitation Planning

Existing planned rehabilitation works for the existing Gamsberg Zinc Mine are detailed in the 2018 EVES Report (EVES, 2018c). Additional planned rehabilitation works associated with the proposed Gamsberg Smelter Project could include:

- Closure and rehabilitation of the individual landfill cells (each with a lifespan of about 5 years) once their design storage capacity has been reached.
- Decommissioning and rehabilitation of the laydown area and Business Partner camp associated with the construction phase of the Gamsberg Smelter Project.

The bulk of the disturbed areas associated with the Gamsberg Smelter Project would, however, only be able to be rehabilitated at LOM.

It should, however, be noted that due to the arid nature of the area, active rehabilitation may be impractical in some areas and more passive approaches such as using seed traps and increasing surface roughness may yield acceptable results.

LOM Decommissioning and Rehabilitation Plan

At a conceptual level, decommissioning is a reverse of the construction phase. The LOM decommissioning plan is as follows:

- Smelter complex infrastructure not required to support post-closure land use(s) should be demolished and removed.
- The secured landfill facility should be capped and would remain in perpetuity.
- The bulk water pipeline from the Horseshoe water reservoir to the smelter complex should be dismantled and removed (for recycling / scrap).
- The laydown area, Business Partners camp and contractors camp infrastructure should be demolished and removed.
- The 132 Kv transmission line to the smelter complex should be dismantled and removed (for recycling / scrap).
- Roads no longer required for post closure use should have any engineered layers removed, and then deep ripped to promote the re-establishment of vegetation.
- Fencing and gates no longer required should be dismantled and removed (for recycling / scrap).

- It is currently anticipated that the storm water dam (for the smelter complex) would not be required post closure, and hence this facility should be decommissioned.
- Areas where surface infrastructure has been removed should be levelled and restored in terms of soil horizons, vegetation and drainage (as far as practical).
- Material that can be recycled/ has a scrap value should be de-contaminated, stockpiled and removed from site.
- Inert rubble and non-recyclable decommissioning/demolition waste (including concrete, plastic liners, brickwork, conveyor belting etc.) should be disposed of on-site at a dedicated dump site, or within the TSF (subject to approval from authorities).
- Hazardous material should be disposed of on-site at the secured landfill facility (subject to approval from authorities, as well as adequate storage capacity), otherwise removed from site for disposal at an approved hazardous landfill facility.

The LOM rehabilitation plan involves the following:

- Decommissioned infrastructure areas should be landscaped and levelled so that the areas are free-draining and that there is no ponding of water.
- Any remaining slopes should be modified to at least 1V:3H (or flatter) to minimise erosion, and long slopes may require energy/flow breakers to curb the velocity of storm water runoff.
- Decommissioned infrastructure areas should be deep ripped and revegetated with indigenous species to align to the surrounding natural environment as far as practical.
- Topsoil that was stripped and stockpiled as part of construction works, should be replaced (presumably 375 mm – similar to existing mining areas).
- Planting with a mix of indigenous grasses (dry seeding), shallow rooted pioneer species and deep-rooted species, where appropriate, such as trees/shrubs (hand planting of seedlings). Deep rooted species are typically not suitable for areas that have covers (e.g. secured landfill facility).

Relinquishment/ Completion Criteria

Relinquishment/ completion criteria are used to facilitate the fulfilment of the closure plan vision and objectives. Keys aspects of the completion criteria are:

- The completion criteria should be specific to the Gamsberg Zinc Mine and Smelter Project reflecting its site-specific set of environmental, social and economic circumstances.
- The completion criteria, and basis on which successful reclamation is determined, should be developed in consultation with stakeholders. This ensures that there is broad agreement on both the post-closure land use objectives and the basis for measuring the achievement of that objective.
- The completion criteria should be flexible enough to adapt to changing circumstances without compromising the agreed post-closure objective. This provides certainty of process and outcome (i.e. relinquishment when the conditions have been met).
- The completion criteria should be periodically reviewed and modified in light of improved knowledge (e.g. data from ongoing field trials, updated modelling exercises etc.) or changed circumstance.

28.1.4 Compatibility of the Rehabilitation Plan with the Closure Objectives

It can be confirmed that the rehabilitation plan is compatible with the closure objectives given that the closure objectives were taken into account during the determination of the financial provision.

28.1.5 Calculate and State the Quantum of the Financial Provision

Quantities

The quantities and areas of disturbance were calculated from the current layouts available for the Gamsberg Smelter Project (Appendix Q).

Unit Rates

It is SLR's experience that reliable site specific rates can only be obtained through a formal tender process with a detailed bill of quantities, detailed scope of work with engineered drawings, as well as, contract specifications (i.e. the level of detail required to generate a ±10% cost accuracy when the remaining life of facility is 5 years or less).

The rates used for the determination of this closure liability have been derived from SLR's own database of rates. This database is considered to be a national average of rates for South African operations, since the rates are obtained from various sources throughout the country, mainly in the precious, fuel and base metal mining industries.

Where up-to-date rates are not available, then previous known rates are escalated by a contract price adjustment formula (that is considered appropriate by SLR - specifically for closure related activities) that considers the escalation of labour, fuel, plant and materials. The escalation of labour, fuel, plant and materials is obtained from the monthly data provided by Statistics South Africa (www.statssa.gov.za), as well as, Namibia Statistics Agency (www.nsa.org.na).

A summary of the master rates (as at September 2020) used in the closure liability calculations are shown in Table 28-1.

Table 28-1: Master Rates used for the Closure Liability Calculation

Ref Nr	Description	Unit	Master Rate (ZAR)
1.1	Dismantling of heavy plant and associated superstructure	m^2	R 2,569-00
1.2	Dismantling of medium plant and associated superstructure	m^2	R 851-00
1.3	Dismantling of medium plant structures	m^2	R 740-00
1.4	Dismantling of workshops and shed type structures	m^2	R 245-00
1.5	Dismantling of suspended conveyors	m	R 495-00
1.6	Demolition of floors, bases and foundations after removal of structures (heavy duty)	m^2	R 1,254-00
1.7	Demolition of floors, bases and foundations after removal of structures (medium duty)	m^2	R 834-00
1.8	Demolish single storey buildings (incl. removal of foundations)	m^2	R 347-00
1.9	Remove tarred roads and bury associated layer works	m^2	R 150-00
1.10	Dismantle security fencing	m	R 70-00
1.11	Remove HDPE liner	ha	R 73,700-00
1.12	Reshaping, profiling of areas	ha	R 55,960-00
1.13	Dismantle and remove small diameter pipeline	m	R 25-00
2.5	Remove gravel roads and bury associated layer works	m^2	R 27-00
3.1	Dismantle and remove large diameter pipeline	m	R 165-00
5.1	Deep ripping of infrastructure areas	ha	R 12,400-00
5.2	Placing 375 mm topsoil for revegetation	ha	R 133,500-00
5.3	Establishment of vegetation	ha	R 63,000-00

Ref Nr	Description	Unit	Master Rate (ZAR)
6.1	SLF capping Cover [12] - 300 mm soil	ha	R 106,800-00
6.2	SLF capping Cover - 1.5 mm HDPE cover	m^2	R 90-00
6.3	SLF capping Cover - 300 mm drainage layer	ha	R 106,800-00
6.4	SLF capping Cover - 600 mm soil	ha	R 213,600-00

Time, Fee and Contingency Costs

The following time, fee and contingency costs have also been included in the closure liability calculations as per the existing BMM closure liability calculations (BMM, 2019).

Table 28-2: Time, Fee and Contingency Costs

Description	Percentage	Rate
Contractor P&G's, site establishment and demobilisation	%	6
Detail design fees, procurement etc.	%	3
Project management and site supervision fees	%	2
Contingency	%	10

Post Closure Supervision and Monitoring

The following provisional post-closure monitoring and maintenance costs have been included in the closure liability calculation. These costs make provision for quarterly, bi-annual and annual sampling (surface and groundwater, dump cover stability/ landscape function analyses (LFA) and vegetation cover) and site inspections by independent external consultants for an estimated period of 7 years.

The 7-year period is made up of decommissioning and rehabilitation of the site (2 years), active maintenance and aftercare (3 years) and passive maintenance and aftercare (2 years). The passive maintenance and aftercare period could be a further 5 years depending on the time taken to reach agreed LFA and vegetative relinquishment/ completion criteria (i.e. 7 years in total for passive maintenance and aftercare).

Table 28-3: Post-Closure Monitoring and Maintenance Costs

Description	Unit	Provisional Allowance (ZAR)
Water quality monitoring	Sum	R 4,718,400
Cover stability /LFA monitoring	Sum	R 1,260,000
Vegetation cover monitoring	Sum	R 1,200,000
Management of monitoring and maintenance	Sum	R 4,500,000

Closure Liability Calculation

The closure liability calculation is provided in Appendix Q, indicating that the total LOM closure liability associated with the Gamsberg Smelter Project is R 204 286 019 (excl. VAT). The closure liability calculation is at Current Value (CV) as at September 2020.

[12] Secured landfill facility capping cover as per design report (TCE, 2020)

28.1.6 Confirmation that the Financial Provision will be Provided

The amount required in order to manage and rehabilitate the environmental impacts as determined for financial provision can be provided for i.e. there is adequate revenue which will be provided for in the mines' operating costs of budget, if the Gamsberg Smelter Project is approved.

To align the financial provisioning with the requirements of the NEMA Financial Provisioning Regulations (GNR 1147, 2015) the project will increase provisioning into the current Gamsberg closure provision to reflect the construction stages. This will entail a six monthly survey of current disturbance and construction progress to determine the required funding to be provided for. This will then be provided into the trust fund or increased guarantee.

29. MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE AGAINST THE EMPR

Environmental impacts requiring monitoring are listed in Table 29-1.

As a general approach, Black Mountain Mining (Pty) Ltd would ensure that the monitoring programmes comprise the following:

- a formal procedure;
- appropriately calibrated equipment;
- where samples require analysis they would be preserved according to laboratory specifications;
- an accredited, independent, commercial laboratory would undertake the sample analyses;
- parameters to be monitored would be identified in consultation with a specialist in the field and/or the relevant authority;
- if necessary, following the initial monitoring results, certain parameters may be removed from the monitoring programme in consultation with a specialist and/or the relevant authority;
- monitoring data would be stored in a structured database;
- data would be interpreted and reports on trends in the data would be compiled by an appropriately qualified person on a quarterly basis; and
- both the data and the reports would be kept on record for the LOM.

Table 29-1 Monitoring of Compliance and Performance in terms of the EMPr

No.	Activity	Impact requiring monitoring	Functional requirements for monitoring	Relevant Standards	Roles and responsibilities	Monitoring and reporting frequency and time period for management actions
1	EMPr monitoring and performance assessment for overall impact of the project	EMPr, EA conditions, project scope as provided for in this report	• Site inspection and verification of monitoring data against EMPr and EA conditions. • Include photographic record, incident register, complaints register. • Annual EMPr Compliance Audit	NEMA	Construction Manager, EO and ECO Environmental Manager	Internal reports - Weekly (ECO) Internal reports - Monthly (EO) External audit to DMRE - Annually

2	• Potential spills from construction activities.
	• Potential spills from operational activities.
	• Potential seepage from the secured landfill facility over time.
		Change in groundwater levels and quality	**Existing Regional Monitoring Boreholes (**Figure 29-1**)**
			
			Groundwater Level Monitoring:
			
			At following boreholes: AR12, DMBH06, KGT78, KGT3, KMBH01, KGT1, KMBH04, NAM3, NAM2, NAM1, NMBH02, WIT1, KOMBH03, AROAMS01, AROAMS02, AMBH05, ACH2, ACH4, ACH3, ACH1
			
			Groundwater Quality Monitoring:
			
			At following boreholes: AR11, AR12, KGT78, KGT3, KGT1, NAM3, NAM2, NAM1, WIT1, AROAMS01, AROAMS02, ACH2, ACH4, ACH3, ACH1
			
			The existing water quality parameters should continue to be monitored:
			• Chemical parameters:
			  • Anions and cations (Na, Ca, Mg, Ca, Mg, K, Cl, SO4, F, nitrate (NO3-N), Fe, Zn, Pb, Al, Cd, Cu, Mn, and U.
			  • Other parameters (pH, EC, TDS, and total alkalinity).
			The following parameters should be included:
			• Physical in-field parameter observations:
			Colour/ clarity, temperature, oxidation-reduction potential (ORP) and odour.
			• Anions and cations (Sb, Hg, As, Se, PO_4, Total Cr and Cr (VI), nitrite, and Ba).
			• Petroleum hydrocarbons contaminants (where applicable, near workshops and petroleum handling facilities).
			• Sewage related contaminants (E.coli, faecal coliforms) in surface water and boreholes in proximity to septic tanks or sewage plants.
			
			Existing Mine Monitoring Boreholes (Figure 29-1**)**
			
			Groundwater Level Monitoring:
			
			At following boreholes: BLH3, GAMS1, MH01, MH02, MH03, MH10, GAMS2, GAMB1, GAMS3, GAMS8, MH04, MH05, MH06, MH07, AR11, AR10, AR09, AR07, MBH17, SOLAR PUMP BH, MH08, MH09, GBTSF2, GBTSF3, GBTSF4, GBTSF5, GBTSF6, GBTSF7, GBTSF8, GBTSF9
			
			Groundwater Quality Monitoring:
				N/A
				
				SANS Drinking Water Standards, South African Water Quality Guidelines: Domestic Use, DWA Livestock water guidelines 1996, Site IWUL
				
				N/A
				
				SANS Drinking Water Standards, South African Water Quality Guidelines: Domestic Use,
					EO
					Independent consultant
						Groundwater levels: Minimum quarterly monitoring measuring the depth of groundwater levels at all boreholes
						
						Groundwater Quality: Quarterly monitoring at all boreholes

No.	Activity	Impact requiring monitoring	Functional requirements for monitoring	Relevant Standards	Roles and responsibilities	Monitoring and reporting frequency and time period for management actions
			At following boreholes: BLH3, GAMS1, MH01, MH02, MH03, MH10, GAMS2, GAMB1, GAMS3, GAMS8, MH04, MH05, MH06, MH07, AR11, AR10, AR09, AR07, MBH17, SOLAR PUMP BH, MH08, MH09, GBTSF2, GBTSF3, GBTSF4, GBTSF5, GBTSF6, GBTSF7, GBTSF8, GBTSF9 Full analysis for cations, anions and ICP metals as above. **<u>New recommended boreholes to be added to mine monitoring network (</u>**Figure 29-1**<u>)</u>** <u>Groundwater Level Monitoring:</u> At following boreholes: GB_SLF_01, GB_SLF_02, GB_SMT_01 <u>Groundwater Quality Monitoring:</u> At following boreholes: GB_SLF_01, GB_SLF_02, GB_SMT_01 • Full analysis for cations, anions and ICP metals as above.	DWA Livestock water guidelines 1996, Site IWUL N/A SANS Drinking Water Standards, South African Water Quality Guidelines: Domestic Use, DWA Livestock water guidelines 1996, Site IWUL		

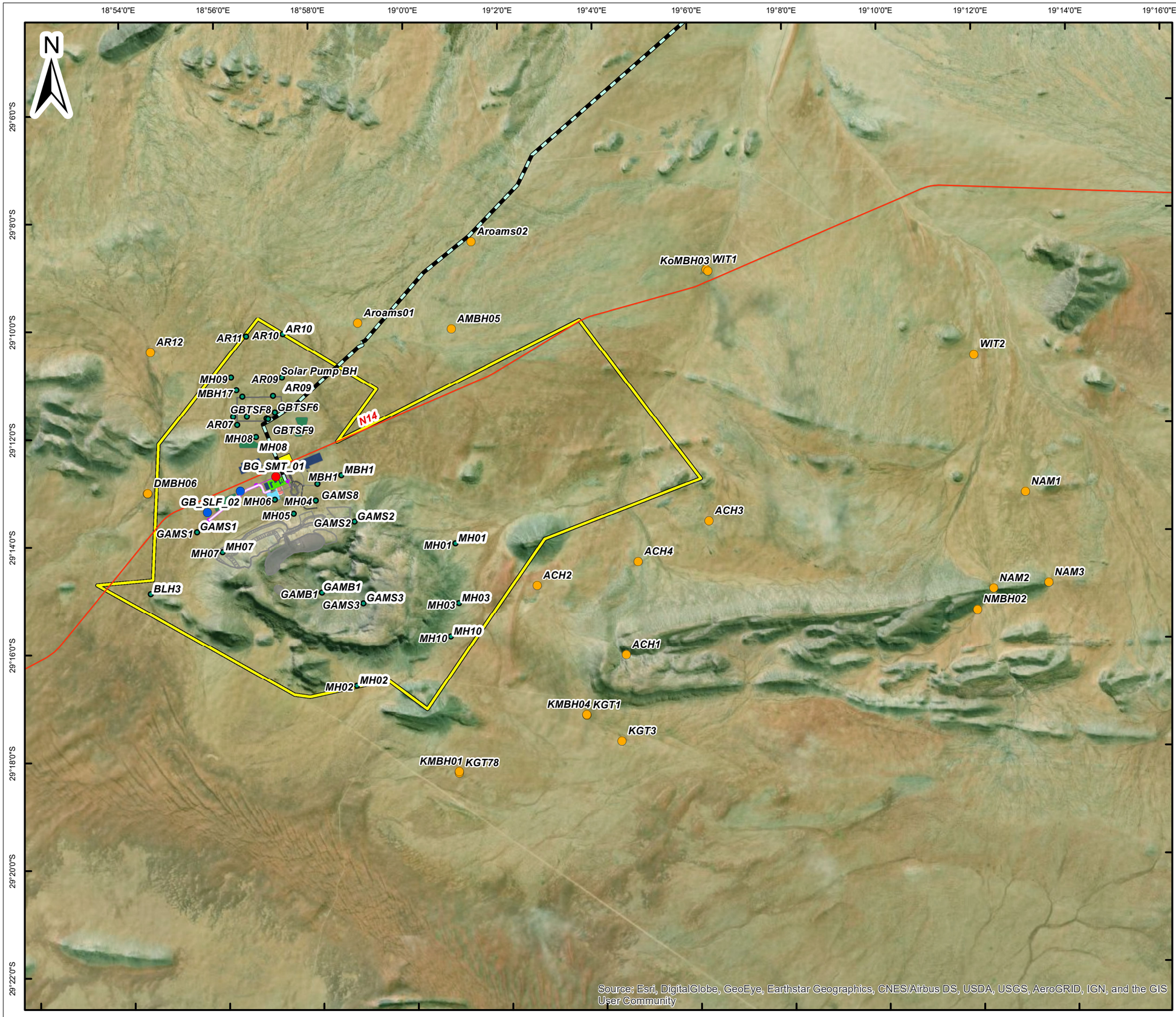
3	• Potential spills from construction activities.
	• Potential spills from operational activities.
	• Potential seepage from the secured landfill facility over time.
		Contamination of surface water resources	The following parameters must be monitored upstream and downstream of the Gamsberg Smelter Project:
			• pH
			• Nitrate as N
			• Electrical conductivity
			• Ammonia
			• Total dissolved solids
			• Potassium
			• Total suspended solids
			• Nickel
			• Aluminium
			• Manganese
			• Calcium
			• Magnesium
			• Fluoride as F
			• Iron
			• Total alkalinity as CaCO3
			• Copper
			• Chloride as Cl
			• Lead
			• Sulphate as SO4
			• Sodium
			• Uranium
			• *E.coli*
				SANS for drinking water quality (SANS241:2006) DWA Livestock water guidelines 1996, Site IWUL	EO
					Independent consultant
						• Internal Reporting – Monthly for:
						  • Water levels in holding dams; and
						  • Drainage Inspections.
						• External Reporting – Annual for:
						  • Water Quality; and
						  • Spillages/ emissions.
						• Accidental spillages and overflows should be reported as and when they occur to the relevant authorities.

4	• Clearance of surface areas for secured landfill facility and smelter complex.	Impact of dust on vegetation and flora	Continue with the current monitoring plan for dust on flora in the Bushmanland Inselberg Region (from Desmet et al. 2018).	N/A	Biodiversity Manager EO Environmental Manager	Daily weather data and hourly time lapse cameras phenology tracking. Monthly dust sampling

<table>
<tr><th>No.</th><th>Activity</th><th>Impact requiring monitoring</th><th>Functional requirements for monitoring</th><th>Relevant Standards</th><th>Roles and responsibilities</th><th>Monitoring and reporting frequency and time period for management actions</th></tr>
<tr>
<td></td><td></td><td></td>
<td>
<table>
<tr><th>Spatial Dimension</th><th colspan="5">Temporal Dimension</th></tr>
<tr><th></th><th>Hourly / Daily</th><th>Monthly</th><th>Seasonal</th><th>Annual</th><th>Occasiona</th></tr>
<tr><td>Landscape</td><td></td><td></td><td>Medium resolution (<10m) multispectral imagery (RGB, IR and hyperspectral, whole landscape)</td><td>High resolution (sub-meter) multispectral imagery (RGB and IR, Gamsberg only possibly Aggeneys)</td><td></td></tr>
<tr><td>Monitoring Site
(Selected sites only)</td><td>Automatic weather data (hourly)</td><td>Dust Sampling</td><td>Ultra-high resolution multi-spectral drone generated imagery</td><td></td><td></td></tr>
<tr><td>Community
(The dominant plant community at each monitoring site at all sites as indicated in Figure 5)</td><td></td><td></td><td>Fixed Point Photographs</td><td>Line transects (all sites)</td><td>Soil analysis (selected sites, baseline and eve years)Whittaker (selected sites, baseline and eve years)</td></tr>
<tr><td>Species in situ
(Species of Conservation Concern and representative species from different leaf morphological/life history guilds)</td><td>Time laps cameras (remote) phenology tracking (Selected sites) (daily)</td><td></td><td>Phenology tracking</td><td>Demography tracking</td><td>Populations gene analysis</td></tr>
<tr><td>Species ex situ
(E.g. nursery)</td><td colspan="5">Plant performance observations (physiology, phenology and demography) under controlle experimental conditions</td></tr>
</table>
</td>
<td></td><td></td><td>Seasonal medium resolution multispectral drone generated imagery, fixed point photographs and phenology tracking

Annual high resolution multispectral imagery, line transects and demography tracking.</td>
</tr>
<tr>
<td></td>
<td>• Emissions from the stacks during smelter operations.
• Vehicle emissions.</td>
<td>Impact on vegetation due to increased air emissions (SO_2, NO_2, Pb and Zn)</td>
<td>A monitoring plan in consultation with key biodiversity stakeholders and specialists needs to be developed that will allow for the measurements of the potential impact of ambient air quality on sensitive vegetation types.
The ambient monitoring of hourly SO_2 and NO_2 concentrations would provide value to the understanding of impacts on the vegetation. The ambient monitoring is recommended to continue once the smelter is operational in order to understand the impacts of the smelter on the vegetation..</td>
<td>To be developed</td><td>Biodiversity Manager</td><td>To be developed</td>
</tr>
<tr>
<td>5</td>
<td>• Generation of dust due to project related activities.
• Smelter operation, materials handling and vehicle movement.</td>
<td>Potential human health impacts due to dust and emissions</td>
<td>• Continue monitoring at existing monitoring points to include daily concentrations of PM_{10}, $PM_{2.5}$ and monthly dust deposition as well as the metal analysis of the particulate matter.
•</td>
<td>NDCR</td><td>Environmental Manager
Occupational Hygiene Manager</td><td>Monthly for a minimum of 24 months prior to commissioning.
Continuous monitoring of SO_2 and NO_2 concentrations during operational phase.
Monthly monitoring of metals in PM.</td>
</tr>
<tr>
<td>6</td>
<td>• Construction phase employment opportunities (direct and indirect).</td>
<td>Noise</td>
<td>The following procedure should be adopted for all noise surveys:
• Any surveys should be designed and conducted by a trained specialist.
• Sampling should be carried out using a Type 1 SLM that meets all appropriate IEC standards and is subject to annual calibration by an accredited laboratory.
• The acoustic sensitivity of the SLM should be tested with a portable acoustic calibrator before and after each sampling session.
• Samples sufficient for statistical analysis should be taken with the use of portable SLM’s capable of logging data continuously over the time period. Samples representative of the day- and night-time acoustic environment should be taken.
• The following acoustic indices should be recoded and reported: L_{Aeq} (T), statistical noise level L_{A90}, L_{AFmin} and L_{AFmax}, octave band or 3rd octave band frequency spectra.</td>
<td>IFC Guidelines
SANS 10103</td><td>Environmental Manager
EO
Occupational Hygiene Manager</td><td>Noise monitoring to be undertaken in response to any noise complaints.</td>
</tr>
</table>

No.	Activity	Impact requiring monitoring	Functional requirements for monitoring	Relevant Standards	Roles and responsibilities	Monitoring and reporting frequency and time period for management actions
			• The SLM should be located approximately 1.5 m above the ground and no closer than 3 m to any reflecting surface. • Efforts should be made to ensure that measurements are not affected by any residual noise and extraneous influences, e.g. wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet. • A detailed log and record should be kept. Records should include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site.			
7	• Employment creation during all phases • Impacts on surrounding land users and communities due to construction workforce and job seekers	Employment creation, skills development and economic stimulus Health, safety and security of community members and local residents	See Table 29-2			



Legend

Proposed Monitoring Network

- New SLF GW Monitoring Boreholes
- New Smelter GW Monitoring Boreholes

Mine Monitoring Network

- Mine Monitoring Network
- Regional Monitoring Boreholes
- Existing Concentrator Plant
- Roads
- existing_roads_infra
- 66kv Transmission Line
- Smelter Roads
- Existing Infrastructure
- Gamsberg Zinc Mine Property

ALTERNATIVES_DIGITISE_20JAN2020

Alternatives

- Alternative Secured Landfill Site
- Alternative Smelter Complex Locations

LABEL

- Explosive magazine; North Pit; ROM; Waste Rock Dump
- Contractors Camp
- Business Partner Camp - Area 12 Ha
- Laydown Area - Area: 15

0 500 1,000 Meters

Scale: 1:25 000 @ A3
WGS_1984_UTM_Zone_34S

Gamsberg Smelter Project

Figure 29.1 Groundwater Groundwater Monitoring Network- Farm and Mine Boreholes & Proposed Boreholes

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Table 29-2 Social Monitoring Plan

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
1. Employment Creation				
A	Local Employment Policy, which includes SLP and BBBEE requirements and gender diversity.	Local Employment Policy on file	HR Department	Once-off
B	Applicable requirements of the existing Recruitment and Selection Policy are applied when employing locally	Recruitment records, checked against policy	HR Department	Every 6 months
C	Local employment requirements are included in Business Partner management plans	Business Partner management plans on file	Procurement and Supply Chain Management Department	Monthly
D	Labour pool database is developed and kept up-to-date	Date of latest revision of database	Procurement and Supply Chain Management Department	Every 6 months
E	Targets in terms of local recruitment are met by Project and Business Partners	Records of employee places of origin	HR Department	Monthly
F	Percentage of locally-recruited employees increases over a 5-year period	Records of employee places of origin	HR Department	Every 5 years
G	Turnover among locally-recruited employees is below 5%	Employee records	HR Department	Annually
2.Skills development and capacity building				
A	• Detailed skills inventory is prepared for the Project	Skills inventory on file	HR Department, with input from technical departments	Once-off, reviewed every 5 years
B	• Appoint qualified Technical Consultant for Skills Survey	Consultant appointment contract	Procurement and Supply Chain Management Department; HR Department and CSR Manager	Once-off at start of operation
C	• Skills survey is undertaken in the local communities & local skills database is developed	Report & database on skills survey results	Consultant; HR Department and CSR Manager	Once-off at start of operation, updated every 5 years

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
D	• Qualified Training Consultant is appointed to develop training programmes	Consultant appointment contract	HR, Procurement and Supply Chain Management Department; CSR Manager	Once-off at start of operation
E	• Training programme is developed based on the skills gaps identified for the Project	Training programme approved by Social Manager & HR Department	Consultant; CSR Manager Consultant; HR Manager, CSR Manager	Once-off at start of operation, updated every 5 years
F	• Training programme is implemented	Annual SLP Report and Workplace Skills Plan Report	CSR Manager, HR Department	Annually
G	• Staff skills levels and job performance improvement	Staff performance appraisals	HR Department, with input from line managers	Annually
H	• Skills levels in local communities improvement	Follow-up skills surveys	HR Department, with input from line managers	Every 2 years
I	• ABET programmes are implemented for both workers and people from local communities	Training records on file	Training Service Provider; CSR Manager	Annually
J	• Locals who received training (and qualified) are employed on the Project or receive procurement contracts with the Project	Employee and procurement records	HR Department; Supply chain management	Annually
K	• SLP's Skills Development Plan (*Skills Development Programmes and Learnership Scheme)* expanded to include more people from the local area	Targets set out in training & learnership plans	HR Department; CSR Manager	Once-off at start of operation, updated every 5 years
L	• Targets are met in terms of enrolment of local community members in training programmes and learnerships	Training and learnership records on file	Training Service Provider; CSR Manager	Annually
M	• Targets are met in terms of participation of suitable people from local communities in company bursaries and internships programmes	Records of bursaries and internships provided	HR Department	Annually

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
3.Local and regional economic development				
A	• Procurement and Supply Chain Management Department and Committee are established	Record of Department and Committee establishment	HR Department; CSR Manager	Once-off at start of operation
B	• Management and operational procedures are developed to ensure preferential procurement in accordance with BBBEE and the Mining Charter	Procedures are on file	Procurement and Supply Chain Management Department	Once-off at start of operation
C	• Procurement Progression Plan is developed as stipulated in the SLP	Procurement Progression Plan on file; included in SLP	Procurement and Supply Chain Management Department; HR Department	Once-off at start of operation, updated every 5 years
D	• Skills development and training targets are defined for local procurement, and included in Business Partner management plans	Targets included in Procurement Progression Plan and Business Partner management plans	Procurement and Supply Chain Management Department; HR Department	Once-off at start of operation, updated every 5 years
E	• Skills development and training targets for local procurement are met	Training records on file	Training Service Provider; CSR Manager	Annually
F	• LED consultant is appointed for local business capacity assessment	Consultant appointment contract	Procurement and Supply Chain Management Department; CSR Manager	Once-off at start of operation
G	• Inventory is compiled of local businesses	Inventory on file	Consultant; CSR Manager	Once-off at start of operation, updated every 5 years
H	• Capacity assessment is undertaken of local businesses	Report on capacity assessment	Consultant; CSR Manager	Once-off at start of operation, updated every 5 years
I	• Existing supplier database is updated regularly to include suppliers that have received training and support, and could qualify for procurement opportunities	Date of latest revision of database	Procurement and Supply Chain Management Department	Annually
J	• Procurement opportunities are identified that may be available to local Business Partners	Record of identified opportunities	Procurement and Supply Chain Management Department, with input from technical departments	Once-off at start of operation, updated every 5 years

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
K	• Goods and services are identified that could be supplied by local Business Partners (e.g. through unbundling of contracts)	Record of identified opportunities	Procurement and Supply Chain Management Department, with input from technical departments	Once-off at start of operation, updated every 5 years
L	• Plan is developed for SMME support and partnerships	Completed plan on file	Consultant; CSR Manager, Commercial Manager	Once-off at start of operation, updated every 5 years
M	• Local businesses are aware of the procurement needs of the Project and have sufficient information to prepare tenders	Record of enquiries/ responses received to advertised tenders	Procurement and Supply Chain Management Department	Annually
N	• Local businesses actively participate in tenders	Record of tenders awarded	Procurement and Supply Chain Management Department	Annually
O	• Community Development Forum is established	Record of Forum establishment	CSR Manager	Once-off at start of operation
P	• Regular meetings of the Community Development Forum are held	Minutes of meetings	Community Development Forum; CSR Manager	Every 3 months
Q	• Technical Consultant is appointed to develop LED Plan	Consultant appointment contract	Procurement and Supply Chain Management Department; CSR Manager	Once-off at start of operation
R	• SLP LED Plan is reviewed and refined	SLP update	HR Department; CSR Manager	Once-off at start of operation, updated every 5 years
S	• SLP LED plan is implemented	SLP implementation reports	HR Department; CSR Manager	Annually
T	• LED impact indicators (as defined in SLP) are achieved	SLP implementation reports	HR Department; CSR Manager	Annually
U	• CSI Policy and Programme are developed and signed off by senior management	Local Employment Policy on file	CSR Manager; senior management	Once-off
V	• Service providers are appointed to assist with/manage CSI & community development projects	Service providers' appointment contracts	Procurement and Supply Chain Management Department; CSR Manager	Once-off at start of operation
W	• CSI & community development projects are implemented	Annual CSI implementation reports	Service provider; CSR Manager	Annually

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
X	• Impact indicators (as defined in CSI Programme) are achieved	Annual CSI implementation reports	HR Department; CSR Manager	Annually
4.Health Safety and Security				
A	• Develop a Health Safety and Security Plan (HSSP)	Consultant appointment contract	Procurement and Supply Chain Management Department; CSR Manager	Once-off at start of operation
B	• HSSP is adopted	Adoption Plan is signed-off by senior management	Senior management	Once-off at start of operation
C	• HSSP is implemented	Quarterly and annual reports submitted and approved	SHEQ Manager CSR Manager	Every 4 months and annually
D	• Relevant mitigation measures in the EMPR are implemented	Environmental & social monitoring reports	SHEQ Manager CSR Manager	Annually
E	• Policing Forum is established	Forum ToR, Minutes of founding meeting	CSR Manager	Once-off at start of operation
F	• Policing Forum actively participates in addressing community safety and security issues	Minutes of forum meetings	Policing Forum; CSR Manager	Every 3 months
G	• HIV/AIDS policy is expanded to include HIV awareness campaigns in communities and provision of Voluntary Counselling and Testing (VCT) for communities	HIV/AIDS Policy on file	SHEQ Department; senior management	Once-off
H	• Service providers appointed to implement HIV awareness campaigns in communities and provide VCT for communities	Service providers' appointment contracts	Procurement and Supply Chain Management Department; CSR Manager, HR Department	Once-off at start of operation
I	• HIV awareness campaigns in communities are implemented	HIV/AIDS prevention programme implementation reports	Service provider; CSR Manager	Annually
J	• HIV awareness in communities is improved, and VCT services are accessed	Sample survey on community knowledge, awareness and practice related to health & safety	CSR/LED Department	Annually

No.	Indicator	Means of Verification	Responsible Party	Reporting Frequency
5.Project-induced population influx				
A	• Investigate partnerships with local authorities	Strategic projects have been identified with municipalities	CSR/LED Manager Public Relations Manager Legal Department	At start of operation
B	• Develop partnership agreements	Agreements developed and signed	CSR/LED Manager, HR Department, Public Relations Manager	At start of operation
C	• Sign agreements with local authorities on assistance with IDPs and SDFs	Sign-off completed and documents on file	CSR/LED Manager Public Relations Manager	On signing of agreements
D	• Include agreements in Project SLP/LED and CSI	SLP and CSI programmes adapted accordingly	CSR/LED Manager Public Relations Manager	Reporting as per SLP requirements and annually
6.Dependency on the Project for sustaining local development (Social Closure)				
A	Social Closure Plan is developed • Aggeneys Exit Plan is developed	Plan on file	Consultant (Exit Plan) CSR Manager, SHEQ Manager Senior management	5 years before closure
B	• SLP and LED Plan are regularly updated	SLP updated	HR Department; CSR Manager	Every 5 years
C	• Exit Plan is regularly updated	Exit Plan updated	Consultant	Every 5 years
D	• Regular reporting is undertaken on SLP and LED Plan implementation	SLP implementation reports	HR Department; CSR Manager	Annually
E	• Objectives as defined in Social Closure Plan and Aggeneys Exit Plan are achieved	Closure Plan implementation report	Senior management HR department CSR manager	At closure

30.ENVIRONMENTAL AWARENESS PLAN

30.1 MANNER IN WHICH APPLICANT INTENDS TO INFORM EMPLOYEES OF THE ENVIRONMENTAL RISKS

This section is addressed by the Environmental Competence and Awareness Plan (SSD-ENV-STD-026 version 9) for the Gamsberg Zinc Mine. The purpose of the Environmental Competence and Awareness Plan is to ensure that all personnel and management understand the general environmental requirements of the site. In addition, greater environmental awareness must be communicated to personnel involved in specific activities which can have a significant impact on the environment and ensure that they are competent to carry out their tasks on the basis of appropriate education, training and/or experience. The objective of the Environmental Competence and Awareness Plan is to achieve environmental performance and fulfil compliance obligations by:

- Eliminating and/ or minimising environmental incidents;
- Increase management and reaction of environmental incidents and audit results; and
- Increase awareness and knowledge on Environmental Management Systems (EMS) (EM – ISO14001:2015).

Chapter 5 of the Environmental Competence and Awareness Plan includes the procedure for implementation. Competence of employees to carry out their tasks is analysed by focussing on appropriate education, training and experience. In order to ensure that the relevant competence training is achieved the following requirements need to be met:

- Training needs for individuals to be identified;
- A training plan and/ or programme needs to be developed to address identified needs,
- Where training is conducted in-house a training delivery method must be in place;
- Evaluation of the training results must be conducted; and
- Training received and the results achieved must be documented and monitored.

The following sections look at the implementation of the Environmental Competence and Awareness Plan.

30.1.1 Awareness

Environmental awareness is a mine wide responsibility that is facilitated by the environmental unit. The following documents need to be communicated:

- Environmental Policy;
- Significant aspects and related actual or potential impacts associated with a person's tasks;
- The contribution of an employee to the effectiveness of the EMS; and
- Implications of not conforming with the EMS and Compliance obligations.

30.1.2 Induction

In addition to competence training for employees an induction process also needs to be in place. This will include:

- Annual induction for all Business Partner's and employees to include:
    - Compliance obligations;

- Environmental Standard Operation Procedures (SOPs);
- Environmental aspects;
- Environmental Emergency Response;
- Environmental objectives;
- Actions to achieve objectives; and
- Incident reporting.

- Specific-on-site induction for all employees prior to starting work in a specific section; and
- Visitor's induction which takes place at the security office and will only remain valid for a specified period.

30.1.3 Training

The Environmental Officer is responsible for the development and updating of all environmental training material. Environmental training needs for each section are identified and addressed to ensure environmental management is part of day-to-day operations. The environmental risk responsibilities guides the training requirements of each individual based on their respective roles.

Records of all training attendance are kept on-site.

30.1.4 Responsibility

The Environmental Officer (EO) is responsible for the implementation and maintenance of the Competence and Awareness document.

30.2 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION

This section is addressed by the EPRP (SSD-ENV-STD 033) which applies to any environmental emergency arising within the scope of activities under the control of the Gamsberg Zinc Mine.

The following aspects have the potential to become environmental emergencies and are addressed in the EPRP:

- Chemical spills
- Hydrocarbon spills;
- Bush fires;
- Mineral residue dam failure;
- Process water spills;
- Fresh water spills;
- Concentrate spills;
- Ore spills;
- Cyanide spills;
- Other environmental emergencies requiring special services such as:
  - -Power failures;
  - -Equipment malfunction;

- -Site fires; and
- -Natural disaster such as a flash flood.

Emergency Management requires as a minimum:

- Emergency Prevention;
- Emergency Preparedness;
- Response; and
- Recovery.

These are discussed in the following sections.

30.2.1 Emergency Prevention

The emergency prevention procedures include:

- Manage Environmental Aspects to prevent emergencies;
- Identification of Environmental Aspects (Risk Assessments) to prevent emergencies;
- Training to prevent emergencies;
- Managing incidents to prevent emergencies; and
- Maintenance of Equipment to prevent emergencies.

30.2.2 Emergency Preparedness

Emergency preparedness is important for emergency management. The following on-site preparedness is required to minimize environmental impacts from potential emergency situations:

- The relevant Material Safety Data Sheets (MSDS) must be available and the emergency response required on the MSDS should be implemented;
- Spill kits must be kept on-site;
- Maintenance of Emergency Preparedness Equipment:
  - Equipment that is used to manage environmental emergencies needs to be monitored periodically for completeness, accessibility, operational condition and must be regularly maintained, to ensure the section is prepared for emergencies at any given time.
  - Maintenance of Spill Kits include the checking of the kit content list, ensuring contents of the kit are replaced immediately after use and ensuring the kit is maintained and stored in a designated area accessible to all.
- Emergency drills should be conducted annually to test the emergency response plans and train employees. Lessons learnt from emergency drills should be incorporated into the section's emergency response plan.

30.2.3 General Emergency Procedure

The general procedure that should be followed in the event of all emergency situations is outlined below.

During construction, the Construction Manager and ECO must be notified of an incident upon discovery.

- During operations, the incident must be reported immediately to the Environmental Department for emergencies involving environmental impacts or to the Safety Department in the case of injury.
- Area should be cordoned off to prevent unauthorised access and tampering of evidence.
- If dams or storm water controls are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Plant Manager on shift must be notified.
- Take photographs and samples as necessary to assist in the investigation.
- The Environmental Department must comply with Section 30 of the National Environmental Management Act (107 of 1998) such that:
    - The Environmental Department must immediately notify the Director-General (DMRE, DHSWS, and Inspectorate of Mines as appropriate), the South African Police Services and relevant fire prevention service, the provincial head of NCDENC or the municipality, the head of the regional DHSWS office and any persons whose health may be affected, of:
        - the nature of the incident;
        - any risks posed to public health, safety and property;
        - the toxicity of the substances or by-products released by the incident; and
        - any steps taken to avoid or minimise the effects of the incident on public health and the environment.
    - The Environmental Department must as soon as is practical after the incident:
        - take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
        - undertake clean up procedures;
        - remedy the effects of the incident; and
        - assess the immediate and long term effects of the incident (environment and public health).
    - Within 14 days the Environmental Department must report to the Director-General (DMRE, DHSWS, as appropriate), the provincial head of NCDENC and the local municipality, the head of the regional DHSWS office such information as is available to enable an initial evaluation of the incident, including:
        - the nature of the incident;
        - the substances involved and an estimation of the quantity released;
        - the possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
        - initial measures taken to minimise the impacts;
        - causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
        - measures taken to avoid a recurrence of the incident.

30.2.4 Identification of Emergency Situations

Potential emergency situations that have been identified for the proposed project are included in Table 30-1.

Table 30-1 Emergency Situations and Response

No.	Emergency Situation	Response in Addition to General Procedures
1	Spillage of chemicals, engineering substances and waste	Where there is a risk that a spill will contaminate the land (leading to a loss of resource), surface water and/or groundwater, the mine will: • Notify residents/users downstream of the pollution incident if potentially exposed . • Identify and provide alternative resources should contamination impact adversely on the existing environment. • Cut off the source if the spill is originating from a pump, pipeline or valve (e.g. return water pipeline, refuelling tanker) and the infrastructure be 'made safe'. • Contain the spill (e.g. construct temporary earth bund around source such as road tanker). • Pump excess hazardous liquids on the surface to temporary containers (e.g. 210 litre drums, mobile tanker, etc.) for appropriate disposal. • Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired.
2	Discharge of dirty water to the environment	Apply the principals listed for Item 1 above. To stop spillage from the dirty water system the mine will: • redirect excess water to other dirty water facilities where possible; • pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; and • carry out an emergency discharge of clean water and redirect the spillage to the emptied facility. Apply for emergency discharge as a last resort.
3	Contamination of surface water	• Personnel discovering the incident must inform their Supervisor and the Environmental Department of the location and contaminant source. • Apply the principals listed for Item 1 above. • Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants. • Contamination entering the surface water drainage system should be redirected into the dirty water system. • The Environmental Department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination.
4	Groundwater contamination	• Investigate the source of contamination and implement control/mitigation measures.
5	Burst water pipes (loss of resource and erosion)	• Notify authority responsible for the pipeline (if not mine responsibility). • Shut off the water flowing through the damaged area and repair the damage (if the mine's pipeline). • Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit.
6	Flooding from failure of surface water control infrastructure	• Evacuate the area downstream of the failure based on volume of impoundment. • Using the emergency response team, rescue/recover and medically treat any injured personnel. • Temporarily reinstate/repair storm water diversions during the storm event (e.g. emergency supply of sandbags).

No.	Emergency Situation	Response in Addition to General Procedures
		• Close the roads affected by localised flooding or where a storm water surge has destroyed crossings/bridges.
7	Risk of drowning from falling into water dams	• Attempt rescue of individuals from land by throwing lifeline/lifesaving ring. • Get assistance of emergency response team whilst attempting rescue or to carry out rescue of people and/or animals. • Ensure medical assistance is available to recovered individual.
8	Falling into excavations	• Get assistance of emergency response team whilst attempting rescue or to carry out rescue of people and/or animals. • Ensure medical assistance is available to recovered individual.
9	Veld fire	• Evacuate mine employees from areas at risk. • Notify downwind residents and/ or other land users of the danger. • Assist those in imminent danger/less able individuals to evacuate until danger has passed. • Provide emergency firefighting assistance with available trained mine personnel and equipment.
10	Road traffic accidents (on-site)	• The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. • Access to the area should be restricted and access roads cleared for the emergency response team. • Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). • Casualties will be moved to safety by trained professionals and provided with medical assistance. • Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.
11	Development of informal settlements	• The mine will inform the local authorities (municipality and police) that people are illegally occupying the land and ensure that action is taken within 24 hours.

31.SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information has been requested at this stage by the Competent Authority.

32.UNDERTAKING

I, the Environmental Assessment Practitioner responsible for compiling this EMPr, undertake that:

- The information provided herein is correct;
- Comments and inputs from stakeholders and I&APs have been included and correctly recorded in this report;
- Inputs and recommendations from the specialist reports have been included where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.

Signature of EAP	Date
Signature of commissioner of oath	Date

Kate Hamilton (Report Author)	Kate Hamilton (Project Manager)	Stuart Heather-Clark (Project Reviewer)

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