mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

KOLOMELA MINE NEAR POSTMASBURG, NORTHERN CAPE

FINAL FOR SUBMISSION

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

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EXM ENVIRONMENTAL SCIENCE

Sishen Iron Ore Company (Pty) Ltd

Part B: Environmental Management Programme Report

Infrastructure and Activities Associated with the Kolomela Mine Near Postmasberg, Northern Cape

09 February 2022

Final for Submission

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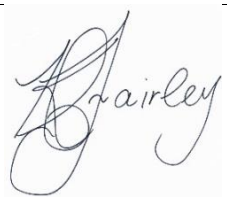
Report reviewed by Kerry Fairley	EXM Environmental Advisory (Pty) Ltd Pr.Sci.Nat		2022/02/08

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ACRONYMS AND ABBREVIATIONS

	Definition
BID	Background Information Document
DMRE	Department of Mineral Resources and Energy
DMS	Dense Media Separation
DSO	Direct Shipping Ore
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GNR	Government Notice Regulation
HME	Heavy Mining Equipment
IAP	Interested and Affected Party
IWWMP	Integrated Water and Waste Management Plan
KS	Kapstevel
LDV	Light Driving Vehicles
LOM	Life of Mine
mamsl	Metres above mean sea level
Mt	Million Tonnes
MPRDA	Mineral and Petroleum Resources Development Act
MW	Megawatt
NDCR	National Dust Control Regulations
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management Air Quality Act
NEM: BA	National Environmental Management Biodiversity Act
NEM: WA	National Environmental Management Waste Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NIA	Noise Impact Assessment
PM	Particulate Matter
PV	Photovoltaic
ROM	Run of Mine
SIOC	Sishen Iron Ore Company
SACNASP	South African Council for Natural & Scientific Professionals
SAHRA	South African Heritage Resource Agency
SANS	South African National Standards
SIOC	Sishen Iron Ore Company (Pty) Ltd
SLP	Social Labour Plan
TOPS	Threatened or Protected Species
TSF	Tailings Storage Facility
WRD	Waste Rock Dump
WUL	Water Use Licence

1. DETAILS OF THE EAP

1.1 Details of EAP who prepared the report

Name of The Practitioner: Trevor Hallatt

Affiliation: Senior Environmental Scientist at EXM Environmental Advisory

Tel No.: 071 689 2229 or 010 0073617

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1.2 Expertise of the EAP

Trevor obtained a B.Sc. degree from the North-West University (Potchefstroom campus) in Geography, Zoology and Tourism in 2010. This degree provided him with a sound base and understanding of the environment and human impacts on the environment. He also obtained an honours degree in Environmental Management at the NWU in 2011. Furthermore, Trevor obtained a Masters degree in Environmental Management (cum laude) in 2014.

Trevor Hallatt has more than 9 years of environmental management experience in mining, power generating, industrial and local government sectors. His duties entail the planning and execution of projects related to environmental management, including ISO 14001: 2004 and legal compliance audits, Environmental Impact Assessments (EIA), Compilation of Environmental Management Programmes, Environmental Risk Assessments and Environmental Management Systems. Furthermore, he performed different functions in the planning and delivery of environmental short courses, including the development of modules and presenting on different topics. Trevor is also a registered Natural Science Professional with the South African Council for Natural Scientific Professions (Reg nr: 300123/15).

Declaration of Independence

The undersigned declare that this report represents an independent and objective assessment of the risks associated with the proposed development. Curriculum vitae and proof of registration of the EAP is provided in Appendix A.

Name	Affiliation	Designation	Signature	Date
Trevor Hallatt	EXM Environmental Advisory (Pty) Ltd	EAP Pr.Sci.Nat.		2022/02/08

2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The requirement to describe the aspects of the activity that are covered by the draft environmental impact assessment report are already included in PART A, Section 4, as required.

2.1 Description of activities to be undertaken

2.1.1 Background

The Sishen Iron Ore Company (Pty) Ltd, part of Kumba Iron Ore Limited (hereafter Kumba), owns and operates Kolomela mine located approximately 8 km south west of Postmasburg in the Tsantsabane Local Municipality, Northern Cape Province. The Minister of Mineral Resources granted a mining right for the mining of iron ore at Kolomela Mine on 5 May 2008, {Ref: (NC) 069 MR} and is valid until 17 September 2038, unless cancelled or suspended.

Kolomela mine operates as a conventional open cast mine where ore is extracted by means of drilling, blasting, loading and hauling. Ore extracted from the pits is transported to a direct shipping ore (DSO) plant which involves the crushing and screening of recovered ore material into stockpiles of 'lump' and 'fines'. The processed iron ore is loaded onto an internal railway line which is connected to a direct rail link to Transnet's Sishen-Saldanha railway line from where the iron ore is transported to the Port of Saldanha for export. Kolomela Mine also utilises a Modular Dense Media Separation (DMS) Processing Plant for the processing of low grade ore not suitable for processing at the DSO plant. Kolomela produced 10.8 million tonnes during its first full year of production in 2013 and currently produces 13-14 million tonnes per annum (Mtpa) facilitated by enhanced stripping techniques and processing of 1-3 Mtpa of lower grade of ore at the Tierbult DMS Modular Plant.

Iron ore is currently extracted from three opencast pits, namely Klipbankfontein, Leeuwfontein and Kapstevel North. Kolomela is in the process of developing the Kapstevel South Pit which is required to sustain the mining production at approximately 14 Mtpa (Mtpa). The current the Life of Mine (LoM) including the Kapstevel South Pit currently stands at 2034, but with the potential to be extended in future with the development of the Ploegfontein, Tierbult and Heuningkranz ore bodies, the mining of which are already authorised.

Kolomela proposes to expand and amend some of the existing activities and also develop new infrastructure to support continued and future production at the mine. This includes:

- Amendment of the Kapstevel South Pit footprint area.
- Amendment of the Kapstevel Waste Rock Dumps and haul roads.
- Amendment of Kapstevel Evaporation Ponds and stormwater management infrastructure.
- Additional park-up, laydown and ore stockpile areas.
- Development of new DMS tailings management infrastructure

- A new Photovoltaic Solar Facility.
- A new Waste Tyre Management Facility.
- A conveyor and railway line to transfer material to and from the DMS plant.
- Amendment to the future Kapstevel DMS conveyor footprint to facilitate widened haul roads.
- Amendment of Kapstevel Waste Rock Dumps and Additional Waste Rock Dumps.
- Additional Low Grade Ore Storage Areas.
- New radio masts.
- Provision for an area of relaxation and safety berms around pits.

The existing and planned infrastructure at Kolomela mine are show in (Figure 5-1 and 5-2). Authorisation is thus being sought from the Department of Mineral Resources & Energy (DMRE) for activities listed under the National Environmental Management Act (No. 107 of 1998) and the National Environmental Management: Waste Act (No. 59 of 2008) as well as amendment of the environmental management programme in terms of Section 102 of the Minerals & Petroleum Resources Development Act (No. 28 of 2002). The authorisation will cover existing and proposed footprints. This will be supported by a Scoping Study and an Environmental Impact Assessment (EIA).

The northern section of Kapstevel north pit, approved during a previous EIA, was originally excluded from this amendment application due its proximity (within the 400m exclusion zone) to KOL-03 (historic mine) heritage resource. Recent exploration data has revealed that the area contains viable ore bodies and the approved area has been included. However, the area will not be developed without the required authorisation and/or permits from the South African Heritage Resources Agency (SAHRA).

3. COMPOSITE MAP

A map which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities is provided as Figure 3-1 below.

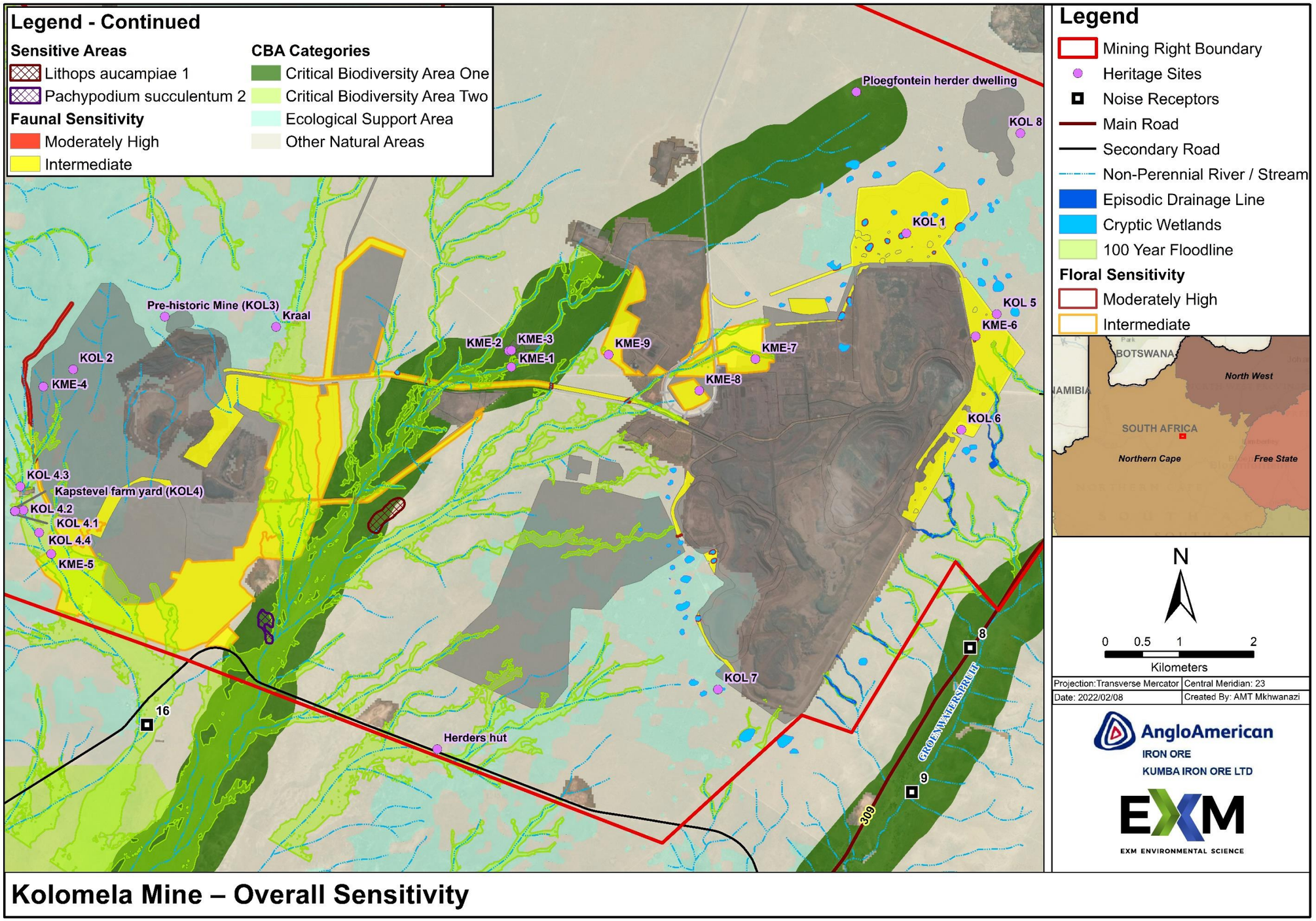


FIGURE 3-1: ENVIRONMENTAL SENSITIVITY MAP

4. IMPACT MANAGEMENT OBJECTIVES

4.1 Closure Objectives

The overarching mine closure objectives aim to ensure sustainability beyond mine closure and leave a positive legacy post closure. This is supported by the following specific objectives and give effect to the physical, biophysical and social closure objectives which are to:

- Identify and mitigate risk (Safety, Health, Environment and Social) to achieve legal compliance;
- Ensure that proposed post-closure land uses are sustainable and pose an acceptable level of risk to public health and safety;
- Restore the mining area to a condition consistent with the pre-determined post closure land use objectives;
- Develop and implement rehabilitation objectives, including the structural and ecological stability of landforms and associated pollution control (air, soils, groundwater and surface water);
- Ensure that post-closure remnants will conform to the concept of sustainability and the post-closure land use plan, with limited long-term liabilities;
- Ensure that rehabilitation work is based on sound reasoning and that rehabilitation execution occurs concurrent with mining activities, is of high quality and is sustainable into the predictable future;
- Ensure that social closure will contribute to local economic development and that socio-economic impacts will be considered and managed via continuous, inclusive (internal and external) stakeholder engagement;
- Manage all workforce transition processes in line with regulatory requirements and commitments to mitigate socio-economic impacts;
- Develop programmes throughout the remaining life of mine to enable municipalities, suppliers and stakeholders to manage social transition (External capacity development (municipal capacity development and support) will in the long-term assist the local municipality to provide basic services (Health & wellbeing) and create an environment that is conducive for investment and job creation by the private sector (Livelihoods)).
- Obtain agreement from relevant authorities regarding the extent of rehabilitation and achievement of closure / success criteria; and

- Facilitate the issuing of a closure certificate with achievable conditions by relevant authorities.

4.2 Process for Managing Environmental Damage, Pollution, Pumping and Treatment of Extraneous Water and Ecological Degradation

Kolomela Mine is required to conform with the polluter pays principle. This principle provides for "*the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*"

The Mitigation measures identified as part of the EIA, specialist studies and EMPr (this document) must be implemented in order to reduce the severity of negative impacts associated with the mining operations. The following measures will be undertaken to ensure that pollutions risks are minimised:

- Adequate dust suppression measures on roads by watering or the use of a dust retardant/binding agent must be implemented to minimize dust fall and prevent the exceedance of legal limits;
- Adequate stormwater management measures must be implemented which adhere to the requirements of GN 704. Clean water is to be diverted around all potentially polluting areas while runoff from dirty areas must be captured and diverted to a sump or pollution control dam.
- Continue with aquifer recharge and monitoring of borehole levels on site as well as at private boreholes.
- Update dewatering model every two years.
- Measures contained in the Geohydrological report must be implemented to minimise reduction in groundwater yield in private boreholes.
- Ensure that measures are in place for the containment and management of hazardous substances spillages.
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates
- Watercourse and wetland areas outside of the construction/upgrade areas in which no proposed activities will occur, should be clearly marked as a no-go areas and protected from secondary impacts.
- Conduct regular inspections in line with regulatory requirements
- Contain potential pollutants and contaminants (where possible) at source

4.3 Potential Risk of Acid Mine Drainage

4.3.1 Steps taken to investigate, assess and evaluate the impact of acid mine drainage

LWRC (2021) conducted a geochemical assessment and waste classification to determine the chemical nature and character of the waste rock dump (WRD) and tailings storage facility (TSF) material and to determine their pollution generating potential (including AMD / ARD).

The results were then compared against relevant previous geochemical assessments and waste classifications conducted at Kolomela Mine. The results from the studies largely agree on the mineralogy, The mineralogy of the waste rock and tailings is dominated by silica (quartz), ferric oxide (hematite), aluminium oxide and dolomite. In terms of acid generating potential all studies agree that the potential is low to zero for the waste rock or tailings material.

The TC's are also similar in the studies in that the elements observed to exceed TCT values are mostly barium, copper and manganese. The LC's are observed to be similar as well. The investigations all classed the waste rock and tailings as Type 3 Waste.

Golder Associates (2016) concluded that although none of the base (model) scenarios for the Waste Rock Dumps are consistent with Type 4 waste, they do not meet the complete definition of Type 3 waste (LC > LCT0 so low risk from leachable concentrations) and this indicates that it is reasonable to consider not applying a Class C barrier system, which is prescribed for Type 3 waste. Please refer to Hydrogeological Assessment in Annexure I of the EIR report for further detail.

4.3.2 Measures and Engineering/Mine design solution that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

A number of geochemical and waste assessments have been undertaken at Kolomela Mine. All studies agree that there is a low to zero potential for acid generation. No measures to remedy acid mine drainage are required.

4.4 Water use licence application

The Department of Water and Sanitation (DWS) issued Kolomela Mine with an Integrated Water Use License (IWUL) (License No. 10/D73A/ABCEGIJ/4125) that allows the mine to use water in terms of section 21(a); (b); (e); (g); (i) and (j) of the National Water Act, 1998 (Act No. 36 of 1998). The proposed amendment to authorised activities and new activities will trigger the Activities c&i and Activity g as summarised below.

TABLE 4-1: SECTION 21 WATER USES TO BE INCLUDED IN THE WULA

National Water Act Section 21 listed activities	Activities and infrastructure
Section 21 c&i	Crossing of watercourses (episodic drainage lines)
	Impacts on wetland pans or their catchment for the development of new infrastructure or amendment of existing infrastructure.
Section 21 g	Development of infrastructure within floodlines
	Disposal of waste rock material at new Waste Rock Dumps at Kapstevel;
	Storage of tailing at new paddocks at the DMS plant;
	Disposal of tailing at a new Tailing Storage Facility (TSF);
	Development of a new return water dam for the TSF

A WUL application process is being undertaken in terms of the Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals (GNR. 267 of 2017). An updated Integrated Water and Waste Management Plan (IWWMP) compiled in accordance with the requirements of GNR. 267 will be submitted in support of the application.

5. ENVIRONMENTAL MANAGEMENT PROGRAMME

The Table below contain the measures that must be implemented to prevent/minimise potential environmental impacts at Kolomela Mine during the different life cycles of Kolomela.

TABLE 5-1: ENVIRONMENTAL MANAGEMENT PROGRAMME

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
Biodiversity management						
Removal of topsoil and vegetation during infrastructure development.	Impacts on floral habitat and Species of Conservation Concern	Minimise disturbance to natural habitat	Planning Construction	Procedure for the Removal of Topsoil, including Vegetation.	National Environmental Management Biodiversity Act Conservation of Agricultural Resources Act National Forests Act	Undertake biomonitoring as per the Kolomela biomonitoring programme
				A contractor must obtain authorisation in the form of a permit from the Kolomela environmental department for the clearance of an area. The application must include the area of the proposed development and the planned activities.		
				Vegetation clearance only allowed in demarcated and approved footprints.		
				Licences & permits for the removal of protected species.		
				Concurrent rehabilitation of areas temporarily disturbed by construction activities.		
				Restrict movement of vehicle and people to designated roads and footprints.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				Implement habitat offset strategy as agreed with relevant authority.		
				Wetland pans not impacted by activities must be dedicated no-go areas.		
Disturbance/destruction of habitat	Impacts on faunal habitat and Species of Conservation Concern	Minimise disturbance to natural habitat.	Planning, construction and operational	Strict speed limits to prevent vehicles colliding with or running over animals.	National Environmental Management Biodiversity Act	Undertake biomonitoring as per the Kolomela biomonitoring programme
				Culverts should be installed (where practicable and if possible) along any drainage lines under roads and fences to allow for the movement of smaller species (particularly small mammals and reptiles).		
				No hunting/trapping or collecting of any faunal species is allowed other than that is authorised by the environmental department.		
				Awareness training regarding the presence of faunal species on site.		
				The Procedure for the Removal of Topsoil should stipulate that the site must be inspected by the environmental department prior to disturbance to detect any faunal species. Relevant permits should be obtained if any protected species are encountered.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				Habitat/biodiversity offset strategy as agreed with relevant authority.		
Disturbance caused by mining development	Encroachment of Alien Invasive Plants in natural areas – outcompete natural species. Transform habitats	Prioritise areas heavily affected. Prevent regrowth in controlled areas.	Construction, operations and decommissioning	Procedure for the management of AIPs.	National Environmental Management Biodiversity Act Conservation of Agricultural Resources Act	Monitor sites that have been cleared to ensure regrowth does not occur
				Implement a schedule for the control of AIPs, priority areas should be targeted first.		
				The control of AIPs must not be limited to disturbed areas, but also natural areas.		
				Conduct follow up inspections of areas during the growing season to control any new growth.		
				Use only registered Pest Control Operators (PCOs) for the use of any herbicides.		
Surface water resources						
Management of hazardous substances Runoff from dirty water areas. Refuelling of vehicles and machinery.	Contamination of stormwater and soil.	Precent spillages of hazardous substances. Manage dirty water infrastructure to prevent spillages.	Construction and operations	Runoff from dirty areas must be captured and diverted to a sump or pollution control dam according to GN 704.	GN 704 Water Use Licence	Surface water monitoring as per WUL requirements.
				Dirty water conduits must be clear of obstacles to ensure maintenance of capacity.		
				Sufficient freeboard must always be available at PCDs to contain a flood event.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				Servicing of vehicles to be conducted in dedicated areas with measures in place for the containment of runoff. Containment measures must be put in place if servicing is conducted outside demarcated servicing areas.		
				Refer to section regarding the management of hazardous substances.		
Construction of mining infrastructure	Destruction of wetland plans. Impact on episodic drainage lines		Planning and construction	Implement mitigated layout plan to avoid wetland pans as far as possible.	GN 704 Water Use Licence	Biomonitoring.
				Implement stormwater control measures close to water courses at stockpile areas and where necessary.		
				Restrict movement outside demarcated areas, especially close to water courses.		
				Water courses not affected by development must be dedicated no go areas		
				Biomonitoring in episodic drainage lines.		
Runoff from disturbed areas	Soil Erosion and Sedimentation of Water Courses	Manage disturbed areas correctly to minimise sediment load	Construction and operations	Install dissipating structures (such as gabions) at stormwater discharge points, where necessary or where erosion is evident.	GN 704 Water Use Licence	Biomonitoring.
				Clear obstacles from culverts		
				Sloping and concurrent rehabilitation of WRDs will		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				reduce potential sediment runoff.		
				Berms along haul roads to control sediment runoff.		
				Install berms < 50 meters downstream from ore stockpiles that are situated near water courses.		
Groundwater						
Dewatering	Impact on aquifer yield	Minimise impact of dewatering on aquifer yield	Operational, closure	The numerical groundwater flow and transport model should be updated prior to closure to confirm predicted impacts.	None	Groundwater Monitoring
				Groundwater monitoring results should be used to plan for mine closure.		
				Ongoing groundwater monitoring after mining has ceased for a specific time period to establish post-closure trends.		
				Based on results from the model update a post-closure monitoring programme may need to be established.		
				Groundwater levels should be monitored on-site as well as on private farms around the mine.		
				Results from ongoing groundwater monitoring should be used to update the mine water balance and groundwater model, as required.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				Continue with artificial recharge of aquifer.		
				Impacted users need to be reinstated		
Soil Management						
Stripping of topsoil Incorrect storage of topsoil Hazardous substances management.	Incorrect stripping – loss of topsoil Deterioration of soil stockpiles. Pollution of soil resources	Minimise topsoil stripping Optimal storage of topsoil for rehabilitation purposes. Prevent soil contamination	Construction. Operations. Closure.	Implement a Procedure for the Removal of Topsoil, including Vegetation.	Anglo procedures and standards	Monitoring of topsoil stockpiles
				Plan soil stockpile positions according to future development footprints to prevent further disturbance.		
				Stripping of topsoil only allowed in demarcated and approved footprints.		
				Implement topsoil management procedure.		
				Angle of repose to be used for stockpile development and disturbance of stockpiles must be limited to preserve the soil integrity.		
				Topsoil stockpiles that will be stored for < 2 years may not exceed 2 meters and older stockpiles can exceed 2 meters, however no equipment will be allowed on top of stockpiles for any reason including deposition of soil.		
				Topsoil stockpiles must be separated from areas with the		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				potential to cause pollution, i.e. use berms to separate areas.		
				Any contaminated soil must be excavated, placed in a designated, labelled skip and taken to the bioremediation facility for treatment. The treated soil can be used for rehabilitation purposes, after quality monitoring has been conducted.		
Air quality management						
Blasting. Area clearance – soil disturbance. Earth works. Vehicles travelling on unpaved roads. DSO plant, crushing, screening Demolition of infrastructure	Nuisance conditions. Health risks	Minimise atmospheric emissions	Construction, operations and closure.	Implement strict speed limits on all roads.	National Dust Control Regulations. National Ambient Air Quality Standards National Environmental Management Air Quality Act	Dust fall monitoring PM10 and PM2.5 monitoring
				Implement dust suppression on haul roads and other unsurfaced roads by using a dust retardant/binding agent for permanent roads and water spraying on other roads. Investigate the use of a product that is biodegradable and water efficient as far as possible.		
				Dust suppression on exposed areas during construction activities.		
				Controlled blasting according to a blasting procedure. Only use registered contractors with appropriate training for blasting.		
				Dust fall monitoring according to the National Dust Control Regulations.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				PM 10 and PM 2.5 monitoring.		
				Implement a community grievances and complaints management procedure (Kolomela Grievance Process). All complaints must be responded to and/or investigated.		
				Present monitoring results at Kolomela environmental forum.		
				Wet scrubber system to remove the dust from the crushing and screening processes at the DSO Processing Plant. Maintenance of scrubber system according to product specifications.		
				Vehicle emissions • Regular servicing of vehicles. • Prevent unnecessary idling of trucks.		
				WRD • Concurrent rehabilitation of WRD.		
Noise Management						
Drilling, blasting and hauling. Material handling.	Nuisance conditions. Health risks	Minimise noise generation.	Construction and operations	Strict speed limits on all Kolomela roads.	Noise Regulations IFC standards	Summer and winter noise monitoring
				No blasting at night time as far as possible.		
				Communicate blasting times to relevant stakeholders, only		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				when blast occur close to Klipbankfontein farmstead.		
				Controlled blasting. Only use registered contractors with appropriate training for blasting		
				Community and complaints management procedure. All complaints must be responded to and/or investigated.		
				Conduct summer and winter environmental noise monitoring.		
Water Use						
Water Use	Depletion of water resources	Optimise and reduce water use	Construction and operations	Awareness training.	Water Use Licence Anglo Standards	Monitor consumption and update water balance
				Water leaks must be reported and repaired timeously.		
				Optimise the reuse of water (i.e. treated sewage, water in PCDs, TSF process water).		
				Water spillages at the refilling station for the water bowsers must be avoided.		
				Investigate measures to optimise water use and saving.		
Electricity Usage						
Electricity Usage	Contribution to green house gas emissions. Dependency on non-	Optimise and reduce water use	Operational phase	Investigate the use of solar energy to supplement electricity obtained from fossil fuels.	Anglo standards	Monitor electricity consumption
				Awareness training regarding electricity consumption.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
	renewable resources					
Fire management						
Lightning Intentional fire starting Storage of waste tyres	Impact on neighbouring farming activities	Efficient fire fighting	Construction and operations	Ensure fire breaks are maintained. Fire-fighting equipment must be readily available. Ensure adequate communication with neighbours regarding fires. Adequate fire fighting measures must be implemented at waste tyre storage area.		Monitor fire breaks
Sewage management						
Sewage spillages	Water and soil pollution Nuisance conditions	Prevent sewage spillages	Construction and operations	The sewage treatment plant (biotreatment facility) must be operated by trained personnel. Any nuisance conditions at the sewage treatment works must be investigated and rectified. Any sewage spillages must be reported and cleaned appropriately. Temporary toilets must be emptied on a regular basis as required and the sewage must be discharged into the bio treatment facility. Good housekeeping practices must be implemented at the	None	None

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				temporary toilets to prevent nuisance conditions.		
				Reuse of treated water in operations.		
Waste management						
Hazardous waste management						
Generation and management of hazardous waste Spillages	Water and soil pollution	Implement efficient waste management practices Optimise recycling potential Follow waste hierarchy approach	Construction, operations and closure.	Waste Management Procedure.	National Environmental Management Waste Act and regulations/norms and standards	Implement a waste manifest system
				Awareness training should be undertaken regarding waste management.		
				No mixing of general and hazardous waste allowed.		
				Provide designated labelled bins and skips at strategic positions for the placement of hazardous waste. These containers must not be overfilled		
				Contaminated soil must be excavated, stored in a designated skip and taken to the bioremediation facility for treatment		
				All hydrocarbon contaminated material (rags, PPE, containers etc.) must be placed in a labelled, skip and taken to the hazardous waste yard. After which it must be disposed at a licenced facility.		
				Waste batteries to be provided to the suppliers for recycling		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				Fluorescent tubes must be provided to a licenced facility for treatment		
				Implement good housekeeping practices at hazardous waste yard. Appropriate stormwater control must be implemented at the hazardous waste yard.		
				Medical waste must be placed in specially marked bins and provided to a licenced contractor for treatment.		
				Implement a waste manifest system for the management of hazardous waste		
				Spent chemicals should not be disposed in the sewar system, but according to the product specifications.		
General waste management						
Generation and management of general waste Wind blown litter	Water and soil pollution Nuisance conditions - littering	Implement efficient waste management practices Optimise recycling potential Follow waste hierarchy approach	Construction, operations and closure.	Provide labelled bins and skips at strategic locations for the placement of general waste. These containers must not be overfilled.	National Environmental Management Waste Act and regulations/norms and standards	Implement a waste manifest system
				Food waste to be taken to the bioremediation plant.		
				Optimise recycling/reuse of general waste that can be recycled.		
				Only dispose non-recyclable general waste at a licenced disposal site. Delivery notes to be obtained.		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				No littering must be allowed on site.		
				Waste tyres must be stored in a designated area until management option has been finalised.		
Hazardous Substances Management						
Storage, handling and general management of hazardous substances. Spillages, leaks	Water and soil pollution	Implement efficient hazardous substances management practices Ensure that hazardous substances are managed correctly to prevent pollution.	Construction and operations	Hazardous substances management procedure.	Hazardous Substances Act and regulations Anglo standards	None
				Incident management procedure for the management of hazardous substances spillages.		
				Bulk hazardous substances must be stored in a bunded area with sufficient capacity to capture 110% of the tank's capacity or 25% of the cumulative capacity where multiple tanks are stored.		
				Safety Data Sheets must be available on file.		
				Spill kits must be available in areas where hazardous substance are used/stored.		
				Spills must be cleaned appropriately.		
				Large spills that cannot be managed by the specific section must be reported immediately to the section manager and environmental department and additional		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				resources must be used for rectification.		
				Refuelling to be conducted in dedicated area with stormwater measures in place to capture spillages.		
				Explosives to be stored in roofed buildings/enclosed structures		
				Strict access control to explosives magazine.		
Visual						
Footprint of activities, especially the WRDs Night time activities	Visual intrusion Sense of place Sky glow, Glare	Minimise visual intrusion	Construction and operations	Concurrent rehabilitation of Waste Rock Dumps.	N/A	N/A
				Apply dust suppression methods on haul roads and on WRDs.		
				Only conduct activities in demarcated approved areas.		
				To ensure that all mitigation and management actions outlined in the closure and rehabilitation report are conducted.		
				Limit the height of the WRD and stockpiles to not exceed the predetermined height.		
				Optimise backfilling.		
				Security lighting to be positioned downwards and inwards, where practicable.		
				Lights directed away from receptors, where practicable.		
				The use of yellow or white lighting should be evaluated,		

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
				based on safety risk in areas of work.		
Cultural Heritage						
Footprint of activities	Impact on heritage resources	Minimise impact on heritage resources	Construction and operations	Implement measures stipulated in the Kolomela Cultural Heritage Management Plan. Implement Chance Find Procedure Obtain approval from SAHRA for any activities that would encroach the 400m buffer around KOL-03 (historic mine).	Kolomela Cultural Heritage Management Plan	As per CHMP
Social						
Influx Management	Pressure on housing, municipal infrastructure, health, schooling and social services.	Reduce in-migration of job seekers into the community.	Construction and operations	Local employment and procurement strategy. Stakeholder engagement aimed at communicating local. LED, CSI and donations to assist local municipality, schools, health service provide and community NPOs/NGOs with management of consequence of influx. Contractor social performance management to include requirements for local employment and community initiatives.	SLP	
Housing shortage	Shortage of affordable housing.			Local employment and procurement strategy. Kumba housing strategy.	Housing & Living Conditions Standard	

Aspect (activities, product, services)	Impact	Objectives and management outcome	Lice cycle phase	Impact management actions	Compliance with Standards/Acts	Monitoring required
Local Employment	Employment of local persons	Upskilling of local persons to improve employment opportunities.	Construction and Operations	Upskilling local persons in sought after vocations. Investment in local education centres to provide facilities for training of local persons. Contractor social performance management to include requirements for local employment.	SLP	
Local Procurement	Procurement of services from local businesses.	Maximise opportunities for local businesses	Construction and Operations.	Procurement procedures to identify opportunities for local services providers. Enterprise development initiatives to provide support to local service providers to allow them to participate in providing services to Kolomela mine.	Mining Charter	
Downscaling & retrenchment	Loss of employment, procurement and support in local community.	Community sustainability at closure	Operations	Social Closure Plan in place aimed at preparing communities for sustainability after closure.	SLP	
Community expectations	Action from community due to failed expectations	To managed expectations and inform communities.	Construction and Operations	Stakeholder engagement aimed at transparency regarding employment and procurement opportunities. Grievance process.		

6. SPECIFIC MANAGEMENT OF ENVIRONMENTAL FEATURES

6.1 Biodiversity Management and Offset Strategy

Kolomela is in the process to develop a Biodiversity Management Programme in order to comply with the Anglo American Environmental Performance Standard for Biodiversity (Anglo American 2018). The purpose of the Standard is to define the minimum requirements to manage biodiversity in all phases of Anglo American's operations to achieve Net Positive Impact (NPI) and maximise biodiversity opportunities wherever we operate.

The Biodiversity Management Programme will consolidate existing and available biodiversity information, identify risks, propose mitigations, address residual impacts and above all, directs the biodiversity programme at Kolomela towards Net Positive Impact (NPI).

It is clear that biodiversity losses as a result of activities Kolomela are unavoidable, and that biodiversity gains may not be achieved and Nett Positive Impact cannot be reached. To compensate for residual impacts a biodiversity offset plan must be developed. Kolomela is in the process to develop a biodiversity off set strategy in consultation with the relevant authorities.

Fundamental to the concept of a biodiversity offset plan is that any offset should deliver a benefit (or in other words, a gain) that is better than what would have otherwise happened if the offset was not implemented. In order to explore this, variables of different threats and the anticipated outcomes on biodiversity in potential offset areas need to be derived from empirical information and verified with experts. These variables will need to be discussed in an offset assessment, as a priority task following this BMP and will be integrated in a Biodiversity Offset Plan.

6.2 Land management

Kolomela has developed a land management strategy for the farms at Kolomela as well as the other SIOC owned properties. The strategy aims to achieve the following objectives:

1. Establish a commercial farming enterprise with livestock and game as the backbone due to the scale of grazing land available.
2. To conserve land in support of biodiversity goals (NPI).
3. To create socio-economic benefits from developing and utilising the land.

A key consideration of the land management strategy is to improve the status of the land and to enhance biodiversity resources. The aim is to establish land utilisation practices which will be conducted in a manner that is in line with the conservation status of the area.

7. FINANCIAL PROVISION

7.1 Closure objectives and the extent to which they have been aligned with the baseline environment

The overarching mine closure objectives aim to ensure sustainability beyond mine closure and leave a positive legacy post closure. This is supported by the following specific objectives and give effect to the physical, biophysical and social closure objectives which are to:

- Identify and mitigate risk (Safety, Health, Environment and Social) to achieve legal compliance;
- Ensure that proposed post-closure land uses are sustainable and pose an acceptable level of risk to public health and safety;
- Restore the mining area to a condition consistent with the pre-determined post closure land use objectives;
- Develop and implement rehabilitation objectives, including the structural and ecological stability of landforms and associated pollution control (air, soils, groundwater and surface water);
- Ensure that post-closure remnants will conform to the concept of sustainability and the post-closure land use plan, with limited long-term liabilities;
- Ensure that rehabilitation work is based on sound reasoning and that rehabilitation execution occurs concurrent with mining activities, is of high quality and is sustainable into the predictable future;
- Ensure that social closure will contribute to local economic development and that socio-economic impacts will be considered and managed via continuous, inclusive (internal and external) stakeholder engagement;
- Manage all workforce transition processes in line with regulatory requirements and commitments to mitigate socio-economic impacts;
- Develop programmes throughout the remaining life of mine to enable municipalities, suppliers and stakeholders to manage social transition (External capacity development (municipal capacity development and support) will in the long-term assist the local municipality to provide basic services (Health & wellbeing) and create an environment that is conducive for investment and job creation by the private sector (Livelihoods)).
- Obtain agreement from relevant authorities regarding the extent of rehabilitation and achievement of closure / success criteria; and

- Facilitate the issuing of a closure certificate with achievable conditions by relevant authorities.

7.2 Confirmation of consultation of closure objectives with landowners

The Environmental Impact Assessment Report and the Environmental Management Programme will be subjected to a public participation process in accordance with Regulations 41 of the EIA Regulations (GNR. 982 of 4 December 2014, as amended). This report and the closure plan will be made available during the public participation for landowners to review and provide comment on.

7.3 Rehabilitation Plan

Management Act (NEMA) (Act 107 of 1998) and regulations. In South Africa, rehabilitated land is expected to achieve four fundamental principles to be considered for relinquishment. The four general rehabilitation goals require rehabilitation of areas disturbed by mining to result in sites that are:

- Safe;
- Stable;
- Non-polluting; and
- Able to sustain the agreed post-mining land use.

The rehabilitation strategy aims to ensure rehabilitation meets the four general rehabilitation goals outlined by the South African Regulators along with ensuring that the mine has cost effective rehabilitation techniques.

A Concurrent Rehabilitation Strategy has been developed by Group T&S for the Anglo Group to clarify the company's commitment to reduce the rehabilitation backlog and associated closure liabilities. In terms of this Strategy, the Group's open-cut mine targets will be developed to eliminate rehabilitation backlog by end LoM as far as possible. The Anglo Strategy requires that:

- All Anglo mines are committed to undertake rehabilitation to ensure that sites are safe, stable, non-polluting and sustainable;
- Group targets will be developed to eliminate rehabilitation backlog through:
    - Full integration of rehabilitation considerations and targets into the Life of Asset Planning (LoAP) process;
    - Site-specific five-year rehabilitation plans outlining the targets to reduce rehabilitation backlog be signed off by the Technical Director;

- Group rehabilitation targets be considered in the budgeted LoA clearing rate (excluding clearing for permanent infrastructure) to ensure backlog is managed appropriately;
- The inclusion of rehabilitation targets in Senior Leaders Performance Contracts to ensure annual rehabilitation targets are met;
- A Strategy Specification be developed which outlines the requirements of the site-specific rehabilitation plans; and
- Rolling five-year rehabilitation plans are developed for all open-cut operations by the Q4 2020.

The rehabilitation strategy for Kolomela Mine considered the following four main focus areas:

1) Identify and develop appropriate post mining land uses (PML) and associated rehabilitation objectives:

a) The PML for this assessment and closure liability was confirmed to be natural pasture (grazing) for domestic animals and game;

b) Several alternative PMLs were considered and preliminary ranked, but further feasibility studies will be required for the selected number of alternatives;

2) Integrate rehabilitation and mine planning:

a) An ICPS opportunities workshop was conducted with stakeholders from the client and five integrated planning opportunities were identified;

b) The preliminary rehabilitation designs for closure in in the process of being further detailed in a separate running project;

c) This already indicated the need to consider the revision of the waste dump deposition plan to optimise concurrent rehabilitation and reduce closure liability;

3) Identify and develop proven and cost-effective rehabilitation criteria that meet the PML: a) Existing rehabilitation criteria was evaluated and updated where needed in view of recent studies and monitoring results;

b) There is a need to consider alternatives for specifically the growth medium in view of the large deficit of soil that can be stripped ahead of mining activities;

4) Identify success criteria and monitor and manage completed areas to achieve the criteria:

a) The success criteria have been updated based on specialist input and monitoring information, including results at Sishen Mine that has a longer monitoring record;

b) There are still certain criteria that must be confirmed with further monitoring information.

7.4 Explain how the rehabilitation plan is compatible with the closure objectives

The identified final land use is a function of the status of the land, feasibility of rehabilitation options that can be applied to certain infrastructure and feasible surrounding land uses. As part of the closure strategy various objectives have been established to ensure that the environment of the areas after rehabilitation, can achieve long term sustainability.

All areas disturbed by mining and closure related activities need to be rehabilitated to ensure that surface topography blends in with the surrounding areas and that the site is free draining (DME,2005). Rehabilitation should also ensure that there are no remnants of unnecessary structures or material from mining related activity on site and that the area is suitable for revegetation.

The closure vision for Kolomela Mine is:

To relinquish the mining lease and assets cost-effectively, in line with relevant legislative requirements and ensuring that the Kolomela mine Area of Influence is left to be sustainable, safe, stable, and non-polluting by establishing feasible post closure land uses and supporting sustainable social performance objectives.

The rehabilitation strategy, as detailed in Section 6.3, has been developed to achieve the closure vision above.

7.5 Quantum of Financial Provision required to manage and rehabilitate the environment

Refer to Annexure O of Part C which contains the methodology used for the quantum calculations. The quantum of financial provision for each of the activities associated with the Kolomela Mine Expansion Project has been estimated based on available information, mine closure objectives and closure criteria, as stated in this plan and aligned to the existing Kolomela Mine Closure Plan. The basis of the methodology complies with the requirements detailed in the MPRDA Regulations, specifically 53 and 54, as well regulation 6 of the NEMA Financial Provision Regulations, 2015. These regulations prescribe the required minimum content as follows: "*a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required*." The regulation further outlines that closure cost estimation must include the following:

1. An explanation of the closure cost methodology.
2. Auditable calculations of costs per activity or infrastructure.
3. Cost assumptions.

Cognisance has also been given to the Guidelines for Evaluation of the Quantum for Closure Related Financial Provision for a Mine issued by DMRE (January 2005). The aim is however to align with the NEMA Financial Provision Regulations to ensure future compliance.

The costing notes, assumptions, and limitation applicable to this financial liability estimate is defined and provided in the detailed cost model and supported by Section 8.6 of the Closure Plan.

7.5.1 Bill of Quantities Development

The bill of quantities ("BOQ") used to develop the decommissioning and rehabilitation cost was developed in Microsoft Excel. The area under investigation included all new activities and proposed footprint expansions associated with the Kolomela Mine Expansion Project (refer to Annexure B1 of the Closure Plan). Existing and approved activities undertaken at Kolomela Mine were excluded from this assessment and are dealt with separately as part of the annual evaluation of financial liability for Kolomela Mine.

The existing Kolomela Mine Closure Plan and closure cost model categorised operational areas into "Zones" according to the specific activities undertaken (see Table 7-1 of the Closure Plan) in these zones. The BOQ for the expansion project used the same reference system to align with the existing Kolomela Mine closure cost model and allow for seamless integration into the overall Kolomela Mine closure cost model with future updates of the financial liability estimates.

TABLE 7-1: OPERATIONAL ZONES OF KOLOMELA MINE

Zone	Description
A	Offices, Contractors & Support
B	Plant
C	Other Onsite Infrastructure
D	Pits
E	MRD's
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits
G	Water Related Infrastructure
H	Overland & General
I	Offsite Infrastructure

7.6 Confirm how the financial provision will be provided

SIOC will make financial provision for closure by means of a rehabilitation trust, bank guarantee or cash deposit, with any shortfall between the immediate closure cost estimate and the balance in the Trust Account being funded by means of bank guarantees. Annual reviews will be conducted to evaluate the closure costing and to check whether sufficient provision has been made.

8. MECHANISMS FOR MONITORING COMPLIANCE

A comprehensive monitoring programme assists in determining whether mitigation and management measures are being implemented and/or if they are effective. Monitoring of the environment prior to the start of activities (establishment of baseline conditions) and continued monitoring throughout the life of the operation will help identify environmental impacts by identifying and tracking potential pollution trends. The monitoring data collected will also provide input into the planning for closure at the end of the life of the mine as a whole.

The development and operation of Kolomela will require environmental monitoring that includes:

- Groundwater Monitoring.
- Surface Water Monitoring (including aquatic biomonitoring).
- Biomonitoring.
- Air quality and noise monitoring.

8.1 Surface Water Monitoring

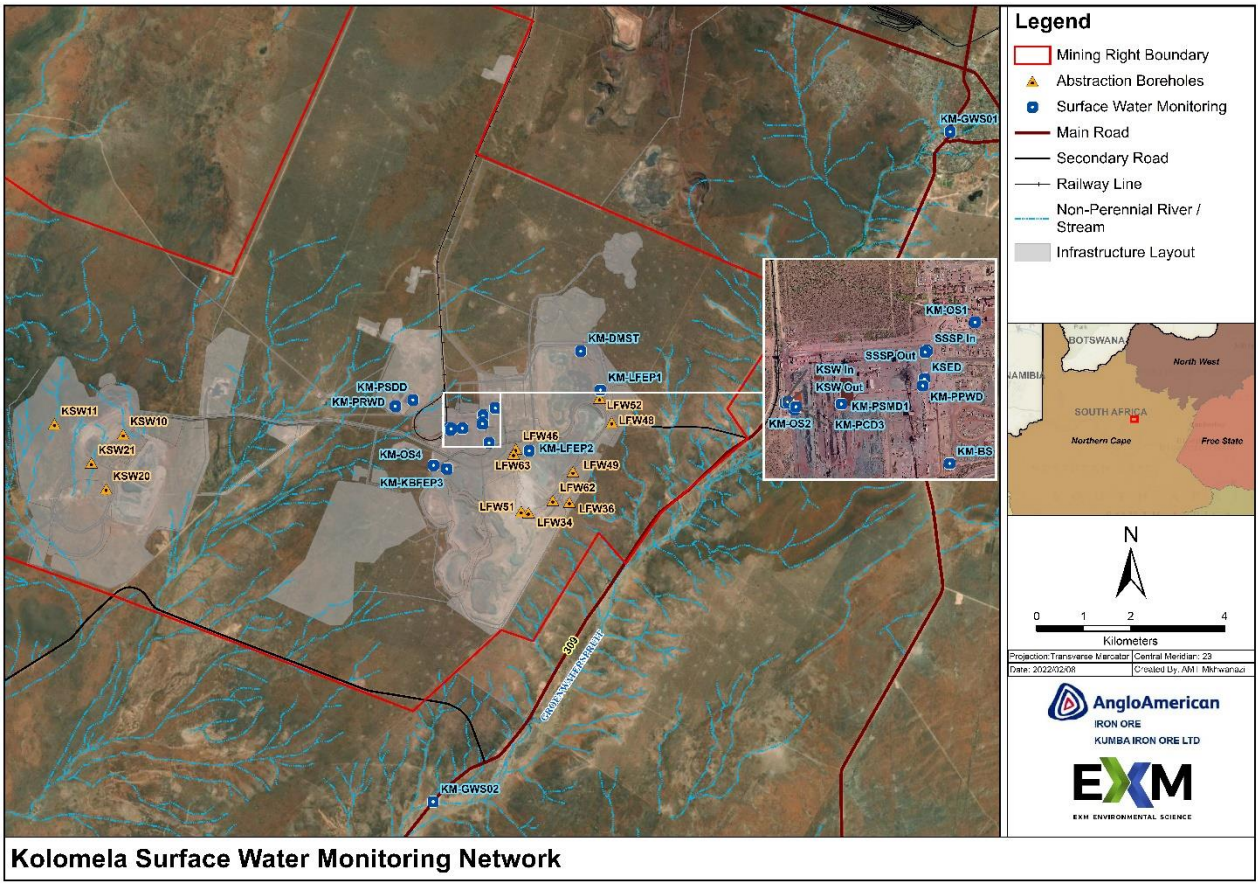
Kolomela has a comprehensive surface water monitoring network to evaluate water quality for the process itself as well as up and downstream to assess potential impacts associated with Kolomela. The below Table contains a summary of the surface water monitoring locations as illustrated in Figure 7-1. Elements to be included are as follows:

Physical and aesthetic determinants: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS).
Macro determinants: Total Alkalinity (MAlk), Sulphate (SO4), Nitrate (NO3), Chloride (Cl), Fluoride (F), Calcium (Ca), Magnesium (Mg), Potassium (K) and Sodium (Na).
Micro determinants: Aluminium (Al), Iron (Fe), Manganese (Mn), Arsenic (As), Cadmium (Cd), Free Cyanide (CN), Copper (Cu), Lead (Pb), Mercury (Hg), Selenium (Se) and Zinc (Zn).

TABLE 8-1: SURFACE WATER MONITORING LOCATIONS

Surface Water Monitoring			
Reference	**Description**	**Coordinates**	
SSSP In	Sishen South Sewage Plant Inflow	S28.38434	E22.96323
SSSP Out	Sishen South Sewage Plant Outflow	S28.38442	E22.96312
KSW In	Kolomela Sewage Works Inflow	S28.38681	E22.95564
KSW Out	Kolomela Sewage Works outflow	S28.38676	E22.95578
KSED	Kolomela Sewage Effluent Dam	S28.38568	E22.96307
KM-GWS01	Groenwater Spruit upstream locality	S28.32998	E23.06449
KM-GWS02	Groenwater Spruit downstream locality	S28.45844	E22.95226
KM-OS1	Oil Sump 1	S28.38300	E22.96579
KM-OS2	Oil Sump 2	S28.38713	E22.95614

Surface Water Monitoring			
Reference	**Description**	**Coordinates**	
KM-OS4	Oil sump at Moolmans	S28.39395	E22.95239
KM-BS	Bioremediated Soil Facility Sump	S28.38967	E22.96444
KM-DMST	DMS Tailings Drying Facility	S28.37206	E22.98432
KM-KBFEP3	Klipbankfontein Evaporation Pond 3	S28.39461	E22.95529
KM-LFEP1	Leeuwfontein Pit Evaporation Pond 1	S28.37952	E22.98864
KM-LFEP2	Leeuwfontein Pit Evaporation Pond 2	S28.39119	E22.97316
KM-PPWD	Kolomela Mine Plant Process Water Dam	S28.38600	E22.96300
KM-PRWD	Kolomela Mine Process Return Water Dam	S28.38260	E22.94409
KM-PSDD	Kolomela Mine Process Slimes Discard Dam	S28.38139	E22.94792
KM-PSMD1	Plant Stormwater management Dam 1	S28.38686	E22.95864
KM-PCD3	Pollution Control Dam 3	S28.38699	E22.95621



Kolomela Surface Water Monitoring Network

FIGURE 8-1: SURFACE WATER MONITORING LOCATIONS

8.2 Ground Water Monitoring

Kolomela has a comprehensive groundwater monitoring network to evaluate water quality as well as groundwater levels on the mining area as well as at boreholes adjacent to the mine. The below Table contains a summary of the surface water monitoring locations as illustrated in Figure 7-2. Elements to be included are as follows:

Physical and aesthetic determinants: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS).

Macro determinants: Total Alkalinity (MAlk), Sulphate (SO4), Nitrate (NO3), Chloride (Cl), Fluoride (F), Calcium (Ca), Magnesium (Mg), Potassium (K) and Sodium (Na).
Micro determinants: Aluminium (Al), Iron (Fe), Manganese (Mn), Arsenic (As), Cadmium (Cd), Free Cyanide (CN), Copper (Cu), Lead (Pb), Mercury (Hg), Selenium (Se) and Zinc (Zn).

TABLE 8-2: GROUNDWATER MONITORING LOCATIONS

Monitoring Boreholes			
Reference	**Description**	**Coordinates**	
KF765	Kapstevel LDV Rd1	S28.38776	E22.94043
KF836	Haul road-Zinc dam	S28.39033	E22.95172
LF707	Camelthorn tree	S28.37619	E22.94963
LF708	Behind slimes	S28.37836	E22.94723
LF709	Slimes Zinc Dam	S28.38345	E22.94184
LF710	Plant Bio-treatment	S28.38714	E22.95546
LF711	Plant Oil-Water Separator	S28.38738	E22.95622
LF712	Plant Lab	S28.38520	E22.95682
LF713	Plant PCD 1	S28.38704	E22.95918
LF714	Plant Primary Crusher	S28.39013	E22.96368
LF715	Temp sewage - Buffer	S28.38484	E22.96281
LF716	Big washbay	S28.38336	E22.96574
LF717	Total depot	S28.38377	E22.96710
LF718	Engineering Laydown Wash bay	S28.38542	E22.96657
LF719	Engineering Laydown	S28.38541	E22.96660
LF720	Slimes opp. flocc plant	S28.38434	E22.94419
LF722	Borehole next to old induction road	S28.37671	E22.96474
WV527	Kapstevel LDV Rd2	S28.38700	E22.93570
WV574	Slimes magazine road	S28.37863	E22.94045
WV582	Magazine	S28.36712	E22.93807
WV583	Loco 1 (from mine)	S28.35556	E22.95192
WV584	Loco 2 (from mine)	S28.35400	E22.95255
Moolmans BH	Moolmans BH	S28.39399	E22.95073
LF723	Leeufontein Deep Borehole	S28.39734	E23.00271
LF724	Leeufontein Deep Borehole	S28.39505	E23.00122
LF725	Leeufontein Deep Borehole	S28.39741	E22.99962
KS981	Klipbankfontein Deep Borehole	S28.42862	E22.91614
KS981A	Klipbankfontein Observation Borehole	S28.42865	E22.91616
KS982	Klipbankfontein Deep Borehole	S28.42620	E22.91773
KS982A	Klipbankfontein Observation Borehole	S28.42626	E22.91770
KS983	Klipbankfontein Deep Borehole	S28.42861	E22.91925
KS983A	Klipbanksfontein Observation Borehole	S28.42862	E22.91914
WV575	Welgevonden Deep Borehole	S28.31268	E22.94988
WV575A	Welgevonden Observation Borehole	S28.31264	E22.94987
WV576	Welgevonden Deep Borehole	S28.31502	E22.94835
WV576A	Welgevonden Observation Borehole	S28.31500	E22.94836
WV577	Welgevonden Deep Borehole	S28.31502	E22.95139
WV577A	Welgevonden Observation Borehole	S28.31501	E22.95144
WV578	Geo Farmhouse	S28.37952	E22.93002

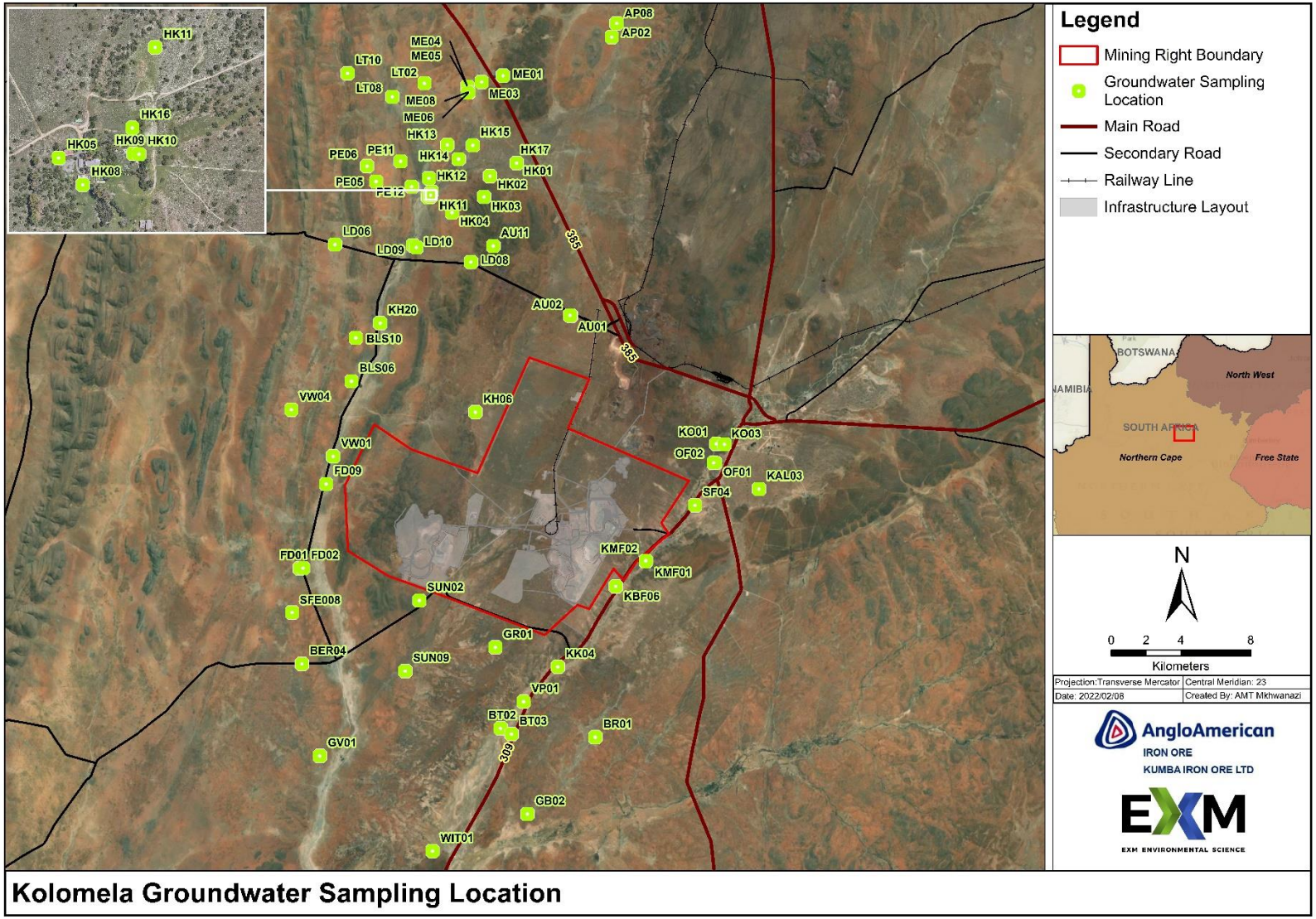


FIGURE 8-2: GROUNDWATER MONITORING NETWORK

8.3 Biomonitoring

In compliance to Anglo American's Environmental Performance Standard on Biodiversity, Kolomela is conducting a long-term biomonitoring programme which include the monitoring of the following aspects:

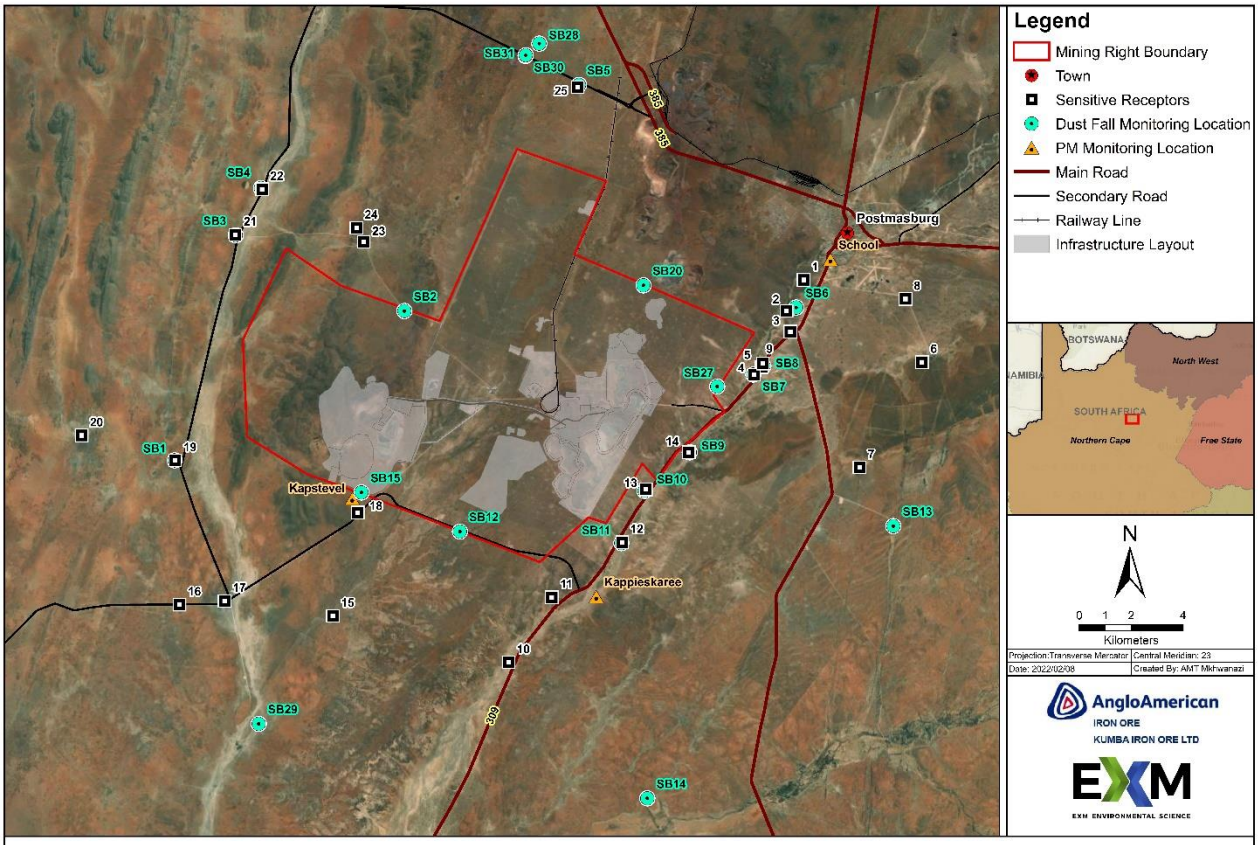
- Vegetation;
- Grazing and browsing;
- Aquatic Invertebrates;
- Pans;
- Terrestrial Invertebrates;
- Reptiles And Amphibians;
- Small And Large Mammals;
- Soil.

8.4 Air quality monitoring

Ambient air quality monitoring can serve to meet various objectives, such as:

- Compliance monitoring;
- Validate dispersion model results;
- Use as input for health risk assessment;
- Assist in source apportionment;
- Temporal trend analysis;
- Spatial trend analysis;
- Source quantification; and,
- Tracking progress made by control measures.

It is recommended that, as a minimum, Kolomela continuous dust fall, PM10 and PM2.5 as well as meteorology, NO2 and SO2 sampling be continued as part of the mine's air quality management plan. Careful screening of data and maintenance of monitoring stations is recommended.



Kolomela Air Quality Monitoring Locations in relation to Sensitive Receptors

8.5 Noise monitoring

Noise monitoring should be conducted at the locations below in line with the identified receptors. It is recommended that short term 20 minute to 24-hour sampling be conducted in accordance with the procedures specified by SANS 10103 (2008). Samples should include the following parameters: LAleq, LAeq, LA90, and the un-weighted octave band sound pressure levels (LZeq).

Monitoring at key receptors should be undertaken twice a year (summer and winter). Ongoing communication with affected landowners should be undertaken during the Environmental Forum meetings.

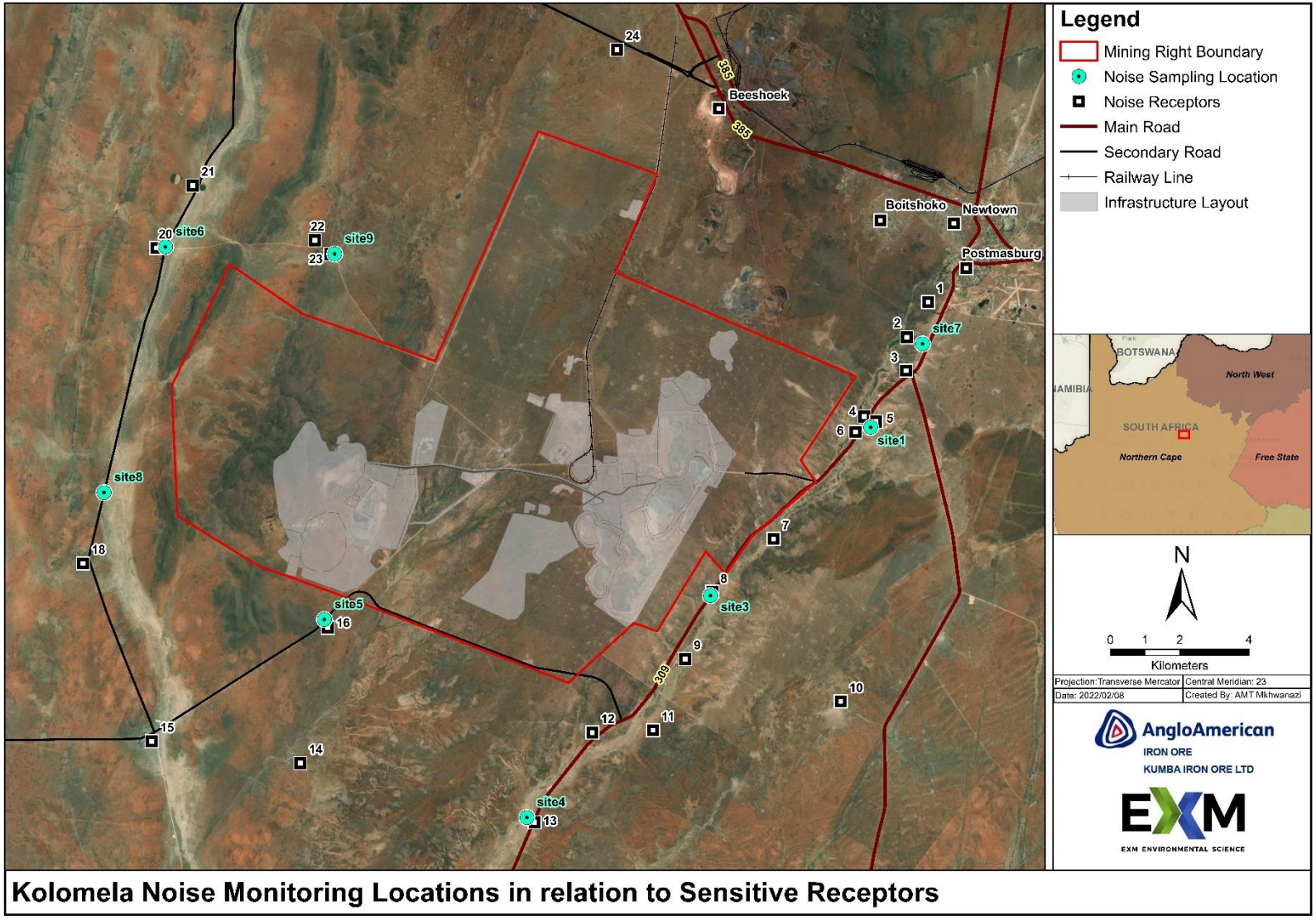


FIGURE 8-3: NOISE MONITORING LOCATIONS

9. SUBMISSION OF COMPLIANCE AUDITS

Compliance Audits are compiled in accordance with legislative requirements (as applicable at the time) including:

(1) Regulation 34 of the EIA Regulations (GN. 982 of 4 December 2014, as amended);

Compliance audits will be submitted bi-annually during construction and annually during operations or in accordance with the Environmental Authorisation.

10. ENVIRONMENTAL AWARENESS PLAN

10.1 Environmental Induction Training

The purpose of the induction training is to promote a general awareness of the sensitivity of the environment, the legal commitments and the aspirations of Kolomela in terms of environmental management and the environmental consequences of individual actions. Induction is applicable to all employees, contractors and service providers that will be working within the mining area.

Environmental Induction for Employees and Service Providers

The induction training for employees, contractors and service providers is to take the form of a presentation including:

- A description of environmental sensitivities in the environment;
- A description of environmental legal requirements and Kolomela's commitment to comply with these requirements;
- A description of broad-based objectives of environmental management at Kolomela;
- A discussion of how individual actions can impact on the environment;
- A discussion of how individual actions can assist in the successful implementation of the environmental management programme (EMPr);
- The Code of Conduct.

All employees are to sign that they have understood and will comply with the Code of Conduct. employees are to be re-inducted on an annual basis (after returning from their annual leave).

Requirements

- Environmental induction material (posters, power point presentations etc.);
- Code of Conduct;
- Register of inducted Employees, service providers and contractors.

10.2 General Environmental Awareness Programme

The purpose of the general environmental awareness programme is to promote ongoing environmental awareness amongst the workforce. It will focus on addressing environmental issues which have been identified as problematic through environmental audits, complaints received, or environmental monitoring undertaken. This awareness campaign can form part of daily/ weekly toolbox talks and must cover all applicable topics related to environmental management.

3.1.1 Job Specific Environmental Awareness Training

The purpose of the job specific environmental awareness training is to ensure that Employees within the specific management units are equipped to implement the actions committed to in the EMPr. All members of the workforce are to be subject to job specific environmental training. This training is undertaken by the managers of each of the management units. Supervisors will be trained to assist with the implementation and training of the work force.

Environmental Risk Identification

The environmental risks associated with each management area are to be identified by the manager and supervisors together with the technical services manager. The risks are to be documented and actions to reduce these risks should be developed. The actions are to ensure overall compliance with the commitments of the EMPr.

Training

All members of the workforce (mining, plant workers, administration etc.) are to be subject to job specific training. This may include but not be limited to:

- Preventing pollution;
- Spill prevention and clean-up procedures;
- The location and purpose of material safety data sheets (MSDSs);
- Managing waste;
- No-go areas; and
- Incident reporting.

The aspects to be covered however are dependent on the findings of the individual risk assessments. This is to be undertaken for each management area initially. Thereafter all new members of the workforce are to undergo environmental training as part of the training required to do their particular job.

11. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

None applicable.

12. UNDERTAKING

I, **Trevor Hallatt**, acting as independent environmental assessment practitioner hereby confirm:

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from specialist reports, where relevant; and
- The acceptability of the project in relation to the finding of the assessment and the level of mitigation proposed.

Report Sign-Off			
Name	**Designation**	**Signature**	**Date**
Trevor Hallatt	EAP Senior Environmental Scientist Pr.Sci.Nat		2022/02/08