PROPOSED MINING RIGHT OVER PORTION 2 (A PORTION OF PORTION 1), REMAINDER PORTION, REMAINDER PORTION OF PORTION 1 AND PORTION 3 OF THE FARM MAKGANYENE NO 667, TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DEPARTMENTAL REFERENCE NUMBER:

NC 30/5/1/2/2/10255 MR

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EXECUTIVE SUMMARY

The Applicant, Assmang (Pty) Ltd, applied for a mining right (MR), environmental authorisation (EA), and waste licence (WL) to mine Hematite, Magnetite, Goethite, Limonite, Siderite, Pyrolusite, Psilomelane, Rhodochrosite, Manganite, Braunite, Hausmannite, Manganese ore, Iron ore, and Diamonds (general) from 1 549.61 ha that extends over Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667 in the Tsantsabane Local Municipality of the Northern Cape.

The operational phase will entail opencast mining. The first phase will focus on pre-stripping the top layer material, of which the topsoil will be stored separately for rehabilitation. Then waste rock will be stripped to access the ore body followed by open cast mining of Pit 1 and Pit 2 (refer to Figure 9). The mining technology will include drilling and blasting with associated truck and shovel operations. Ore (RoM) from the open pit/s will report to a crusher situated on site and in the proposed stockpile area. Crushed ore will be stockpiled on-site from where ore will be transported via road (R385) to the Beeshoek Mine processing facility (off-site) using side tipper trucks. No processing will take place at the Makganyane Iron Ore Mine.

Upon commencement, the proposed project will trigger listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations 2014 (as amended) and therefore requires an environmental impact assessment (EIA) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral and Petroleum Resources) when considering the environmental authorisation.

Need and Desirability

The proposed Makganyane Iron Ore Mine (MIOM) is both needed and desirable, addressing critical socio-economic and strategic priorities. The project will create direct and indirect employment, stimulate local businesses, enhance procurement opportunities, and contribute to infrastructure and community development in Tsantsabane Local Municipality—an area facing high unemployment and poverty.

Strategically, the mine strengthens South Africa's iron and steel value chain by supplying hematite ore via Assmang's Beeshoek Mine, thereby supporting domestic beneficiation and export competitiveness. The project aligns with the National Development Plan, Mining Charter, and Northern Cape Provincial development frameworks, while spatially fitting within an established mining district with existing infrastructure.

Although potential impacts such as dust, noise, and traffic are anticipated, these will be mitigated through the Environmental Management Programme (EMPR). The socio-economic benefits, including skills development, youth employment, and community upliftment, substantially outweigh these trade-offs.

Alternatives Considered

During the EIA phase the following alternatives were considered:

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

The final project proposal identifies mining as the most sustainable land use for the Makganyane site, over the proposed mining right footprint of 1 549.61 ha. The preferred design is the Phase 1 & 2 scenario with Layout Option 2, which balances technical feasibility and environmental responsibility. Key operational choices include exclusive use of sump pumping for dewatering and Dust Suppression Scenario 2, both of which enhance efficiency and reduce impacts. With specialist mitigation measures integrated into the EMPR, the project is expected to minimise environmental risks while delivering socio-economic benefits. The No-Go alternative is not preferred, as the proposed mine represents the more balanced and sustainable outcome.

Public Participation Process

Initially the relevant stakeholders and interested and affected parties (I&AP's) were informed of the mining right application by means of an advertisement in the Gemsbok and the Noordkaap Bulletin, and on-site notices that were placed at two entrances to Makganyene No 667/2. On-site notices were also placed at the Postmasburg Library and Municipal Offices. I&AP's and stakeholders were also invited to comment on the draft Scoping Report (DSR) over a 30-days commenting period (ending 07 January 2025). The comments received on the DSR were incorporated into the final Scoping Report (FSR) that was submitted and subsequently approved by the Department of Mineral and Petroleum Resources (DMPR) on 17 February 2025.

This report, The draft Environmental Impact Assessment Report (DEIAR) and Environmental Management Programme (EMPR) was compiled following the approval of the FSR and incorporates the comments received to date as well as the specialist reports. The DEIAR will be circulated for public comments over a 30-day period that extends until **23 October 2025**. The comments received on the DEIAR & EMPR will be incorporated into the final EIAR & EMPR to be submitted to the Department for decision making.

Environmental Impact Assessment Report (EIAR)

The environmental impact assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The proposed MIOM has been assessed across biophysical, social, and heritage aspects. The project will affect limited portions of land through pit excavations and waste rock disposal, but rehabilitation and mitigation measures will reduce long-term topographical and visual impacts to acceptable levels. Air quality modelling shows that with enhanced dust suppression (Scenario 2), predicted particulate concentrations comply with standards, and associated health impacts are low. Noise, blasting, and traffic impacts are manageable with proposed mitigation.

Specialist studies confirm low agricultural potential of the site, limited long-term groundwater risks, and minimal impacts on hydrology and freshwater ecosystems if mitigation and monitoring are implemented. Biodiversity impacts are highest during active mining but can be reduced with strict mitigation, species relocation, and rehabilitation. Heritage resources such as graves and historical features will be protected with buffers, and palaeontological risks are negligible.

Socio-economic benefits—including job creation, skills development, and local procurement—are significant and outweigh anticipated environmental trade-offs. Overall, the project is considered environmentally acceptable and sustainable, subject to strict adherence to the Environmental Management Programme and specialist mitigation measures.

Environmental Management Programme (EMPR)

All mitigation measures and monitoring programmes identified through the specialist studies have been consolidated into the Environmental Management Programme (EMPR). The EMPR will serve as the primary, legally binding management tool on site, guiding day-to-day operations to ensure that environmental impacts are effectively avoided, minimised, or rehabilitated. It provides clear responsibilities, performance standards, and monitoring requirements, and will be subject to annual external audits to verify compliance and drive continuous improvement throughout the life of the project.

In accordance with the requirements of NEMA and the Financial Provisioning Regulations, the financial provision for the rehabilitation of the mining area, both in the event of sudden closure during operations and at final planned closure, has been calculated at R 99 903 239.82.

In conclusion, the proposed Makganyane Iron Ore Mine is considered both environmentally acceptable and socio-economically desirable, provided that all mitigation measures and monitoring commitments outlined in

the EMPR are fully implemented. The project represents a balanced and sustainable development opportunity, aligning with local, provincial, and national priorities.

LIST OF ACRONYMS

ABA	Acid Base Accounting
ADT	Average Daily Traffic
ADTT	Average Daily Truck Traffic
Afs	Attributable Risk Fractions
AIP	Alien Invasive Plant
AIR	Atmospheric Impact Report
ASLP	Australian Standard Leaching Procedure
ASTM	American Society for Testing and Materials
BAS	Best Attainable State
BBBEE	Broad Based Black Economic Empowerment
BI	Biodiversity Importance
BIF	Banded Iron Formation
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Areas
CI	Conservation Importance
CLO	Community Liaison Officer
CR	Critically Endangered
CVB	Channel Valley Bottom Wetland
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEIAR	Draft Environmental Impact Assessment Report
DEM	Digital Elevation Model
DFA	The Development of Facilitation Act, 1995 (Act No 67 of 1995)
DFFE	Department of Forestry, Fisheries and Environmental Affairs
DM	District Municipality
DMPR	Department of Mineral and Petroleum Resources
DRPW	Department of Roads and Public Works
DSLP	Draft Social and Labour Plan
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECO	Environmental Control Officer

EDL	Episodic Drainage Line
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPR	Environmental Management Programme
EN	Endangered
EPL	Ecosystem Protection Level
ES	Ecological Sensitivity
ESA (Arch)	Early Stone Age
ESA	Ecological Support Area
ESTA	Extension of Security of Tenure Act, 1997 (Act No 62 of 1997)
ETS	Ecosystem Threat Status
E-WULAAS	Electronic Water Use Licence Application and Authorization System
FEIAR	Final Environmental Impact Assessment Report
FEPA	Freshwater Ecosystem Priority Area
FI	Functional Integrity
FMP	Fire Management Plan
FSR	Final Scoping Report
GDP	Gross Domestic Product
GHS	Global Harmonised System of Classification and Labelling of Chemicals
GNR	Government Notice Number
GQM	Groundwater Quality Management Classification
GVA	Gross Value Added
HHRA	Human Health Risk Assessment
HIA	Heritage Impact Assessment
HMG	Hlabaki Mining Group (Pty) Ltd
HSA	Hazardous Substances Act, 1973 (Act No 15 of 1973)
I&AP	Interested and Affected Party
IBA	Important Bird and Biodiversity Areas
IDP	Integrated Development Plan
IFC	International Finance Corporation
IOEC	Iron Ore Export Channel
LC	Least Concern
LCT	Leachable Concentration Thresholds in GNR 635
LED	Local Economic Development
LOM	Life of Mine
LOS	Level of Service
LM	Local Municipality

LN	Listing Notice
LSA	Late Stone Age
MC	Magnitude of Change
MHSA	Mine Health and Safety Act, 1996 (Act No 29 of 1996)
MIOM	Makganyane Iron Ore Mine
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)
MR	Mining Right
MRA	Mining Rights Application
MSA	Middle Stone Age
MWP	Mining Work Programme
NAAQS	National Ambient Air Quality Standards
NAF	Non-acid Forming
NAG	Net Acid Generation
NBA	National Biodiversity Assessment
NCPSDF	Northern Cape Spatial Development Framework (2003)
NCNCA	The Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
NDA	National Development Plan, 2030
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NFA	National Forest Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NP	Not Protected
NPAES	National Protected Areas Expansion Strategy
NRTA	National Road Traffic Act, 1996 (Act No 25 of 1996)
NT	Near Threatened
NWA	National Water Act, 1998 (Act No 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act No 85 of 1993)
ONA	Other Natural Area
PAA	Protected Agricultural Area
PAOI	Project Area of Influence
PCB’s	Polychlorinated Biphenyls
PCO	Pest Control Officer
PES	Present Ecological State
PFP	Preferential Flow Path
POC	Probability of Occurrence
PPE	Personal Protection Equipment

PPV	Peak Particle Velocity
PSD	Passing Sight Distance
PSM	Palaeontological Sensitivity Map
PV	Project Visibility
RAHIA	Rapid Appraisal Health Impact Assessment
REC	Recommended Ecological Category
RLE	Red Listed Ecosystem Database
RLRA	Restitution of Land Rights Act, 1994 (Act No 22 of 1994)
RMO	Resource Management Objective
ROM	Run of Mine
RoW	Right of Way
RQOIS	Research Quality Information Services
RR	Receptor Resilience
RTMC	Road Traffic Management Corporation
SACAD	South African Conservation Areas Database
SAHRA	South African Heritage Resources Agency
SAHRA DAU	South African Heritage Resources Agency Development Applications Unit
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SAMBF	South African Mining and Biodiversity Forum
SAMRAD	South African Mining Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SAPAD	South African Protected Areas Database
SAS	Scientific Aquatic Services (Pty) Ltd
SDS	Safety Data Sheet
SEI	Site Ecological Importance
SEIA	Socio-economic Impact Assessment
SCC	Species of Conservation Concern
SIOC	Sishen Iron Ore Co (Pty) Ltd
SLP	Social and Labour Plan
SSD	Stopping Sight Distance
STS	Scientific Terrestrial Services (Pty) Ltd
SWMA	Sub-Water Management Area
SWMP	Stormwater Management Plan
SWSA	Strategic Water Source Area
TBC	The Biodiversity Company
TCT	Total Carbon Thresholds in GNR 635 and 636
TDS	Total Dissolved Solids

TIA	Traffic Impact Assessment
TLM	Tsantsabane Local Municipality
TMP	Traffic Management Plan
TOPS	Threatened or Protected Species (as per the 2007 List)
USBM	United States Bureau of Mines
v/c	Volume-to-capacity
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VII	Visual Impact Index
vph	Vehicle per hour
VRP	Vehicle Routeing Plan
VS	Viewer Sensitivity
VU	Vulnerable
WCA	Waste Classification and Assessment
WL	Waste Licence
WRD	Waste Rock Dump
WMA	Water Management Area
XRD	X-ray Diffraction
XRF	X-ray Fluorescence
ZMDM	ZF Mgcawu District Municipality
ZoR	Zone of Regulation

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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

and

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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).

NAME OF APPLICANT:	Assmang (Pty) Ltd
TEL NO:	011 779 1300
FAX NO:	-
POSTAL ADDRESS:	P.O. Box 782058, Sandton, Gauteng, 2146
PHYSICAL ADDRESS:	24 Impala Road, Chislehurston, Gauteng
FILE REFERENCE NUMBER SAMRAD:	NC 30/5/1/2/2/10255 MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development act (Act 28 of 2002 as amended); the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorization can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation, or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulation, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has considered any minimum requirements applicable, or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorization for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as failure to meet the requirements of the Regulation and will lead to the Environmental Authorization being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the Applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process-

(a) determine the policy and legislative context within the activity is located and document how the proposed activity complies with and responds to the policy and legislative context,

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location,

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment,

(d) determine the –

(i) nature, significance, consequence, extent, duration, and probability of the impacts occurring to inform identified preferred alternatives, and

(ii) degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed, or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts, and

(h) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) the proponent/applicant must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the Act. Assmang (Pty) Ltd (hereinafter the "Applicant") appointed Greenmined Environmental (Pty) Ltd (hereinafter "Greenmined") to undertake the study needed. Greenmined has no vested interest in Assmang (Pty) Ltd or the proposed project and hereby declares its independence as required by the EIA Regulations, 2014 (as amended).

i) Details of the EAP

Name of the Practitioner:	Ms Christine Fouché
Tel No:	021 850 8875 / 082 811 8514
E-mail address:	christine.f@greenmined.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP

Ms Fouché has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full curriculum vitae with evidence is attached as Appendix X.

(2) Summary of the EAP's past experience.

Ms Fouché has twenty years' experience conducting Environmental Impact Assessments and Mining Applications in South Africa. She is a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA), holding registration number 2019/1003. A list of past projects is attached as Appendix X.

b) Description of the property

Table 1: Properties description.

Farm Name:	δ Remainder of the farm Makganyene No 667; δ Remainder portion of Portion 1 of the farm Makganyene No 667; δ Portion 2 (a portion of Portion 1) of the farm Makganyene No 667; δ Portion 3 of the farm Makganyene No 667;
Application area (Ha)	1 549.61 ha
Magisterial district:	Tsantsabane Local Municipality
Distance and direction from nearest town	±24 km north-west of Postmasburg on opposite sides of the R385 provincial road. Exit Postmasburg towards Olifantshoek. Drive ±24 km along the R385 and the site will be on the left and right of the road.
21-digit Surveyor General Code for each farm portion	δ C04100000000066700000 δ C04100000000066700001 δ C04100000000066700002 δ C04100000000066700003

c) Locality map

The requested map is attached as Appendix B.

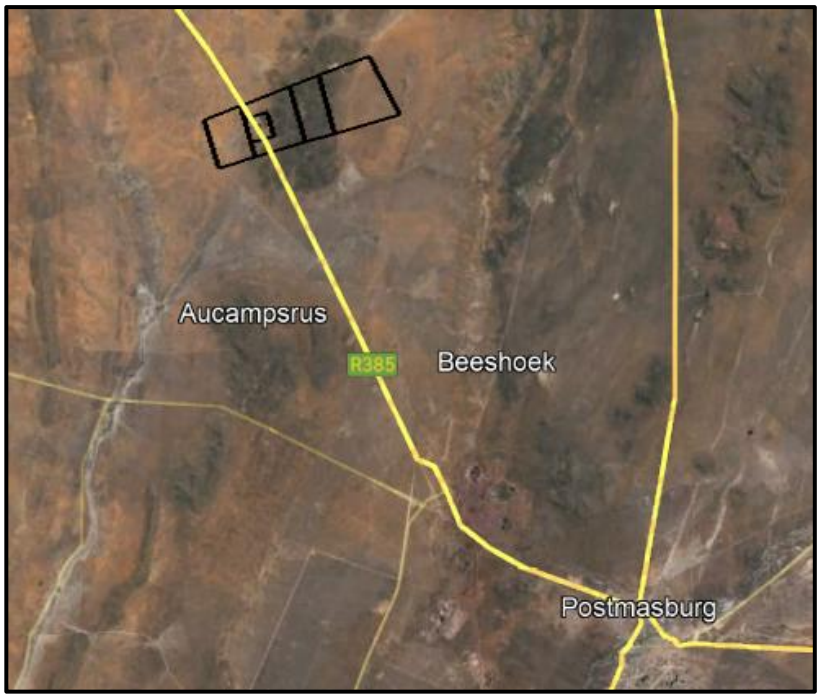


Figure 1: Satellite view of the proposed mining area (black polygon) in relation to the surroundings (Image obtained from Google Earth).

d) Description of the scope of the proposed overall activity

The Applicant, Assmang (Pty) Ltd, applied for a mining right (MR), environmental authorisation (EA), and waste licence (WL) to mine Hematite, Magnetite, Goethite, Limonite, Siderite, Pyrolusite, Psilomelane, Rhodochrosite, Manganite, Braunite, Hausmannite, Manganese ore, Iron ore, and Diamonds (general) from 1 549.61 ha that extends over Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667 in the Tsantsabane Local Municipality of the Northern Cape.

Should the relevant authorisations be granted, and the project proceeds the principal mining activities will entail:

- site establishment and infrastructure development;
- stripping and stockpiling of topsoil and overburden to access the ore (excavation);
- opencast mining (including drilling and blasting);
- transporting, stockpiling and crushing of run of mine ore (RoM);
- transporting of crushed ore to Beeshoek Mine for offsite processing; and
- sloping, landscaping and rehabilitation of the affected Makganyane Iron Ore Mine (MIOM) areas upon closure of the mine.

The layout of the mining area (Figure 7) is expected to include at least the following:

- Internal roads;
- Office complex (±1 ha):
- Stockpile Area (±9 ha):
- Excavations (±36 ha):
  - Pit 1
  - Pit 2
- Waste rock dump (±61 ha);
- Stormwater structures:
  - Two evaporation dams (combined capacity ±79.8 Mℓ),
  - Stormwater sumps
  - Diversion channels
  - Silt fences
- Plant Nursery (±1.2 ha).

The proposed project triggers listed activities (see following table) under the National Environmental Management Act, 1998 (Act 107 of 1998), the Environmental Impact Assessment Regulations 2014 (as amended) as well as the National Environmental Management: Waste Act, 2008 (NEM:WA). As a result, an Environmental Impact Assessment (EIA) is required to evaluate project-specific environmental impacts and alternatives, incorporate public input, and develop mitigation measures

in collaboration with specialists. This process ultimately informs the Environmental Management Programme (EMPR) and guides the Department of Mineral and Petroleum Resources (DMPR) in its decision on environmental authorisation.

Refer to Appendix C1-5 for the mining related Site Activity Plans that were aligned with the specialist's findings.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the proposed application.

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Site establishment and infrastructure development.	±14 ha (Fully operational)	X	EIA Regulation GNR 984 of 2014 (as amended) Activity 17.	Category B Activity 10
Stripping and stockpiling of topsoil and overburden to access the ore.	±36 ha (Pit 1 & 2) & ±61 ha (Waste Rock Dump) (Fully operational)	X		Category B Activity 11
Opencast mining (including drilling and blasting).	±36 ha (Fully operational)	X		N/A
Transporting, stockpiling and crushing of RoM.	±9 ha (Fully operational)	X		Category A Activity 2
Transporting of crushed ore to Beeshoek Mine (for offsite processing).	±20 km (Makganyane Mine to Beeshoek Mine)	X		N/A
Sloping, landscaping and rehabilitation of the affected MIOM areas upon closure of the mine.	±264 ha (Within the 1 549.61 ha)	X		Category A Activity 14 Category B Activity 9 Category B Activity 11
EIA Regulation GNR 984 of 2014 (as amended) Activity 17: *Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right.*				
NEM:WA: Category A Activity 2: *The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000 m².*				
NEM:WA: Category A Activity 14: *The decommissioning of a facility for a waste management activity listed in Category A or B of this Schedule.*				

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
NEM:WA: Category B Activity 9: *The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.*				
NEM:WA: Category B Activity 10: *The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).*				
NEM:WA: Category B Activity 11: *The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).*				

Also refer to *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.2.1 NEM:WA Related Activities*.

ii) Description of the activities to be undertaken

1. BACKGROUND INFORMATION

In 2019, Charlton Michael Rex was granted a prospecting right for manganese ore, iron ore, and diamonds (general) on the above-mentioned properties. The prospecting right, referenced as NC 30/5/1/1/2/2292 PR, was later ceded to Makganyane Resources (Pty) Ltd in the same year. It was subsequently renewed in 2020, extending its validity until 18 November 2024. On 19 November 2021, the Minister granted consent under Section 11 of the MPRDA to cede the prospecting right to Assmang (Pty) Ltd, with the Deed of Cession officially executed on 15 December 2021. The table below provides the GPS coordinates of the prospecting right.

Table 3: GPS coordinates of the prospecting right.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
1A	28°08’42.35”	22°54’42.37”	-28.145097°	22.911769°
1C	28°09’27.69”	22°56’14.23”	-28.157692°	22.937286°
1D	28°09’46.16”	22°55’03.61”	-28.162823°	22.917670°
2A	28°08’58.80”	22°54’47.84”	-28.149666°	22.913290°
2B	28°08’50.29”	22°55’20.36”	-28.147303°	22.922323°
2C	28°09’19.11”	22°55’29.96”	-28.155310°	22.924989°

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
2D	28°09'27.62"	22°54'57.44"	-28.157672°	22.915956°
3AT	28°08'04.65"	22°56'31.94"	-28.134624°	22.942206°
3BT	28°07'40.21"	22°57'42.93"	-28.127835°	22.961924°
3CT	28°08'53.30"	22°58'25.59"	-28.148140°	22.973776°
3DT	28°09'17.06"	22°56'54.85"	-28.154740°	22.948571°
3ET	28°08'18.66"	22°55'51.24"	-28.138516°	22.930899°
A	28°09'00.02"	22°53'50.99"	-28.150004°	22.897497°
D	28°09'59.73"	22°54'11.70"	-28.166593°	22.903251°

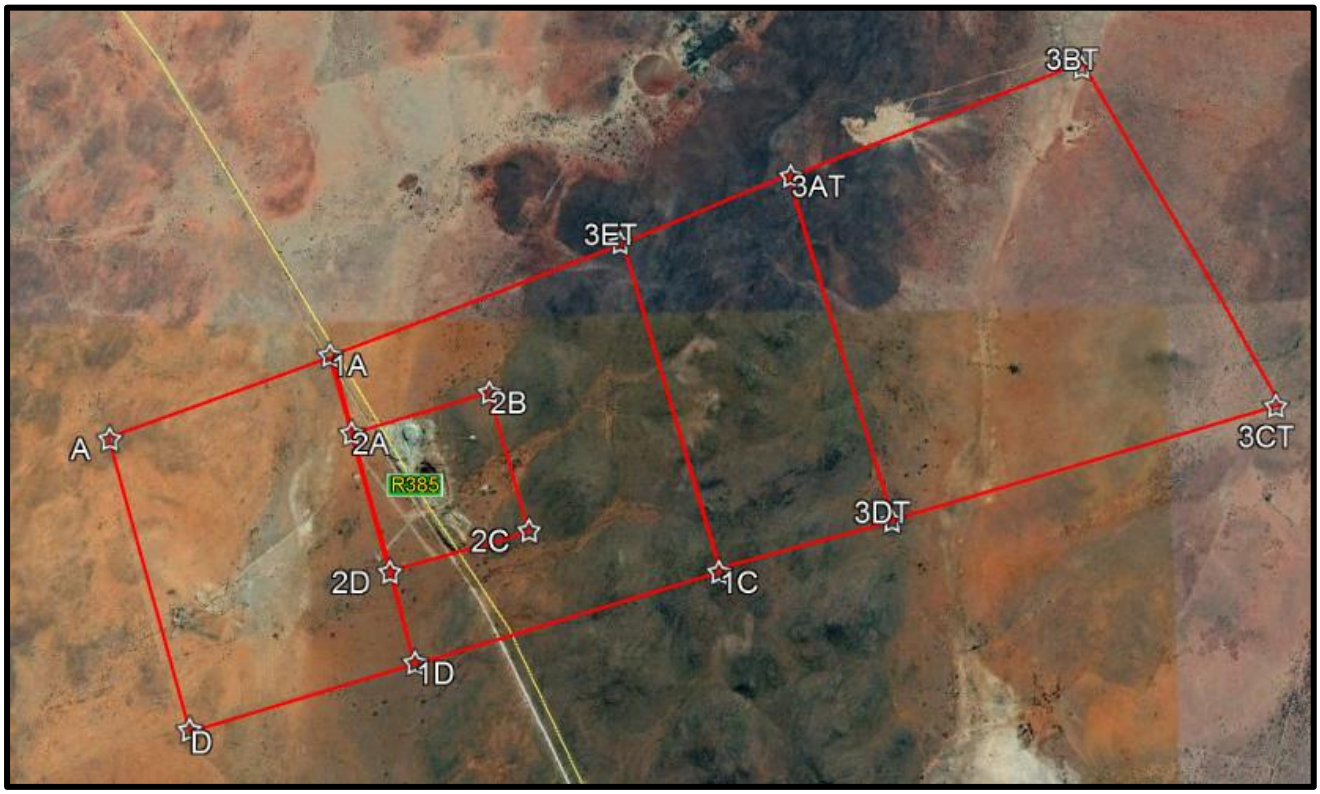


Figure 2: Satellite view of the prospecting right footprint.

Exploration of the prospecting area began in 2019 with detailed, non-invasive surface mapping along the outcrops of the Remaining Extent (RE) and Portion 1 (Remaining Extent) of the farm Makganyene No. 667. This was followed by non-invasive geophysical surveys, including limited ground magnetic and audio-magnetotelluric surveys, covering portions of the same properties. The data collected from these surveys provided the basis for initiating a first-phase drilling campaign in two target areas, which commenced in 2019. The first-phase drilling was completed in 2021, followed by data modelling. A second-phase drilling campaign began in 2022 and continued into 2023.

2. PROJECT PROPOSAL

Considering the above, the Applicant, Assmang (Pty) Ltd applied for environmental authorisation, a waste licence and a mining right to win Hematite, Magnetite, Goethite, Limonite, Siderite, Pyrolusite, Psilomelane, Rhodochrosite, Manganite, Braunite, Hausmannite, Manganese ore, Iron ore, and Diamonds (general) from the above mentioned properties. The following table lists the GPS coordinates of the proposed MIOM area as shown on the Mine Plans attached as Appendix A1 and A2 respectively.

Table 4: GPS Coordinates of the proposed mining footprint.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	28°09'00.02"	22°53'50.99"	-28.150006°	22.897497°
B	28°08'42.35"	22°54'42.37"	-28.145097°	22.911769°
C	28°08'18.66"	22°55'51.24"	-28.138516°	22.930899°
D	28°08'04.65"	22°56'31.94"	-28.134624°	22.942206°
E	28°07'40.21"	22°57'42.93"	-28.127835°	22.961924°
F	28°08'53.30"	22°58'25.59"	-28.148140°	22.973776°
G	28°09'17.06"	22°56'54.85"	-28.154740°	22.948571°
H	28°09'27.69"	22°56'14.23"	-28.157692°	22.937286°
J	28°09'46.16"	22°55'03.61"	-28.162823°	22.917670°
K	28°09'59.73"	22°54'11.70"	-28.166593°	22.903251°
1A	28°08'58.80"	22°54'47.84"	-28.149666°	22.913290°
1B	28°08'50.29"	22°55'20.36"	-28.147303°	22.922323°
1C	28°09'19.11"	22°55'29.96"	-28.155310°	22.924989°
1D	28°09'27.62"	22°54'57.44"	-28.157672°	22.915956°

The satellite image below shows the layout of the proposed mining area.

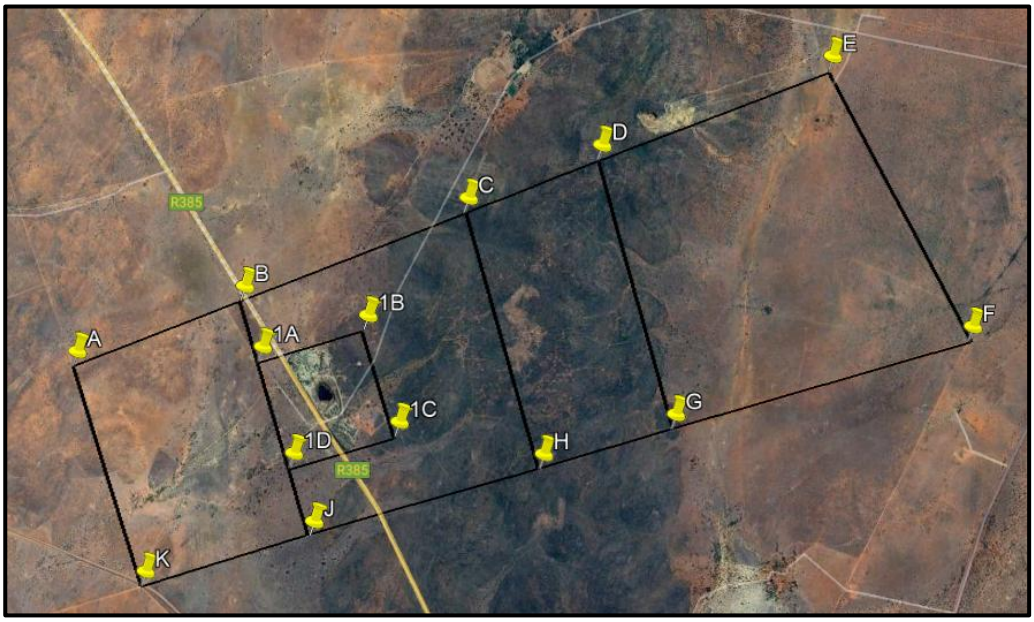


Figure 3: Satellite view showing the proposed mining area (black polygon) in relation to the surrounding landscape. (Image obtained from Google Earth)

Should the relevant authorisations be granted, and the proposed mining be allowed, the project will comprise of activities that can be divided into three key phases (discussed in more detail below) namely the:

(1) *Site establishment/construction phase* which will involve the demarcation of the site boundaries, operational areas and buffer zones pertaining to the episodic drainage lines (EDLs) identified during the environmental impact assessment. Site establishment will further necessitate the clearing of vegetation, stripping and stockpiling of topsoil, and establishment of site infrastructure.

(2) *Operational phase* that will entail opencast mining. The first phase will focus on pre-stripping the top layer material, of which the topsoil will be stored separately for rehabilitation. Then waste rock will be stripped to access the ore body followed by open cast mining of Pit 1 and Pit 2 (refer to Figure 9). The mining technology will include drilling and blasting with associated truck and shovel operations. Ore (RoM) from the open pit/s will report to a crusher situated on site and in the proposed stockpile area. Crushed ore will be stockpiled on-site from where ore will be transported via road (R385) to the Beeshoek Mine processing facility (off-site) using side tipper trucks. No processing will take place at the Makganyane Iron Ore Mine.

(3) *Decommissioning phase* which will involve the sloping and rehabilitation of all affected areas, the replacement of topsoil, and the removal of all infrastructure no longer needed by the landowners. The right holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining right holder will be required to submit a closure application to the Department of Mineral and Petroleum Resources in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998.

2.1 SITE ESTABLISHMENT / CONSTRUCTION PHASE

Section 5 of the MPRDA provides that a holder of a mining right may enter a property to conduct mining activities, however such mining right holder may not mine for any mineral or commence with any work incidental thereto without giving the landowner or lawful occupier of the land in question at least 21 calendar days' written notice. Subject to this, Surface Use Agreements in terms of the MPRDA will be developed and signed between the landowners and the Applicant before site activities commence.

Site establishment will further entail the demarcation of the mining boundaries and sensitive areas (EDLs), clearance of vegetation (as necessary), stripping and

stockpiling of topsoil to allow the establishment of mining related infrastructure, the stockpiles, and the excavation zone as detailed below.

2.1.1 Demarcation of Mining Boundaries

Pursuant to receipt of the relevant authorisations the boundary of the mining area will be demarcated. It is proposed that the operational areas will be fenced off from the rest of the farms with a game fence of at least 2.4 m high. Project specific and sensitive areas to be demarcated within the boundary of the mining footprint will include the:

- δ 48 m buffer zones around the EDLs,
- δ Internal Roads,
- δ Nursery,
- δ Office complex,
- δ Pit 1 & 2,
- δ Stockpile Area, and
- δ Waste Rock Dump.

The following figure illustrates the proposed layout of the mining area and identifies the various operational areas that will require demarcation.

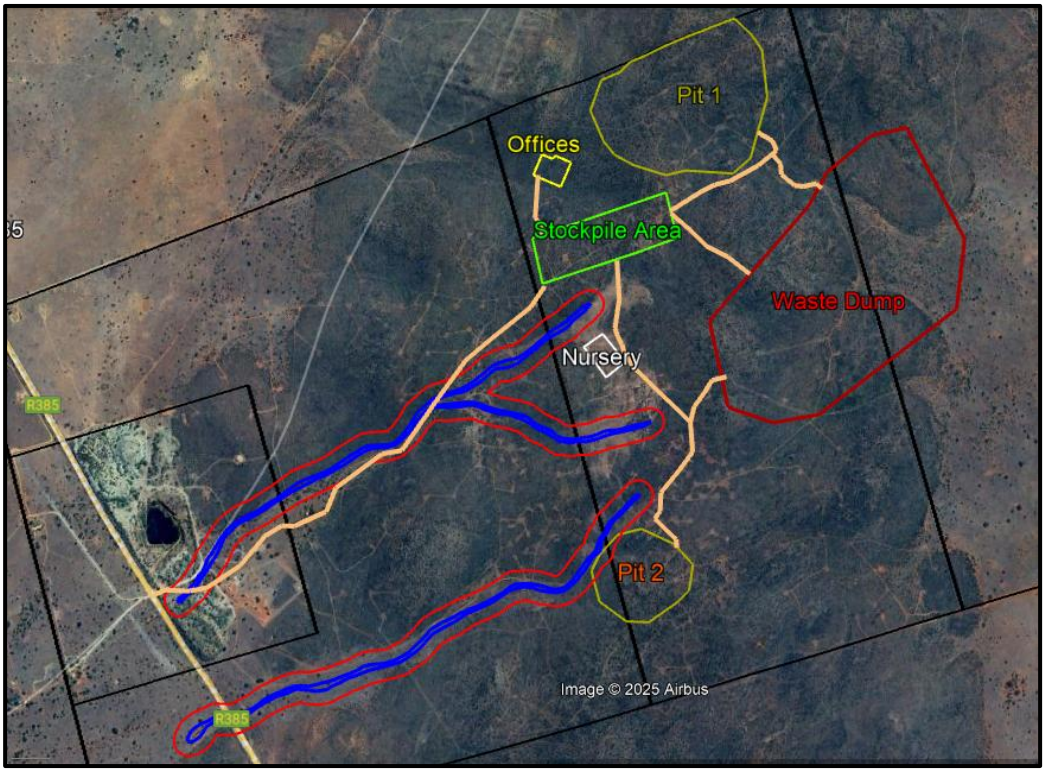


Figure 4: Proposed mine design layout where the orange lines indicate the proposed internal road network, and the blue lines show the EDL positions. The red lines indicate the 48 m buffer around the EDLs. (image created on Google Earth).

2.1.2 Clearing of Vegetation

(Information extracted from the Biodiversity Assessment attached as Appendix J)

The Biodiversity Assessment (compiled by STS) identified four (4) broad habitat units within the Focus Area namely the Kuruman Mountain Bushveld, Olifantshoek Plains Thornveld, Freshwater Habitat, and Transformed Habitat (refer to Figure 79). The verified habitat conditions indicated that the Recharge area (within the Freshwater Habitat) are of medium site ecological importance (SEI), and the Kuruman Mountain Bushveld, Olifantshoek Plains Thornveld and EDL (within the Freshwater Habitat) of low SEI. The preferential flow paths (within the Freshwater Habitat) and Transformed Habitat are of very low SEI.

STS concluded that the proposed activities will largely impact on semi-intact habitat (i.e., Kuruman Mountain Bushveld), and that the impacted habitats are not regarded as sensitive floral communities. The loss of floral species (and associated habitat) will therefore not result in significant, negative residual impacts as these habitats were associated with low and very low SEI scores and thus no avoidance mitigation is recommended. STS does however note that minimisation and rehabilitation mitigation measures are the key focus in these habitats.

Several species protected under the NCNCA, TOPS and NFA were recorded or are likely to occur within the Focus Areas. These species will require marking as part of final site walkdowns prior to vegetation clearing. Permit applications are required for the removal of NCNCA-protected species, and DFFE for nationally protected trees and/or TOPS species, and it is recommended that species be relocated out of the proposed mining footprints and not destroyed (where possible).

Vegetation clearing will commence once the applicable mitigation measures proposed in this document have been implemented, and the area to be developed will then be systematically cleared using tracked dozers.

A plant nursery will be established for the propagation of indigenous plants rescued from the mining footprint as proposed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). These plants will be vital for rehabilitation of the footprint and will be grown from seeds and cuttings gathered from plants in the footprint. The nursery will also function for the protection and propagation of SCC, Protected Species, keystone species and seedlings that

are possible to translocate as whole plants, and for the safe and dry storage of seeds gathered from the mining footprint.

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.*

2.1.3 Topsoil Stripping and Stockpiling

It is proposed that topsoil removal will be restricted to the exact footprint of the areas to be used or mined during the site establishment, construction, and operational phases of the activity. Topsoil will be stripped using dozers and placed into stockpile berms. Topsoil removed from areas such as the office complex and stockpile area will be stockpiled adjacent to those areas, while topsoil removed from the excavation areas will be stockpiled along the highwall side of the excavations.

It will be part of the obligations of site management to prevent the mixing of topsoil heaps with overburden/other soil heaps. The complete A-horizon (the top 100 – 200 mm of soil which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil (if available) will be stripped.

2.1.4 Access and Internal Roads

Access to the proposed MIOM will be taken from an existing farm access located along the R385 (see following figure), that is ±25 km north-west of the town of Postmasburg. This access point currently serves agricultural operations on the properties and will be formalised and upgraded to support the anticipated increase in traffic volumes associated with mining activities. The access will be designed in accordance with applicable geometric and safety standards to ensure safe ingress and egress for all vehicle types, including heavy vehicles associated with the mine's operations.

A wayleave application to the Northern Cape Department of Roads and Public Works will likely be required if any upgrades to the access road are planned. This application is separate from the mining right application and must be completed before making any amendments or changes to the public road network.

Figure 5: View of the R385 that will be used to access the proposed mining area and transport ore to Beeshoek Mine (image obtained from Google Earth).

Within the mining boundary, internal and haul roads will be developed to establish access between the operational areas and the orebodies. Where possible, the existing road network developed during the prospecting phase will be utilised for the mining operation. Certain sections of the road network will however require upgrading, which will involve the placement of suitable material sourced from the waste rock dump, end-tipped in a single layer, and then levelled and graded.

Road development will adhere to the mitigation measures applicable to the operation and maintenance of crossings withing the ephemeral drainage lines (EDLs) proposed by the specialists and incorporated into the EMPR. It is proposed that the internal roads will have an approximate width of 9 m. The Water Use Licence Application will include the crossing of EDLs as part of the DWS application.

The following figure presents a preliminary layout of the proposed internal road network. However, the layout is subject to change should more suitable routes be identified during the site establishment phase.

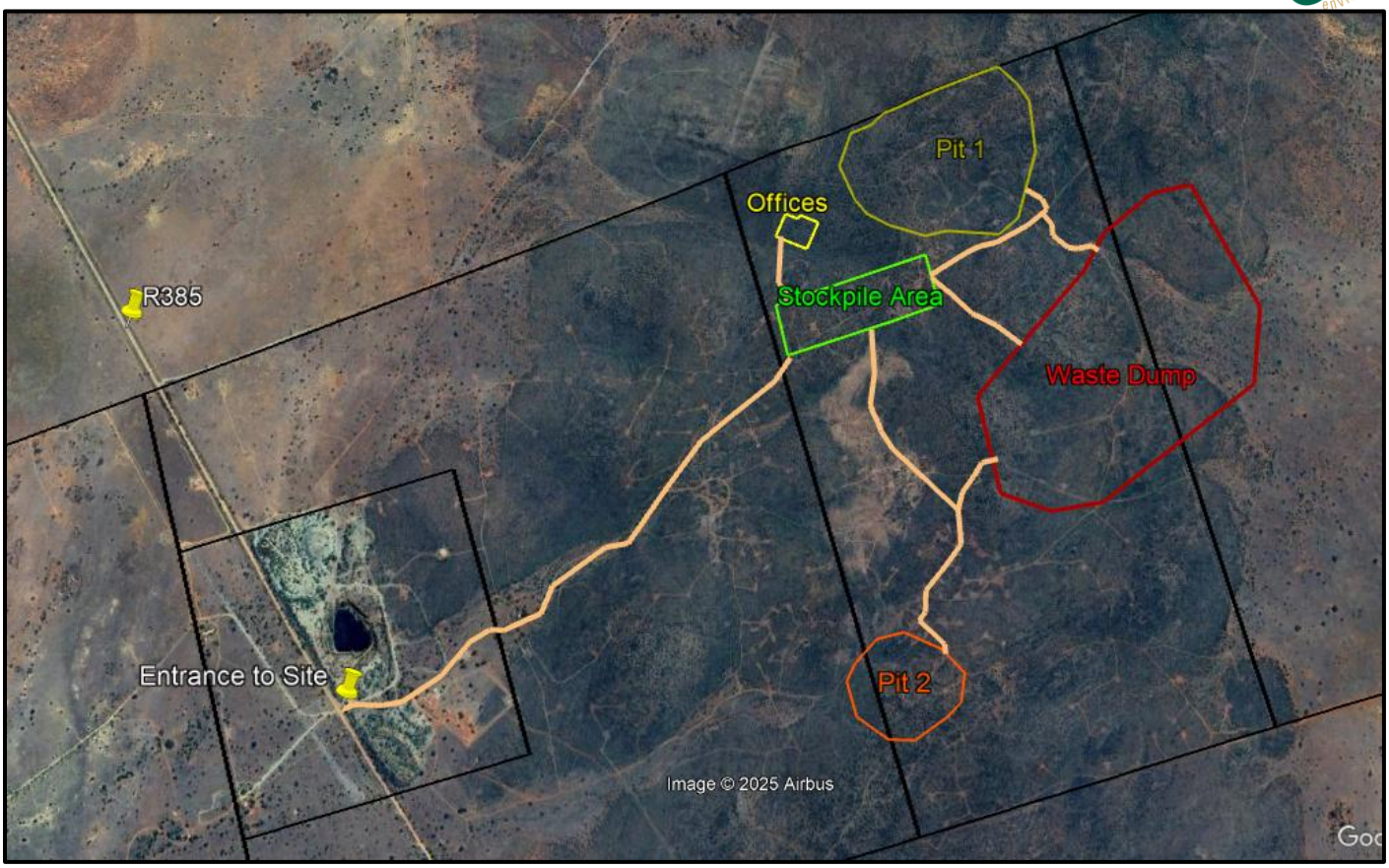


Figure 6: Preliminary internal road network.

The crushed ore will be transported by truck from the MIOM stockpile area to the Beeshoek Mine processing facility (off-site) via the R385.

Also refer to *Part A(1)(g)(1)(c) Description of specific environmental features and infrastructure on the site – 13.1 Road Network and Traffic Assessment* for additional information regarding the road network and traffic matters of the proposed activity.

2.1.5 Establishment of Site Infrastructure

The site infrastructure to be established within the mining footprint is expected to consist of at least the following:

- Internal roads;
- Office complex (±1 ha):
  - Ablution facilities,
  - Diesel depot,
  - Equipment workshop,
  - Office containers,
  - Parking area,
  - Planning / meeting site rooms,

- Security access control,
- Water reservoir,
- Wash bays.

δ Stockpile Area (±9 ha):

- Crushing plant,
- Dust control structures,
- Weigh bridge.

δ Stormwater Structures:

- Stockpile evaporation dam (±0.3 ha),
- Waste dump evaporation dam (±1.7 ha)
- Stormwater sumps in the excavations,
- Diversion channels, and
- Silt fences.

δ Plant Nursery.

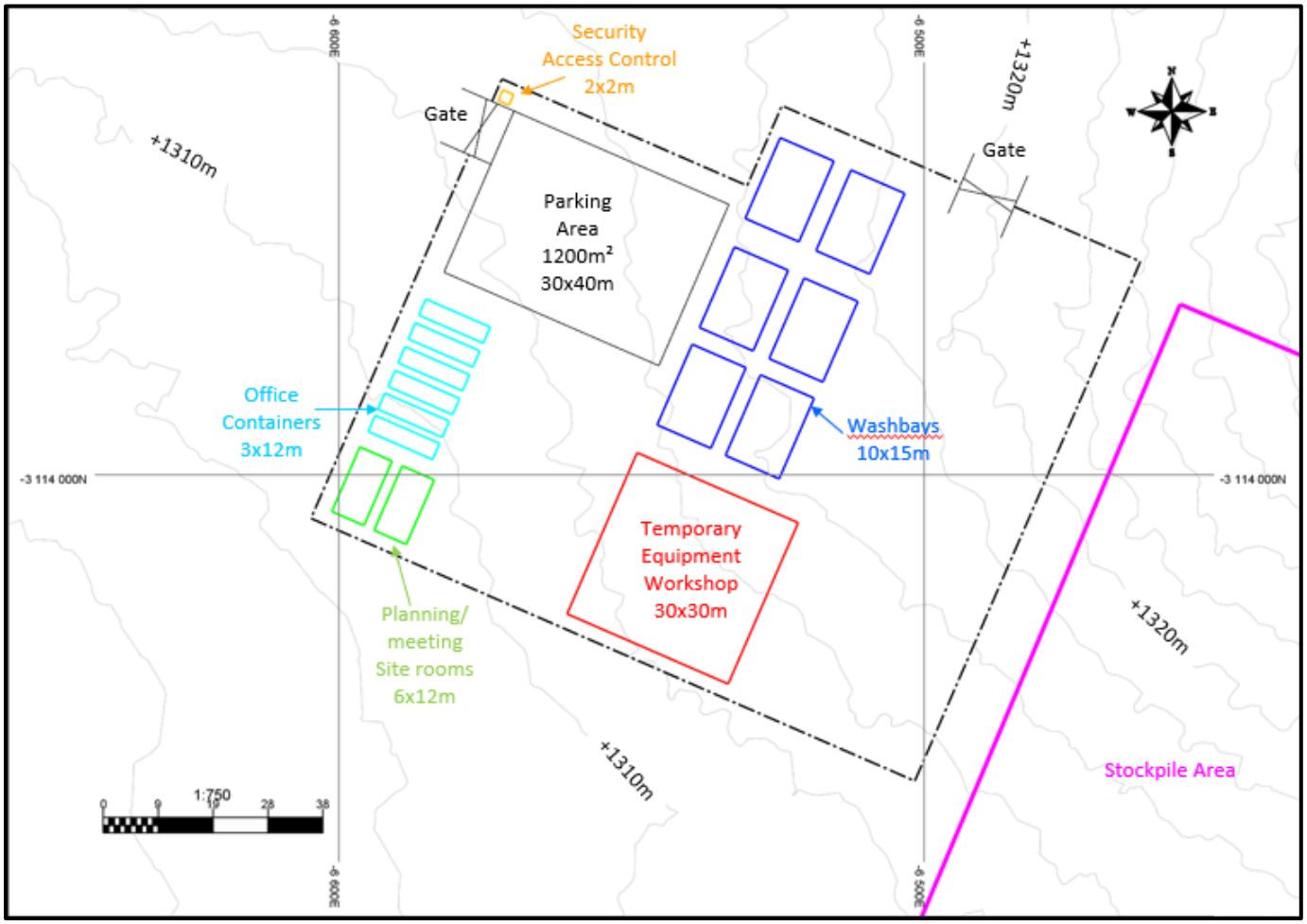


Figure 7: Proposed layout of the infrastructure to be developed at the Office Complex.

Also refer to Appendix C1-5 for the Site Acitvity Plans as well as Figure 15 showing the proposed stormwater structures.

2.1.6 Electricity Requirements

Limited electricity will be required for the mining activities, as the surface mining operations will primarily utilise diesel-powered equipment and machinery.

It is proposed that the offices and crushing infrastructure will be powered by generators and/or solar energy.

Should the need for Eskom electricity arise, the connection to the national grid will be undertaken in consultation with, and subject to approval by, Eskom.

2.2 OPERATIONAL PHASE

(Also refer to Part A(1)(g)(i) Details of the development footprint alternatives considered.)

According to the Mine Works Programme (MWP) the best-case open pit mining scenario (referred to as "Phase 1 & 2" henceforth) was selected from the various options based on projected economic results. The Phase 1 & 2 option entails the open pit mining of Pit 1 and Pit 2 with a production schedule as shown in the following figure. The life of mine (LoM) schedule is >38 months.

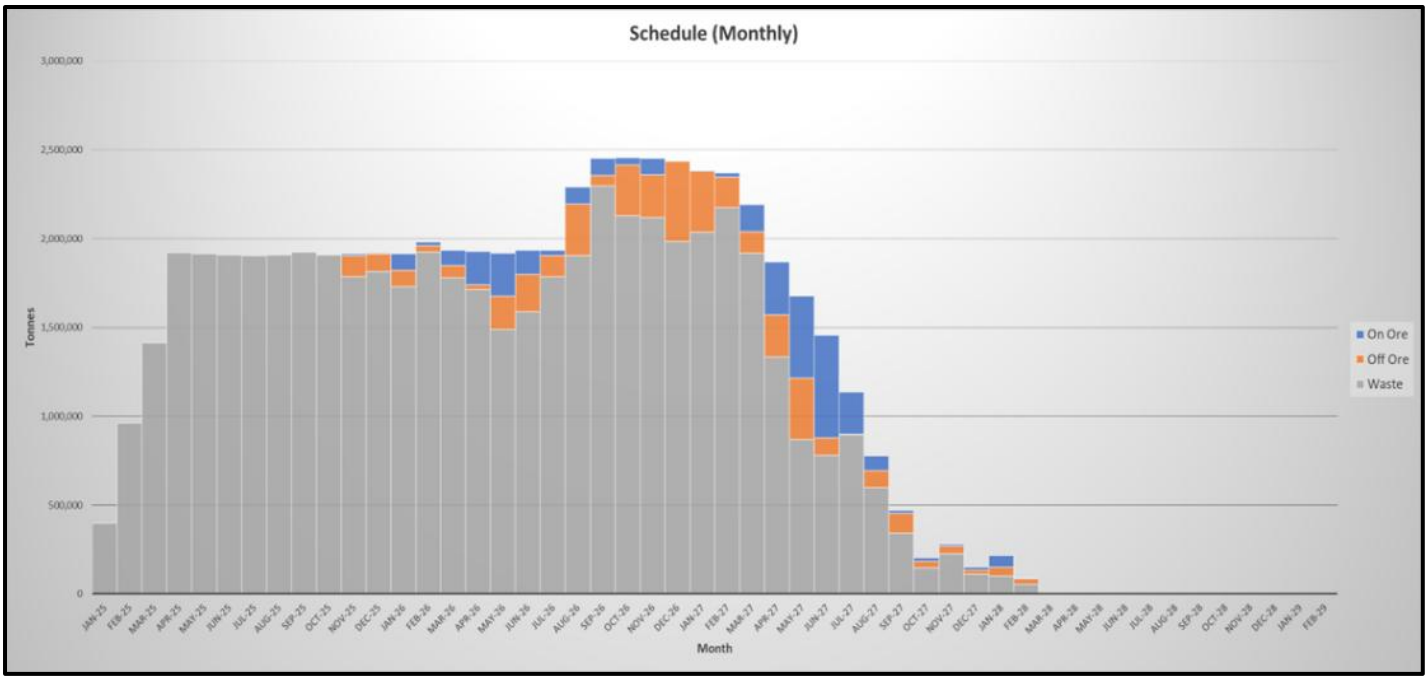


Figure 8: Phase 1 & 2 mine production schedule (image obtained from the MWP).

Waste production will build up to 1.9 million tonnes per month in Month 4. Continue at this rate for another 6 months when first ore will be reached, with an average of 250 000 tonnes per month. The open pit will have an initial aggressive waste stripping requirement to open the ore horizon. Waste stripping will continue for the full period of

the project up to Month 28 from where it will drop to Month 38 when life of mine is complete.

Mining production will only commence during the fifth year of the mining right due to the required build-up period. The geological setting of the ore bodies does not allow for a faster ramp up period as the ore bodies do not sub-outcrop on the surface. Hence a fair amount of overburden and topsoil needs to be removed before the ore can be accessed. Free digging is limited but can be done up to ±5 m in vertical depth whereafter blasting will be required.

Furthermore, it is estimated that for the first three years of the mining right, there will be no employees at the mine. The estimated number of positions available from Year 4 is 50 permanent employees, and provision was made for ±30 contract workers.

Mining will take place by means of an open pit mining operation along the orebody. The first phase will focus on pre-stripping the top layer material, of which the topsoil will be stored separately (along the highwall side of the excavation) for rehabilitation. Then waste rock will be stripped to access the ore body followed by open cast mining of Pit 1 and Pit 2 (refer to Figure 9). The mining technology will include drilling and blasting with associated truck and shovel operations.

Waste rock from the open pit/s will report to the centralised waste rock dump where excavated material will be stored until such time as pit deposition is possible.

Mining will take place by cutting 10 m benches, with an overall highwall slope angle of between 45° - 55° to ensure geotechnical integrity. Access will be established for the identified pits and infrastructure aligned to be flexible to supply volumes anticipated. Access to the open pit resources will be via a typical open pit layout using ramps inclined at 8% for each pit.

Ore (RoM) from the open pit/s will report to a crusher situated on site in the stockpile area. There will typically be two crushing processes consisting of a Primary and Secondary Crushers. At the primary crusher ore is crushed to -200 mm and at the secondary crusher it is further reduced to -80mm. Crushed ore will then be stockpiled on-site from where the ore will be transported via road to the Beeshoek Mine processing facility (off-site) using side tipper trucks. No processing will take place at the MIOM.

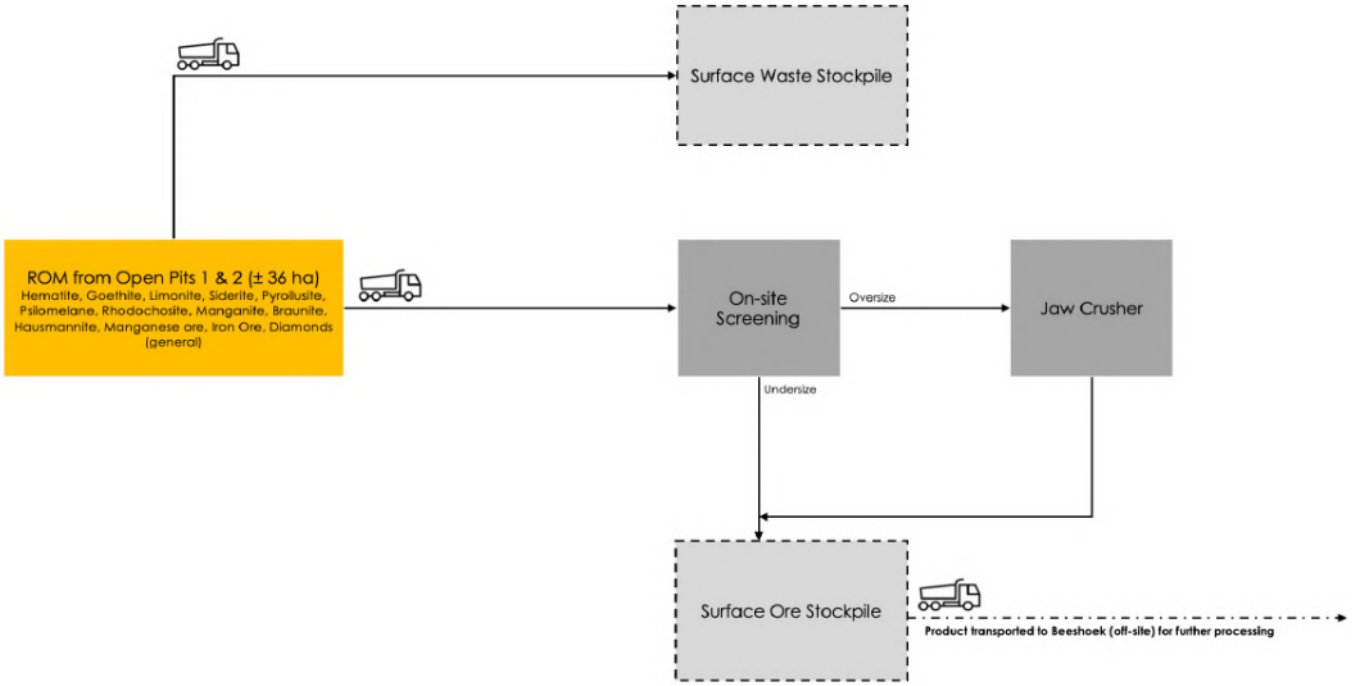


Figure 9: Process flow chart for the operation phase (Yellow Tree, 2025)

Ore will be mined in three shifts per day using excavators and articulated dump trucks for hauling purposes. Drilling and blasting will take place utilising vertical drilling and explosive charging units. Blasting will occur daily during normal work hours (Monday – Friday, 08:00 – 17:00).

Figure 10 to Figure 14 indicate the scheduling approach in months and the pit positions relative to each other. Note that Pits 3 and 4 are indicated but were not considered financially viable options at this stage, the pits (3 & 4) still had to be taken into consideration to ensure the ground is not sterilised for future mining, and to allow for the correct positioning of the waste rock stockpile.

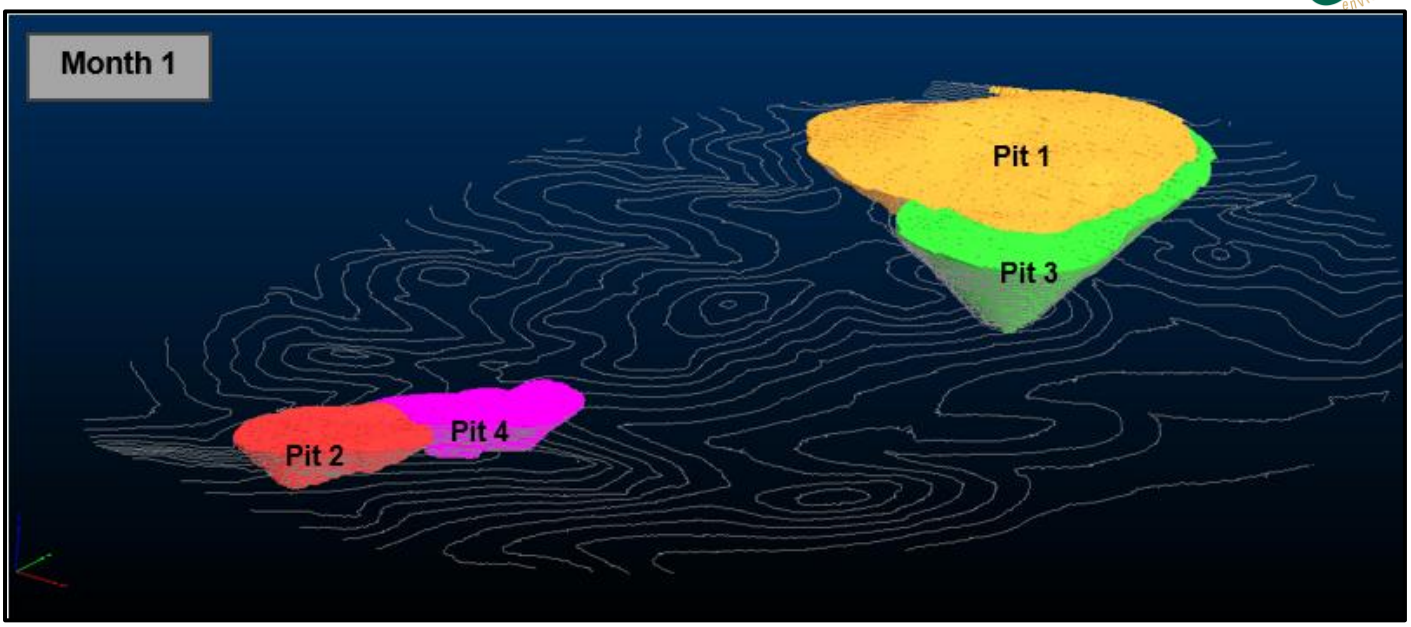


Figure 10: Design to be implemented at the MIOM showing Month 1's mining schedule (image obtained from the Mining Work Programme).

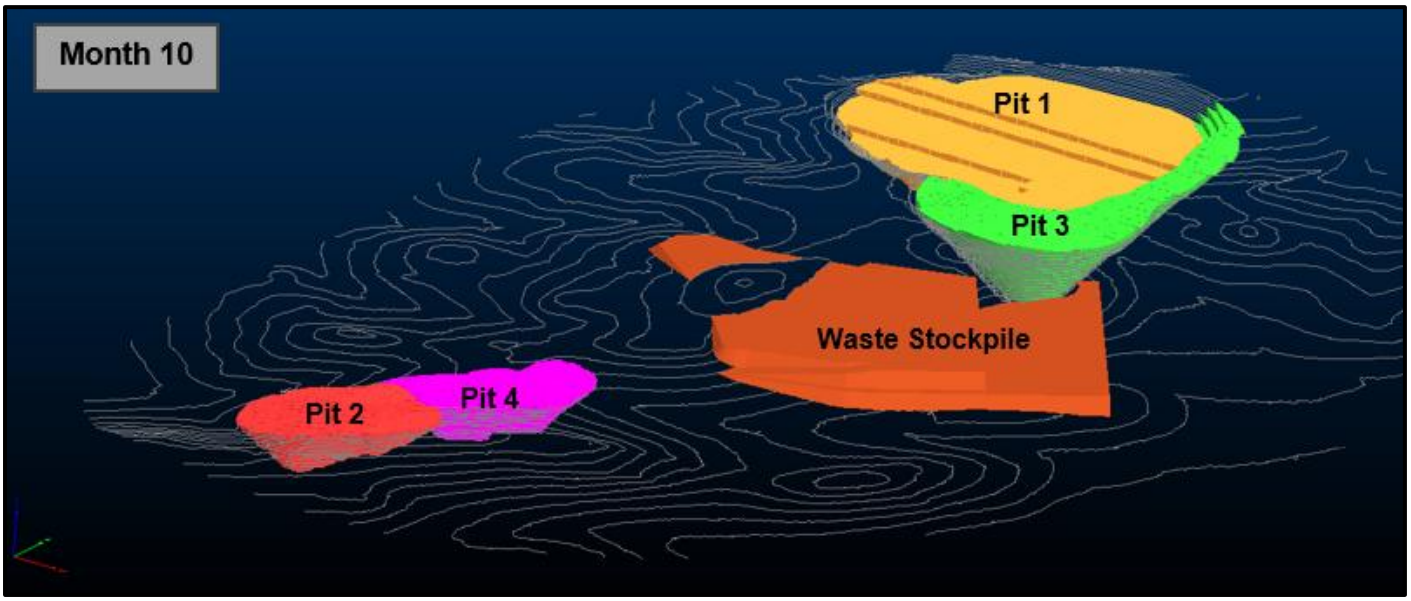


Figure 11: Design to be implemented at the MIOM showing Month 1 – 10 mining schedule (image obtained from the Mining Work Programme).

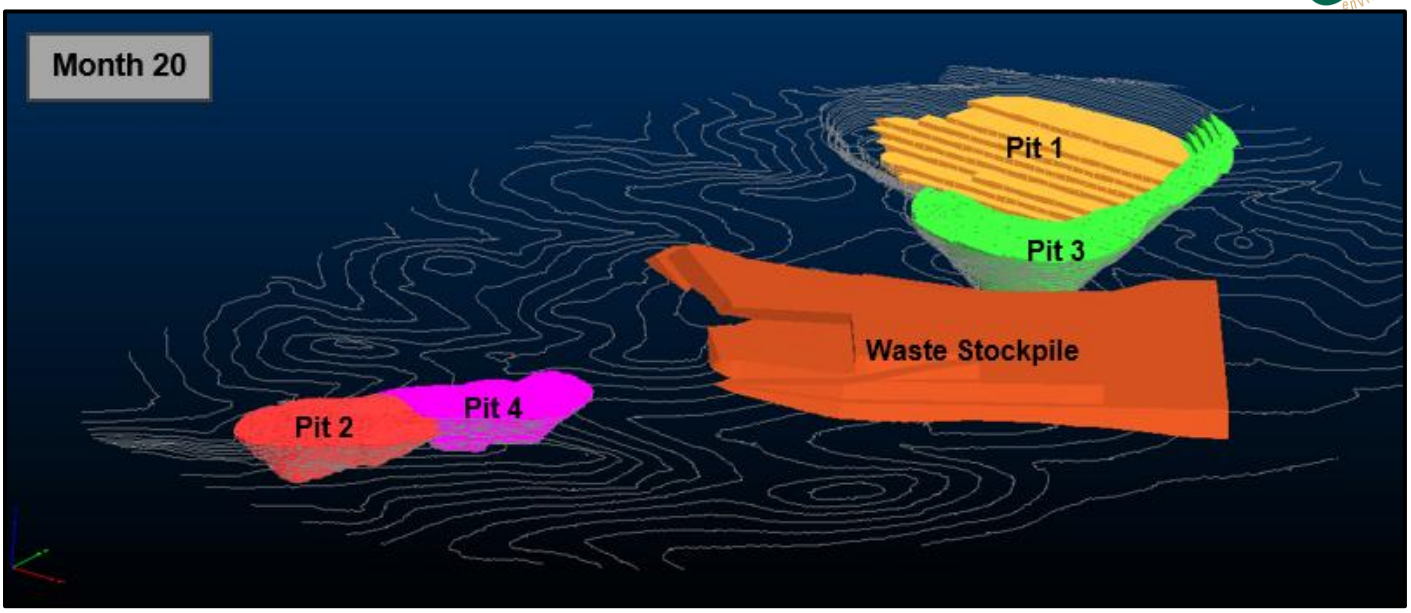


Figure 12: Design to be implemented at the MIOM showing Month 1 – 20 mining schedule where only Pit 1 being mined. No Pit 2 mining commenced yet. (image obtained from the Mining Work Programme).

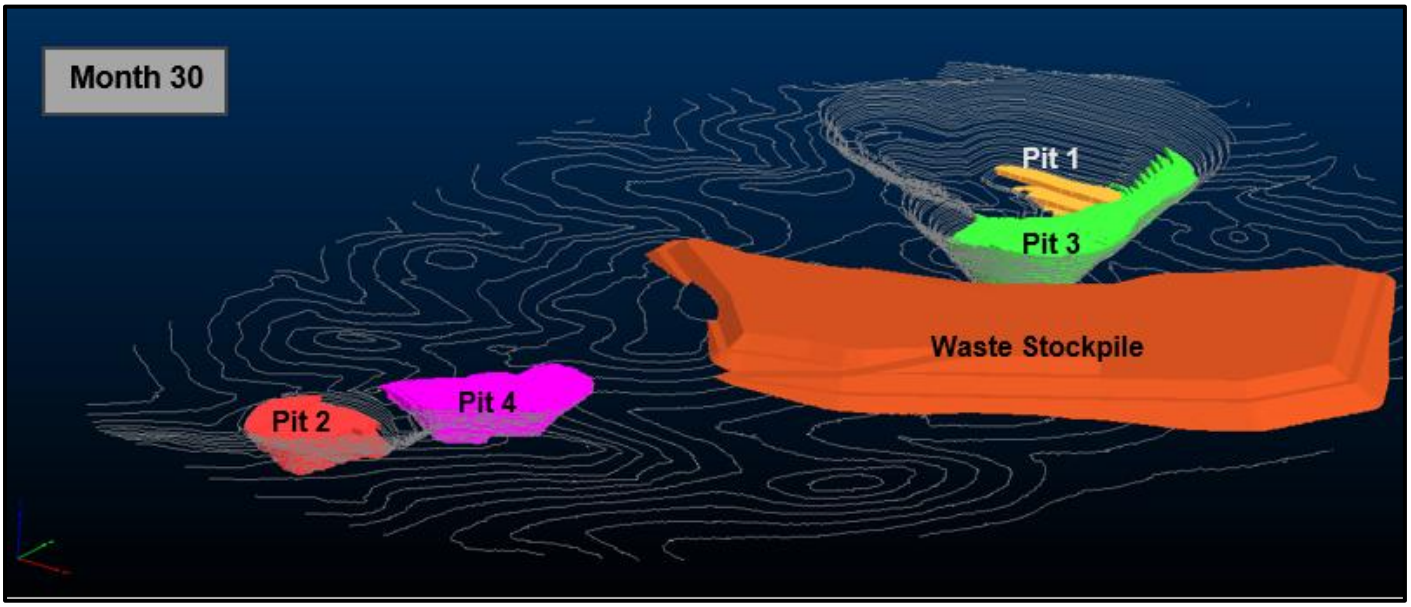


Figure 13: Design to be implemented at the MIOM showing Month 1 – 30 mining schedule where Pit 1 being completed and mining of Pit 2 commenced. Pit 1 and 2 completed in 38 months (image obtained from the Mining Work Programme).

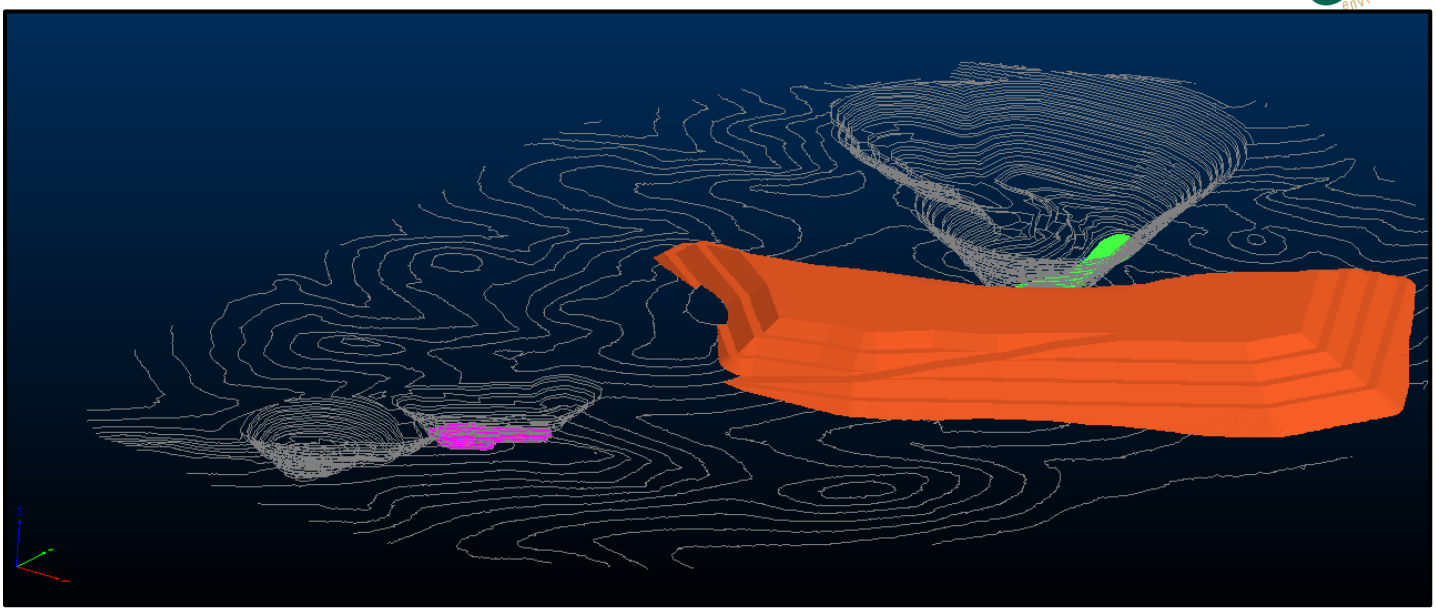


Figure 14: Design to be implemented at the MIOM showing Month 1 – 40 mining schedule. Pit 1 and 2 completed in 38 months (image obtained from the Mining Work Programme).

Presently it is proposed that ±113 ha of the 1 549.61 ha MR footprint will be altered by the proposed mining activity.

2.2.1 Water Management

Also refer to *Part B(1)(d)(vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation;* and *Part B(1)(d)(viii) Has a water use licence been applied for*.

2.2.1.1 Water Use

Process water will be obtained from the excavation sumps and, when available, from the stormwater evaporation dams. This water will be required solely for dust suppression purposes that will be applied using water trucks. Sprayers will be fitted to the crushing plant to reduce dust generation at the plant. It is anticipated that ±250 m³ (250 000 ℓ) of process water will be required per day.

The geohydrological investigation indicated that the groundwater is of good quality and suitable for human consumption, in accordance with the South African National Standards for drinking water (SANS 241:2015). It is therefore proposed that the domestic water requirements of the mine will also be met from the pit sumps. If required, this water may also be filtered prior to human consumption. The project is expected to require ±10 m³ (10 000 ℓ) of potable water per day, which will be stored in tanks at the office complex.

2.2.1.2 Pit Dewatering

Pit dewatering will be required to maintain a dry and safe mining environment. The proposed dewatering design, together with the anticipated hydrogeological impacts, is described in detail in *Part A(1)(g)(iv)(1)(c) – Description of specific environmental features and infrastructure on the site – Section 5: Site Specific Geohydrology*.

The management approach for water abstracted through pit dewatering will be finalised through the Water Use Licence Application (WULA) process, in consultation with and subject to approval by the Department of Water and Sanitation (DWS). One potential management option under consideration involves pumping the abstracted water into nearby boreholes situated outside the relevant aquifer. In addition, northern neighbouring farmers whose boreholes may be influenced by the groundwater depression cone may be supplied with water from the pits as a mitigation measure.

All dewatering activities will be undertaken in a manner that prevents deterioration of groundwater quality, in accordance with the National Water Act, 1998 (Act No. 36 of 1998), and NEMA principles. A groundwater monitoring programme (Appendix E) will be implemented to track water levels and quality in both mine and neighbouring boreholes, and contingency measures will be developed to address any unforeseen adverse impacts on groundwater availability or quality.

2.2.1.3 Stormwater Management

(Information extracted from the Stormwater Management Plan: Proposed Makganyane Iron Ore Mine attached as Appendix F)

Stormwater management is a critical component of responsible mine planning and environmental protection. Uncontrolled stormwater runoff can cause soil erosion, flooding, and the contamination of nearby watercourses with sediments and pollutants, leading to significant impacts on biodiversity, agricultural land, and downstream users. Effective stormwater management ensures that clean and dirty water are separated, flow is controlled, and potential pollutants are contained, thereby safeguarding water resources, reducing infrastructure damage, and ensuring compliance with environmental legislation.

The Biodiversity Company (TBC) was commissioned to compile a Stormwater Management Plan (SWMP) for the proposed MIOM as presented in the following figure.

TBC considered the majority of the application area clean as no mining works are anticipated in the greater mining footprint, apart from the areas identified in Figure 4. The area between Pit 1 and the Waste Rock Dump (WRD) was included for modelling purposes so as to separate clean and dirty water in line with the GN704 Regulations. The area was classified as moderately dirty as this area is anticipated for the passing of vehicles required for the mining operations.

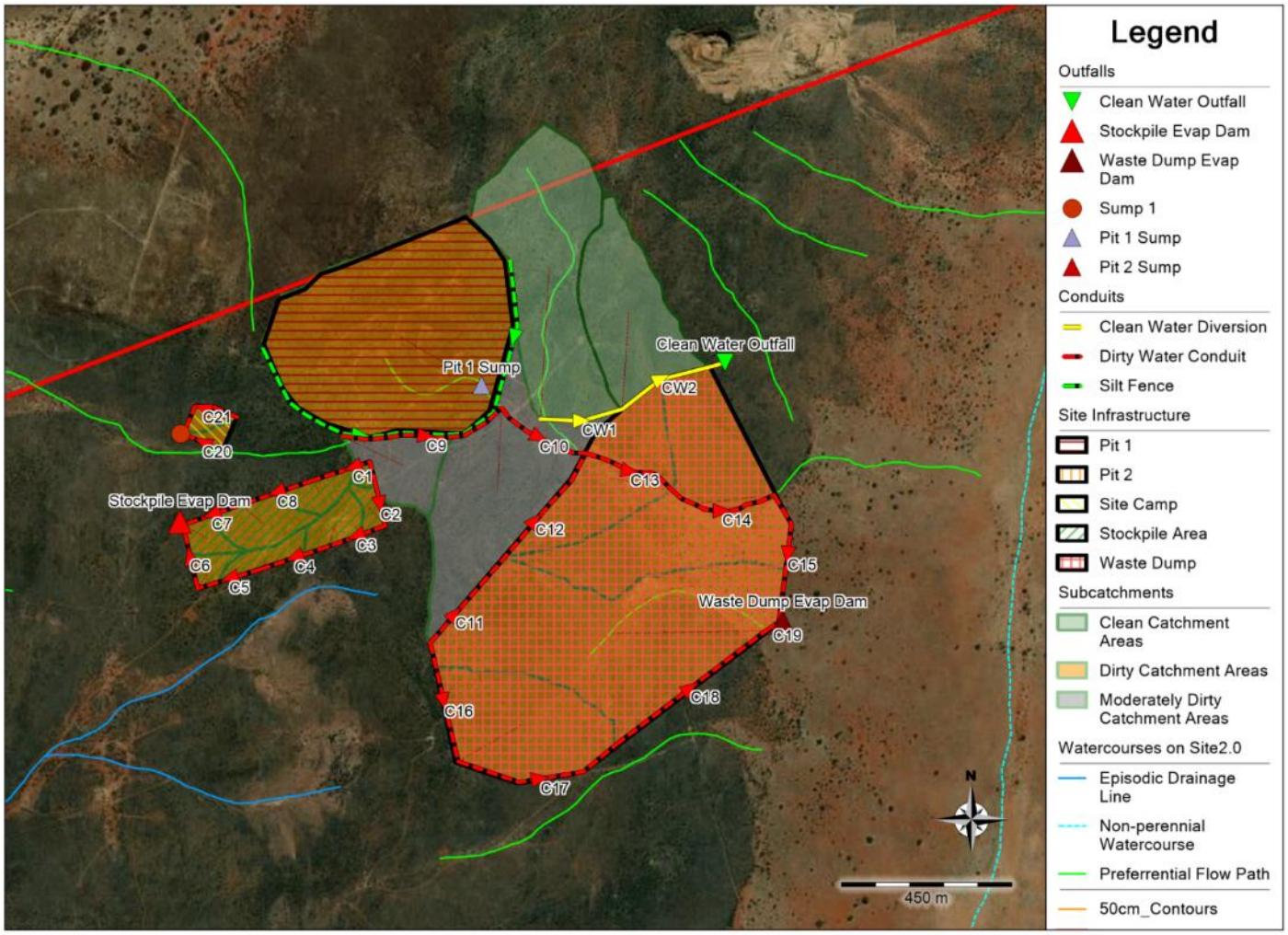


Figure 15: Conceptual stormwater management plan (TBC, 2025).

TBC reported the following with regard to the MIOM SWMP:

2.2.1.3.1 Modelling Outputs

The 1:50-year flood events were routed through the site to determine the flow rates and flow volumes generated from each of the catchment areas,

together with the flow rates and flow volumes reporting to the channels and proposed containment facilities. The results are shown in the following three tables.

Table 5: Sub-catchment results (TBC, 2025).

Catchment ID	Area (ha)	Slope (%)	Runoff Volume (ML)	Peak Runoff (m³/s)
Clean Catchment Areas				
C1	16.4322	9.001	13.67	10.24
C2	9.2951	9.848	7.74	5.91
Moderately Dirty Areas				
MD1	3.704	6.703	3.03	1.82
MD2	14.5145	8.763	11.63	5.72
Pits				
P1	27.56224	12.993	25.1	15.93
P2	8.982619	14.432	8.24	5.71
Stockpile Area				
S1	0.9823	7.929	1.33	0.77
S2	2.3796	8.492	3.21	1.85
S3	1.2965	10.484	1.75	1.01
S4	0.2986	2.841	0.4	0.23
S5	0.7328	5.723	0.99	0.57
S6	1.1395	6.892	1.54	0.88
S7	1.4268	6.626	1.93	1.11
S8	0.6886	4.376	0.93	0.53
Site Camp Area				
SC1	0.5733	10.631	0.61	0.43
SC2	0.4317	9.484	0.46	0.32
Waste Dump Area				
WD1	10.1515	9.937	9.21	5.61
WD2	24.5951	8.544	22.36	13.89
WD3	8.4765	8.638	7.73	5.03
WD4	17.164	7.039	15.63	9.93

Table 6: Flow rate and volumes reporting to the containment facilities (TBC, 2025).

Description	Avg. Flow (m³/s)	Max. Flow (m³/s)	Total Flow (ML)	Total Flow (m³/s)
Clean Water Outfall	0.628	5.23	15.254	15 254
Pit 1 Sump	1.001	15.929	25.093	25 093
Pit 2 Sump	0.33	5.711	8.234	8 234
Stockpile Evap Dam	0.407	6.668	12.057	12 057
Sump 1	0.04	0.731	1.069	1 069
Waste Dump Evap Dam	2.717	35.333	67.723	67 723

Table 7: Flow rate and volumes reporting to each channel (TBC, 2025).

Name	Length (m)	Slope (m/m)	Max. |Flow| (m³/s)	Max. |Velocity| (m/s)	Contributing Area (ha)
C1	217.774	0.04122	0.141	1.19	0.299
C2	108.117	0.01499	0.085	0.86	0.299
C3	159.836	0.03214	0.604	2.74	0.987
C4	182.275	0.03141	1.676	4.76	2.414
C5	174.532	0.02869	2.508	5.54	3.554
C6	169.351	0.02392	3.028	5.07	4.286
C7	159.673	0.01275	2.912	4.45	3.975
C8	199.945	0.05275	1.122	2.94	1.595
C9	442.453	0.04625	1.011	2.18	18.218
C10	255.477	0.03661	7.096	9.3	18.218
C13	256.076	0.02056	4.81	4.3	18.218
C14	287.209	0.01464	11.461	6.42	26.695
C15	342.089	0.01788	16.512	9.72	43.859
C17	448.12	0.07497	5.484	8.4	10.152
C18	490.075	0.01645	5.276	4.12	10.152
C19	44.689	0.02657	18.799	11.12	34.747
C20	110.528	0.06623	0.315	3.27	0.432
C21	203.638	0.07445	0.422	4.11	0.573
CW1	217.936	0.02171	10.135	6.32	16.432
CW2	259.899	0.00162	5.222	3.68	25.727

2.2.1.3.2 Discussion and Recommendations

The proposed MIOM was discretised into a total of sixteen (16) dirty, two (2) moderately dirty and two (2) clean sub-catchments based on the topographical layout of the site. The majority of the site boundary has been considered clean as operations were restricted to a few site-specific

areas. These clean areas, with the exception of areas that require diversions were omitted from the SWMP as the natural flow would be away from the proposed operations. The proposed stormwater infrastructure related to the MIOM development areas includes the following:

- Dirty Stormwater channels around the WRD, Product Stockpiles and the Office Complex represented in red on Figure 15.

- Two (2) evaporation dams, with one being located at the WRD and the other at the Stockpile area. These dams were proposed to act as containment facilities for the dirty water emanating from the respective catchment areas. It has been assumed that the runoff from these dams will be utilised across the mining operations, specifically for dust suppression.

- Regarding Pit 1 and Pit 2, sumps were proposed for these areas. The location of the sumps would be at the lowest point within the respective Pit. These sumps would collect runoff from within the Pits as well as any decant as a result of the mining operations. It is assumed that the sumps within the Pits will be kept as low as possible to cater for any runoff generated during rainfall events. The water contained within these sumps will be utilised across the mining operations, specifically for dust suppression. Furthermore, given the nature of the works envisaged within the respective Pits, silt fences have been proposed downgradient of the respective Pits with the aim of reducing sedimentation of the nearby watercourses or drainage lines.

- Dirty stormwater channels were proposed around the Office area diverting runoff towards a Sump with an oil separator. Excess water from the sump can be considered clean after passing through the oil separator and can be allowed to flow away from the site into the nearby drainage line.

- Clean stormwater diversion channels were proposed for the area between Pit 1 and the WRD with the aim of diverting clean water away from operations towards the drainage line located towards the east.

- The specialist concluded that the proposed dimensions of the evaporation dams and sumps are at the discretion of the consulting engineer. However it was recommended that the flow volumes presented in Table 6 be considered. For the purpose of this EIA, it was assumed that the:
  - Waste Dump Evaporation Dam will have an approximate footprint of 1.7 ha,
  - Stockpile Evaporation Dam will take up ±0.3 ha.

The management of the proposed stormwater infrastructure as recommended by TBC is summarised below:

- The proposed containment facilities should be designed to incorporate a 0.8 m freeboard.
- The SWMP should be revisited after any major changes to the current operations or design changes.
- It is recommended that stone pitching channels are used to transfer runoff and to reduce high runoff velocities in channels.
- To prevent clogging of the grated channel covers and maintain channel capacity, best practice and proper housekeeping practices must be ensured.
- All channels must be checked after any major rainfall events to ensure that there are no blockages and that the water flow will not be restricted in any way.
- Sediment that accumulates within channels and retention facilities needs to be removed directly after the storm events and appropriately disposed of to ensure design capacity is maintained.
- It is recommended that the stormwater attenuation facilities be operated empty or at a storage level low enough to accommodate stormwater inflows, whilst meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements.

The above recommendations were incorporated into the EMPR (Part B).

2.2.2 Waste Management

2.2.2.1 NEM:WA Related Activities

The project triggers listed waste management activities in terms of NEM:WA. While the EIAR acknowledges the applicable requirements under the Waste

Regulations, 2015 and associated Norms and Standards (e.g., for residue stockpiles and waste disposal), it is confirmed that the detailed design, construction, operation and closure requirements will be addressed and enforced through the Waste Management Licence. These requirements, including those related to professional engineering design, geotechnical investigations, pollution control and closure, will form part of the conditions of authorisation to be issued by the competent authority. Accordingly, this EIAR does not prescribe technical licence conditions, but records the Applicant's commitment to full compliance.

The following table explains the inclusion of the listed activities as part of this application.

Table 8: Listed waste management activities triggered and associated justification

CATEGORY & ACTIVITY	DESCRIPTION OF ACTIVITY	JUSTIFICATION / MOTIVATION
Category A, Activity 2	The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1 000 m².	The proposed use of waste rock/overburden (classified as inert waste) for haul road construction may require crushing and screening at the crusher plant. This qualifies as a waste management activity exceeding 1 000 m², thus triggering this listed activity.
Category B, Activity 9	The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.	Waste rock will be temporarily stored at the central waste rock dump until such time that pit deposition is feasible. The eventual placement of waste rock (inert waste) into the mined pits qualifies as disposal and exceeds the 25 000-ton threshold, thereby triggering this activity.
Category B, Activity 10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	This activity is triggered by association as the construction and use of facilities for the disposal and handling of waste rock (related to Activities 9 and 11) are part of the project and fall under Category B waste management activities.
Category B, Activity 11	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	The development of the waste rock dump and related stockpiles (including topsoil) triggers this activity. These will serve as residue stockpiles, some of which will be used in the rehabilitation of the mining area.
Category A, Activity 14	The decommissioning of a facility for a waste management activity listed in Category A or B of this Schedule.	This activity will become applicable during the decommissioning phase of the mine, when

CATEGORY & ACTIVITY	DESCRIPTION OF ACTIVITY	JUSTIFICATION / MOTIVATION
		waste facilities (e.g., dumps and stockpiles) are rehabilitated and the site is decommissioned.

2.2.2.2 Waste Classification and Assessment of Expected Waste Rock

(Information extracted from the Waste Classification attached as Appendix G)

The overburden and waste rock generated during the excavation of the pits will be transported to the designated waste rock dump area, which will cover an extent of ±61 hectares. This facility will serve as the primary deposition site for non-ore material, where the material will be systematically stockpiled to ensure safe storage and facilitate rehabilitation during the decommissioning phase.

The Waste Classification and Assessment (WCA) documented the characteristics of the expected waste rock and the potential risk to the environment when disposed on the surface.

The study used four different geological core samples, obtained during prospecting, to predict the waste rock quality (refer to Table 2 of the WCA for the sample details). Two samples were obtained from the proposed location of Pit 1, and two from Pit 2.

2.2.2.2.1 Material Classification

The total element concentrations were determined by XRF. These results show that the material consists mainly of silica (quartz), iron oxide, aluminium oxide and potassium oxide while sample MK0240 also contains 5% manganese oxide.

The rock samples were prepared for X-ray Diffraction (WRD) analysis according to standard analytical methods. The XRD mineral phases and relative phase amounts showed that the samples consist mainly of quartz and hematite with lesser amounts of other iron-bearing minerals.

The results of acid base accounting (ABA) are aimed at indicating the relative proportions of acid generating and neutralizing elements within a specific sample. The ABA results of the core samples showed that the tailings are non-acid forming.

The net acid generation (NAG) test indicates the potential drainage quality of the waste material. A titration value at pH 4.5 indicates acidity due to free acid (i.e. H_2SO_4) as well as soluble Fe and Al. A titration value at pH 7 includes metallic ions that precipitate as hydroxides at pH 4.5-7 (AMIRA, 2002). The results of the Makganyane samples indicated that under complete oxidation, the water quality interacting with the rock material will have a pH of 6.3 – 6.5. The results therefore indicate that the waste rock material will be non-acid forming (NAF) under maximum oxidation (NAG at pH 4.5 <0).

Included in the analytical suite was the determination of the leachable fraction of the constituents of concern. The Australian Standard leaching procedure (ASLP) with deionised water extract was conducted to assess the potential drainage quality of the material. The results of ASLP test work were compared to the South African Water Quality Guidelines (DWS, 1996) to assess the quality of the leachate. Guidelines for domestic use, agricultural use (irrigation and livestock) and aquatic ecosystems were considered.

The constituents of concern in the leachate concentrations of all samples were generally low, in most cases below detection. None of the water quality threshold values were exceeded, except the manganese (Mn) concentration which exceeded the domestic, irrigation and aquatic ecosystems (only MK0240) guidelines.

2.2.2.2.2 Waste Classification

The Global Harmonised System of Classification and Labelling of Chemicals (GHS) classification is based on the analytical results as well intrinsic properties of the waste streams. The percentage concentration of chemical constituents of the waste material must be screened in terms of physical, human health and environmental hazards as per the cut-off limits presented in the WCA. The study lists the GHS classification of the geological material as follows:

- **Physical hazards –** The waste rock materials are not explosive, flammable (combustible through friction), pyrophoric (ignite when in contact with air) or oxidising and does not release toxic gases when in contact with water or acid. Therefore, it is not hazardous in terms of physical characteristics.

- **Health hazards –** The percentage concentration of constituents obtained from the XRF were compared to the cut-off values/concentration limits for hazard classes. The only elements with concentrations >1% were silica (SiO_2), aluminium (Al_2O_3), iron (Fe_2O_3), manganese (MnO; only sample MH0240) and K_2O. Silica dust may be harmful to human health, but it is unlikely that the waste rock will generate sufficient dust to impact on human health. No carcinogens or mutagens were present in concentrations >0.1% and the pH of the material is neutral. The geological material (waste rock) does not pose a hazard to human health.

- **Environmental hazard –** The concentrations of constituents in the leachates are <1% and not likely to be hazardous to the aquatic environment.

2.2.2.2.3 Waste Assessment

The purpose of the waste assessment was to determine the waste Type intended for land disposal. A summary of the analytical results of the waste rock are presented in Table 9 and Table 10 of the WCA (Appendix G). Although the total concentrations of Ba, Ni, Co, Mn and Ni exceeded the Total Carbon Thresholds (TCT0) levels, the low leachable concentrations of all constituents (<LCT0) in the samples results in a Type 4 waste (non-hazardous) according to the GN 5522 of 2024 amendment to GN R. 635.

2.2.2.2.4 Risk Assessment Outcome

The WCA states that the waste rock is expected to pose a low risk to surface- and groundwater quality due to its low leachability of constituents and the low rainfall in the area.

Also refer to *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity* for the impact assessment outcomes.

2.2.2.2.5 Summary and Conclusion

The outcome of the WCA is summarised in the following table and concludes that no material impacts is anticipated on the local aquifers and ecosystems due to the proposed disposal of the Waste Rock.

Table 9: Waste rock risk assessment summary (IQS)

Aspect		**Waste Rock**
Chemical	Acid-base accounting	Not acid-generating
	Paste pH	Neutral (6.9-7.4)
	Chemical composition of leachate (short-term)	No exceedances of water quality guidelines, except Mn in sample MK0240
	Propensity to oxidise and decompose, stability and reactivity	Not containing minerals that will react with oxygen and water to produce ARD
	Concentration of volatile organics	Not applicable
Waste classification	Physical hazards	Not hazardous
	Health hazards	Not hazardous
	Environmental hazard	Not hazardous
	Classification	Not hazardous in terms of GHS
	Total concentrations	TC > TCT0 (Ba, Ni, Co, Mn and Ni) TC > TCT1 (Mn) in sample MK0240
	Leachable concentrations	LC < LCT0 for all constituents

Aspect		**Waste Rock**
	Assessment	Type 4 waste, due to low leachable concentrations (LC< LCT0)
Toxicity	Ecotoxicology	Not ecotoxic (low leachability)
Presence of vulnerable ecosystems		Artificial channelled valley bottom wetland, located in the eastern portion of the focus area, associated with the unnamed river
Mitigation measures to manage the impact on receiving environment		Continuous surface- and groundwater monitoring Regular updates of numerical and geochemical model

2.2.2.3 Solid (General) Waste Handling

General waste generated at the mine will primarily consist of paper, plastic, glass, metal, and tins. This waste will be collected in sealable, clearly marked refuse bins to prevent wind dispersal, odour, and attraction of scavengers. Bins will be placed at strategic locations across the site, regularly monitored, and

emptied when nearing capacity. All general waste will be removed from site and disposed of at the Postmasburg landfill site in accordance with the requirements of the local municipality.

Waste handling activities will comply with the National Environmental Management: Waste Act (Act No. 59 of 2008), and all disposal records will be retained for auditing purposes. Opportunities for waste minimisation, such as reuse and recycling, will be explored where feasible, and awareness will be raised among staff to support responsible waste practices.

2.2.2.4 Hazardous Waste

Hazardous waste generated during the mining operation may include used oils, greases, contaminated rags, hydraulic fluids, oil filters, empty chemical containers, and potentially hydrocarbon-contaminated soil. All hazardous waste will be classified in accordance with the National Environmental Management: Waste Act (Act No. 59 of 2008) and SANS 10234. It will be stored in clearly labelled, bunded and weatherproof containers or drums within a designated hazardous waste storage area on site. No hazardous waste will be disposed of on-site. A licensed hazardous waste contractor will be appointed to remove and dispose of such waste at an authorised hazardous waste disposal facility.

Safety Data Sheets (SDS) will be kept on file for all hazardous substances used or stored on site, and spill kits will be made readily available in relevant operational areas. Staff will be trained in hazardous waste handling procedures and emergency spill response.

2.2.2.5 Liquid Waste

Ablution facilities will be provided for employees at the Office Complex that will drain into a septic tank system (closed system). The septic tank will be serviced as needed by an appropriately qualified and licensed contractor to ensure compliance with environmental and health regulations.

Water generated at the wash bays will drain into an oil sump of sufficient capacity, designed to retain hydrocarbons and prevent environmental contamination. The oil sump will also be serviced by a suitably qualified contractor when required, and any waste will be disposed of at a licensed hazardous waste facility.

Stormwater runoff from dirty areas, including operational zones and areas where machinery is maintained or refuelled, will be managed in accordance with the measures outlined in the attached Stormwater Management Plan (Appendix F). These measures aim to prevent contamination of natural watercourses and surrounding environments. The plan includes the separation of clean and dirty water, containment structures such as berms and sediment traps, and controlled discharge points. Regular inspections and maintenance of stormwater infrastructure will be undertaken to ensure ongoing compliance with the National Water Act (Act No. 36 of 1998).

2.3 DECOMMISSIONING PHASE

(Also refer to Part B(1)(d)(i) Determination of closure objectives and Appendix H1 for the Rehabilitation, Decommissioning and Closure Plan)

The decommissioning phase represents the formal closure of mining operations and will involve the systematic dismantling of infrastructure, removal of equipment, and rehabilitation of all remaining disturbed areas. Progressive rehabilitation will be undertaken throughout the operational life of the mine, forming an integral part of the project proposal. During decommissioning, these measures will be consolidated and finalised to achieve landform stability, ecological restoration, and compliance with approved closure objectives. This phase is therefore essential to ensuring long-term environmental sustainability, regulatory compliance, and the successful transition of the site to its designated post-mining land use.

The Rehabilitation, Decommission and Closure Plan (Appendix H1) proposes that final rehabilitation will be applicable to an area of ±264 ha as presented in the following figure.

The following specific areas will require rehabilitation:

- Pit 1 and 2,
- Waste Rock Dump,
- Stockpile Area,
- Nursery, and
- Haul Roads

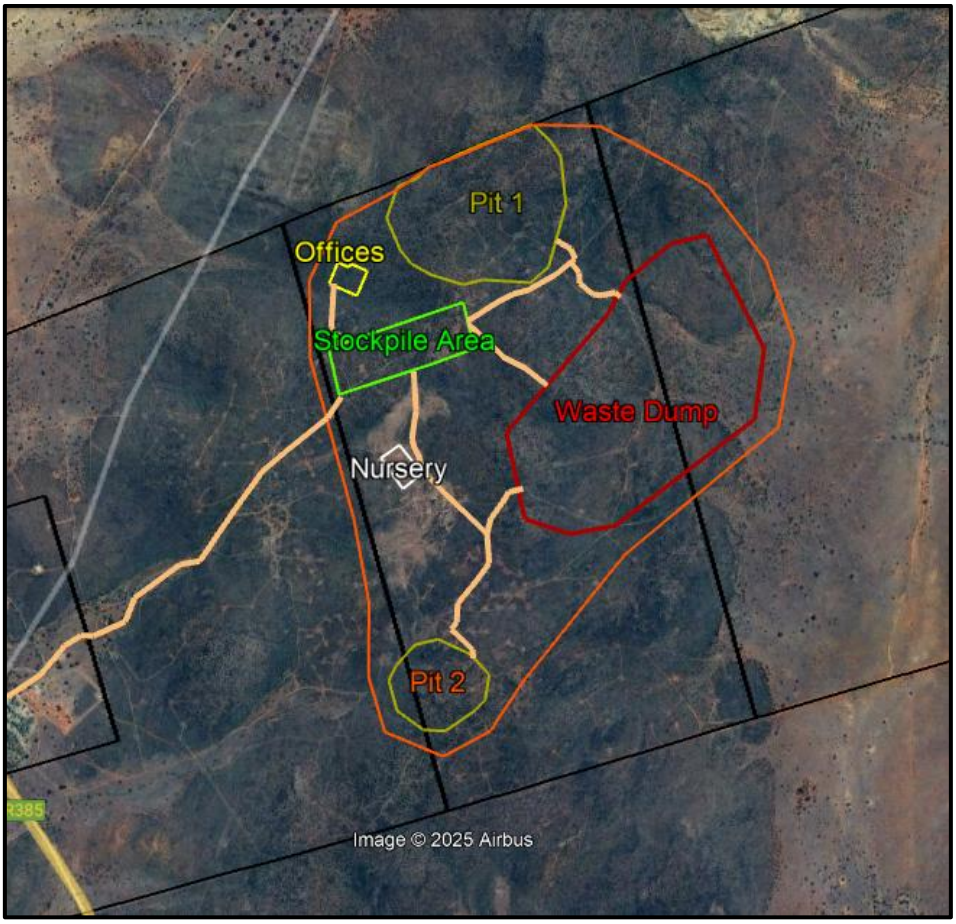


Figure 16: Satellite view showing the proposed rehabilitation area of ±264 ha (orange polygon) placed around the proposed mine layout. (Image obtained from Google Earth)

The preferred post-mining land use for the proposed MIOM has been informed by the findings of various specialist studies, which recommend that the closure vision should focus on establishing a wilderness ecosystem closely resembling the pre-mining condition. In light of the above, the following closure objectives are proposed:

- δ Minimise negative impacts within the demarcated mining footprint.
- δ Prevent negative impacts outside of the demarcated mining footprint.
- δ Remove all equipment, infrastructure and materials that were introduced during the mining operation.
- δ Reshape the mining footprint to a landform similar to the pre-mining condition, with stable gradients and topographical features that support a sustainable wilderness ecosystem (excluding Pits 1 and 2, that will not be fully backfilled, and the waste rock dump, which will form new permanent features).
- δ Shape and stabilise Pits 1 and 2 and the waste rock dump into safe, sustainable landforms with gradients that minimise erosion and maximise ecosystem development.
- δ Remove unsafe edges in Pit 1 and 2 and on the waste rock dump.

- δ Ensure adequate, non-toxic, non-polluted, and non-compacted topsoil and subsoil are available to support indigenous vegetation from the on-site nursery.
- δ Eliminate visible erosion within the mining footprint and downslope areas and mitigate any future erosion risks through an erosion risk assessment and management plan.
- δ Prevent water pollution and toxicity in Pits 1 and 2.
- δ Prevent water pollution and toxicity in monitoring boreholes within the mining right area and in boreholes on neighbouring farms.
- δ Eradicate all alien and invasive plants in the 264 ha rehabilitation area.

Final rehabilitation shall be completed within a period specified by the DMPR Regional Manager. Once the entire mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Minerals and Petroleum Resources in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

Also refer to Part B(1)(d)(i) *Determination of closure objectives* and Appendix H1 for the Rehabiltiation, Decommisiong and Closure Plan.

e) Policy and Legislative Context

Table 10: Policy and legislative context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). (CARA)	Part A(1)(g)(iv)(1)(b) Description of the current land uses. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 4. Site Specific Geology, Soils and Agricultural Sensitivity.	The Soil, Land Use and Land Capability Report considered the requirements of CARA, and the proposed mitigation measures for the site incorporate the relevant provisions of the Act.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	
Extension of Security of Tenure Act, 1997 (Act No 62 of 1997) (ESTA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The ESTA imposes specific obligations on the proposed MIOM project, emphasising the protection of non-landowning residents in the project area. Compliance with ESTA is not only a legal requirement but also a critical component of ethical business practices and community relations in rural South Africa. Ensuring adherence to the Act will be pivotal in mitigating socio-economic impacts and fostering a positive and cooperative relationship with the local community.
Hazardous Substances Act, 1973 (Act 15 of 1973) (HSA)	Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The development will comply with the requirements of the HSA by ensuring that all hazardous substances, including fuels, oils, lubricants, and cleaning agents, are stored, handled, and transported in a manner that prevents risk to human health and the environment. Storage areas will be clearly demarcated, appropriately bunded, and equipped with spill containment measures. Only trained personnel will handle hazardous substances, and Safety Data Sheets (SDS) will be available on site. All disposal of hazardous waste will be undertaken by licensed contractors in accordance with applicable legislation.
Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017).	Part A(1)(f) Need and desirability of the proposed activities.	The need and desirability of the project was assessed in accordance with these guidelines.
Labour Relations Act, 1995 (Act No 66 of 1995) read together with applicable	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site –	The development will comply with the Labour Relations Act (Act No. 66 of 1995) by promoting fair labour practices, protecting the rights of

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
amendments such as the Labour Relations Amendment Act, 2002 (Act No 12 of 2002)	11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	workers to freedom of association, and supporting collective bargaining where applicable. Employment practices on site will adhere to the principles of equity, non-discrimination, and procedural fairness. All contractors and subcontractors will be required to comply with the provisions of the Act, including grievance procedures, disciplinary processes, and the right of workers to union representation.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) (MHSA) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The development will comply with the MHSA by implementing measures to ensure a safe and healthy working environment for all employees. This includes conducting regular risk assessments, providing appropriate personal protective equipment (PPE), ensuring access to medical surveillance where applicable, and offering relevant health and safety training. A site-specific Health and Safety Plan will be developed and enforced, and all incidents or near-misses will be recorded and investigated in accordance with the Act. Compliance will be monitored through regular inspections and reporting, as required by the legislation.
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto.	Part A(1)(d) Description of the scope of the proposed overall activity.	Application for a mining right. Reference number: NC 30/5/1/2/2/10255 MR
Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover. Part A(1)(l) Proposed impact management objectives and	The Biodiversity Assessment considered the requirements of the Guidelines.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	the impact management outcomes for inclusion in the EMPR.	
National Development Plan, 2030 (NDA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The proposed development supports the objectives of the NDP, 2030 by contributing to inclusive economic growth, job creation, and sustainable use of natural resources. The project will create temporary and permanent employment opportunities, promote local procurement where possible, and support infrastructure development in the region. Furthermore, environmental management measures have been incorporated to ensure that the development proceeds in a sustainable manner, in line with the NDP's vision of balancing environmental protection with socio-economic advancement
National Environmental Management Act,1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended): δ EIA Regulations GNR 984 of 2014 (as amended) Activity 17	Part A1(d)(i) Listing and specified activities.	Application for Environmental Authorisation. Reference number: NC 30/5/1/2/2/10255 MR
National Environmental Management: Air Quality Control Act, 39 (Act No 39 of 2004) (NEM:AQA) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Air Quality and Noise Ambiance. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The Atmospheric Impact Assessment considered the requirements of the NEM:AQA, and the proposed mitigation measures for the site incorporate the relevant provisions of the Act.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial	The Biodiversity Assessment considered the NEM:BA and the mitigation measures proposed for the site includes specifications of this Act.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
NEM:BA: List of terrestrial species and freshwater species that are threatened or protected, restricted activities that are prohibited, and restricted activities that are exempted, 2023.	Biodiversity, Conservation Areas, and Groundcover. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 9. Site Specific Fauna. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) read together with applicable amendments and regulations thereto: δ Category A Activity 2; δ Category A Activity 14; δ Category B Activity 9; δ Category B Activity 10; δ Category B Activity 11; NEM:WA, 2008: National norms and standards for the storage of waste (GN 9260).	Part A(d)(i) Listed and specified activities. Part A(1)(d)(ii) Description of the activities to be undertaken - 2.2.1 Waste Management. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	An application for a waste licence accompanied the EA application submitted to the DMPR. Reference number: NC 30/5/1/2/2/10255 MR The Waste Classification Study considered the NEM:WA and the mitigation measures proposed for the site includes specifications of this Act.
National Forest Act, 1998 (Act No 84 of 1998) (NFA) read together with applicable amendments and regulations thereto.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The Biodiversity Assessment considered the NFA and the mitigation measures proposed for the site includes specifications of this Act.
National Heritage Resources Act No 25 of 1999. (NHRA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and	The Heritage Impact Assessment as well as the Palaeontological Impact Assessment considered the NHRA

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	infrastructure on the site – 11. Cultural, Heritage and Palaeontological Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	and the mitigation measures proposed for the site includes specifications of this Act.
National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 13.1 Road Network and Traffic Assessment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The Traffic Impact Assessment considered the NRTA and the mitigation measures proposed for the site includes specifications of this Act.
A wayleave application to the Northern Cape Department of Roads and Public Works will most likely be required if upgrades to the access road are undertaken. This will be a separate process from the mining right application and must be completed before any amendments or changes to the public road network can be made. For the operation of mining activities, several transport-related permits and approvals are typically required by local authorities to ensure safety, environmental protection, and minimal disruption to communities. These permits and approvals may include: δ **Road use permits:** Mining companies may need permits to use public roads for transporting materials, particularly if the roads are not designed for heavy vehicle traffic. These permits regulate the size, weight, and frequency of vehicles to prevent road damage and ensure public safety. δ **Oversized load permits:** If mining trucks or equipment exceed standard size and weight limits, oversized load permits are required. These permits often come with specific conditions, such as escort vehicles, route planning, and timing restrictions to minimize traffic disruption. δ **Traffic Management Plans (TMPs):** Local authorities may require mining companies to submit a detailed Traffic Management Plan outlining how mining traffic will be controlled, including proposed routes, speed limits, signage, detours, and any measures to mitigate impacts on local traffic and communities.		
National Water Act, 1998 (Act No. 36 of 1998) (NWA) read together with applicable amendments and regulations thereto.	Part A(1)(d)(ii) ii) Description of the activities to be undertaken – 2.2.1 Water Management.	The development will comply with the NWA, as amended. All relevant water uses associated with the proposed activities will be applied for in consultation with, and as confirmed

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
Department of Water Affairs and Forestry Best Practice Guideline Series (2007).	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 6. Site Specific Hydrology. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 7. Site Specific Freshwater Ecosystems. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 4. Site Specific Geohydrology. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR. Part B(1)(d)(vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation. Part B(1)(d)(viii) Has a water use licence been applied for?	by, the Department of Water and Sanitation (DWS) during the water use license application (WULA) process. This includes consideration of regulated areas as defined in GN 4167 (GG No. 49833 of 08 December 2023), as well as the requirements of GN R. 704 of 4 June 1999, which governs the protection of water resources in relation to mining activities. A client link for the WULA associated with the proposed project was created on 03 December 2024 on the e-WULAAS system of DWS. DWS assigned CT31224 as temporary reference number to the application. Refer to Appendix D2 for proof of correspondence with the DWS. The water related specialist studies all considered the NWA and the mitigation measures proposed for the site includes specifications of this Act.

Government Notice 4167, published in Government Gazette No. 49833 on 08 December 2023, relates to the National Water Act, 1998 (Act No. 36 of 1998), as amended. In accordance with GN 4167, a 'regulated area' of a watercourse—specifically in relation to water uses listed under Sections 21(c) and 21(i)—is defined as follows:

- δ the outer edge of the 1 in 100-year flood line or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake, or dam;
- δ in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m distance from the edge of a watercourse where the edge of the watercourse (excluding flood plains) is the first identifiable annual bank fill flood bench; or
- δ In respect of a wetland, a 500 m radius around the delineated boundary (extent) of any wetland, including pans.

Government Notice 704 as published in the Government Gazette 20119 of 1999 as it relates to the National Water Act, 1998 (Act No. 36 of 1998). These Regulations, forming part of the NWA, were put in place in order to prevent the pollution of water resources and protect water resources in areas where mining activity is taking place from impacts generally associated with mining. It is recommended that the MIOM complies with GN 704 of the NWA, which states that:

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
No person in control of a mine or activity may: (a) locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year floodline or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on waterlogged ground, or on ground likely to become waterlogged, undermined, unstable or cracked; (b) carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest; According to the above, the activity footprint must fall outside of 100m from the delineated edge of the wetlands. Authorisation for activities within the regulated zone must be obtained.		
National Web based Environmental Screening Tool Site Sensitivity Verification Requirements for Specialist Assessment, and all relevant Species Protocols. Appendix 6 of the EIA Regulations, 2014 (as amended)	Part A(1)(d)(ii) ii) Description of the current land uses. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site. Appendix E – S: Specialist Studies.	A site screening report was generated using the National Web-Based Environmental Screening Tool, and all relevant environmental theme sensitivities were identified and assessed. Where applicable, sensitivity verification was undertaken in accordance with the published protocols for the assessment and minimum report content requirements of environmental themes. Specialist studies were conducted where required and compiled in line with Appendix 6 of the EIA Regulations to ensure consistency, transparency, and scientific credibility.
Northern Cape Nature Conservation Act, 2009 (Act No 9 of 2009) (NCNCA) read together with applicable amendments and regulations thereto.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 9. Site Specific Fauna. Part A(1)(l) Proposed impact management objectives and	The Biodiversity Assessment considered the NCNCA and the mitigation measures proposed for the site includes specifications of this Act.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	the impact management outcomes for inclusion in the EMPR.	
Northern Cape Provincial Strategic Plan (2019 – 2024)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	This project aligns with the Northern Cape Strategic Plan (2020–2025), which emphasises inclusive growth, economic transformation, and improved human welfare. It supports the province's focus on mining and infrastructure development as key economic drivers, while addressing the strategic priorities of job creation, poverty reduction, and basic service delivery. By contributing to the province's Provincial Growth and Development Plan goals, particularly under Driver 1: Economic Transformation and Driver 2: Social Transformation, the project advances the broader vision of a "Modern, Growing and Successful Province.
Northern Cape Spatial Development Framework (2003) (NCPSDF)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The proposed MIOM project aligns with the principles of the NCPSDF by promoting mineral-based rural development, local employment, and land use optimisation. The project's commitment to responsible land use, job creation, and phased rehabilitation ensures alignment with provincial spatial planning priorities and long-term sustainability objectives.
Public Participation Guideline in terms of the NEMA EIA Regulations.	Part A(1)(g)(ii) Details of the Public Participation Process Followed	Public participation was conducted in accordance with the public participation guidelines.
Restitution of Land Rights Act, 1994 (Act No 22 of 1994) (RLRA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management	The RLRA directly impacts the proposed MIOM project by necessitating a thorough review and resolution of any land claims associated with the project site.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	outcomes for inclusion in the EMPR.	
Road Traffic Management Corporation (RTMC) Regulations	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 13.1 Road Network and Traffic Assessment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The RTMC is responsible for overseeing road traffic management in South Africa, including ensuring that heavy vehicles, such as those used in mining, comply with the road traffic regulations.
Species Environmental Assessment Guidelines (SANBI, 2020)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 9. Site Specific Fauna. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The Biodiversity Assessment considered the Guidelines as part of the study.
The Development of Facilitation Act, 1995 (Act No 67 of 1995) (DFA)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	The DFA provides a comprehensive framework that the proposed MIOM project must adhere to, ensuring that the project not only supports local and regional development goals but also adheres to principles of sustainability and equitable land use. By aligning with the DFA, the proposed project can enhance its legitimacy, ensure greater community buy-in, and contribute positively to the socio-economic fabric of the Tsantsabane Local Municipality.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
The Constitution of the Republic of South Africa, 1996 (The Constitution)	Implied throughout the document.	The development is aligned with The Constitution, particularly Section 24 of the Bill of Rights, which guarantees everyone the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations. This right is supported through legislative measures such as the National Environmental Management Act (NEMA), and the project has been designed and assessed in a manner that promotes sustainable development, prevents environmental degradation, and ensures responsible environmental stewardship.
Tsantsabane Local Municipality Integrated Development Plan 2022/2027	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	Refer to below discussion.

The proposed MIOM project in the Tsantsabane Local Municipality aligns with several objectives outlined in the IDP for 2022/27. The IDP emphasises economic growth and job creation, which the mining project can directly support by providing employment opportunities in both construction and operational phases. This initiative aligns with the IDP's goals to stimulate local economic development and reduce unemployment in the area.

Environmental sustainability is another core component of the IDP, and the MIOM project addresses this through its commitment to minimal environmental impact. The project plans to use mobile and temporary infrastructure to reduce its environmental footprint and has incorporated plans for site rehabilitation post-mining, adhering to local environmental regulations and the need for environmental and water use licenses.

The project also proposes the development of temporary roads and other infrastructure enhancements, which, while primarily serving the mining operations, align with the IDP’s infrastructure improvement objectives.

Overall, the Makganyane Mining Right project has the potential to contribute to the socio-economic development goals outlined in the IDP of the Tsantsabane Local Municipality. However, its success will depend heavily on effective implementation, adherence to environmental and social governance standards, and robust community engagement. These efforts are essential to ensure the project delivers substantial benefits while minimizing any adverse impacts.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
ZF Mgcawu District Municipality Integrated Development Plan 2022 – 2027 (IDP)	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 11. Site Specific Socio-Economic Environment. Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	Refer to below discussion.
The proposed MIOM located within the Tsantsabane Local Municipality, supports the ZF Mgcawu District Municipality's vision of service delivery excellence by contributing to key performance areas such as financial viability, institutional development, and local economic growth. The project will attract private investment and stimulate economic activity through job creation, local procurement, and the development of supporting infrastructure. It further enhances institutional capacity through compliance with environmental legislation and coordination with regulatory authorities. By providing infrastructure such as haul roads, crushing plants, and water storage dams, the project indirectly strengthens service delivery in the region. In addition, its commitment to progressive rehabilitation and inclusive public participation promotes good governance and accountability. Overall, the Makganyane Mine contributes to the district's strategic goals by advancing financial sustainability, infrastructure development, economic upliftment, and transparent, participatory governance.		

f) Need and desirability of the proposed activities.

(Information obtained from the Mining Work Programme, 2024 as well as the Socio-Economic Impact Assessment attached as Appendix M)

This section has been prepared in accordance with the DEA Guideline on Need and Desirability (2017), which supplements the Environmental Impact Assessment Regulations under the National Environmental Management Act (NEMA, 1998).

1. NEED (SOCIETAL AND RESOURCE-BASED CONSIDERATIONS)

The Tsantsabane Local Municipality faces high unemployment, poverty, and limited economic diversification, making the socio-economic benefits of the mine particularly significant. The project will generate direct and indirect employment opportunities, prioritising recruitment from nearby communities and fostering skills development, training, and youth employment. This is particularly important in a rural municipality where mining is a primary economic driver. Indirectly, the mine will stimulate local small businesses, enhance procurement opportunities, and contribute to broader infrastructure and service delivery improvements. These benefits align with urgent developmental priorities at municipal and provincial levels, providing a much-needed stimulus to the local economy.

Iron ore is a strategic mineral for South Africa, forming the backbone of the domestic steel industry and contributing significantly to export earnings. South Africa remains one of the world's largest producers of high-grade iron ore, supplying both local beneficiation plants and global markets. The Northern Cape hosts some of South Africa's most significant iron ore resources. The Makganyane Mine will extract hematite (iron) ore for processing at Assmang's Beeshoek Mine, thereby strengthening the domestic supply chain and supporting South Africa's role in the global iron ore market. This contributes to the sustainability of the iron and steel industry, which underpins industrialisation and export earnings.

The mine's proximity to existing operations and infrastructure, including the Beeshoek Mine and established transport routes, enhances its economic viability and ensures efficient integration into existing value chains.

2. DESIRABILITY (POLICY, SPATIAL AND DEVELOPMENTAL FIT)

From a policy and developmental perspective, the proposed MIOM demonstrates clear alignment with national, provincial, and local frameworks. At the national level, the project supports the objectives of the National Development Plan (NDP) and the 2018 Mining Charter, both of which promote inclusive economic growth, beneficiation, and the empowerment of Historically Disadvantaged South Africans.

Provincially, the development advances the priorities of the Northern Cape Provincial Spatial Development Framework (2023) and the Provincial Strategic Plan (2019–2024), which identify mining as a cornerstone of rural economic growth, service delivery, and transformation.

At a district and local scale, the mine contributes to the ZF Mgcawu District Municipality Integrated Development Plan (2022–2027) and the Tsantsabane Local Municipality Integrated Development Plan (2022–2027) by creating employment opportunities, stimulating local procurement, and supporting infrastructure-led development.

Spatially, the site is located within an established mining district, adjacent to other operations such as the Kumba Heuningkranz, Japies Rust, and Metseatsididi mines, and is accessible via the R385 provincial road. This favourable spatial fit reduces the need for additional large-scale infrastructure, ensures efficient integration with the Beeshoek Mine processing facilities, and consolidates the existing mining value chain in the Northern Cape. Furthermore, the project has committed to strict compliance with environmental authorisation requirements under NEMA, NEM:WA and the MPRDA (2002), including rehabilitation of disturbed areas. In doing so, it balances ecological sustainability with socio-economic development, ensuring that the exploitation of mineral resources proceeds in a responsible and sustainable manner.

3. RESOURCE EFFICIENCY AND COMPARATIVE ADVANTAGE

South Africa's comparative advantage in high-grade iron ore production is leveraged through this project. The ore will be mined at MIOM and transported to Beeshoek Mine, optimising existing infrastructure and minimising environmental duplication. This ensures resource efficiency while maximising contribution to domestic beneficiation and export markets.

4. SOCIO-ECONOMIC BENEFITS AND TRADE-OFFS

While nuisance impacts such as noise, dust, and increased traffic are anticipated, these can be mitigated through the Environmental Management Programme (EMPR). The socio-economic benefits outweigh these trade-offs and include:

- δ Direct and indirect employment for local residents.
- δ Skills development and training, particularly for historically disadvantaged groups.
- δ Contribution to community development initiatives via the mine's SLP.
- δ Multiplier effects for local businesses in Postmasburg and surrounding settlements

5. CONSEQUENCES OF THE NO-GO ALTERNATIVE

The "no-go" alternative would preserve agricultural use of the land and avoid nuisance impacts. However, it would also result in a loss of opportunity to exploit a proven and valuable iron ore resource, with implications not only for local development but also for South Africa's ability to meet mineral demand.

Failing to develop the Makganyane Mine would therefore mean foregoing:

- δ Contribution to the national mineral economy, including iron ore exports and local beneficiation.
- δ Revenue and tax contributions to local and national government.
- δ Critical employment and training opportunities for local communities.

In the context of South Africa's strategic reliance on mining as an economic driver, this option is deemed undesirable.

6. CONCLUSION

The proposed MIOM is both needed and desirable. It responds to urgent socio-economic challenges at the local level while contributing strategically to South Africa's iron ore supply and global competitiveness. The project aligns with national, provincial, and local development policies, fits spatially within an established mining district, and commits to sustainability through environmental compliance and rehabilitation.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

During the EIA phase the following alternatives were considered and assessed upon receipt of the site-specific information, comments received from the public, and the results of the specialist studies.

Also refer to *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity* where the various alternative options were assessed.

(a) THE PROPERTY ON WHICH, OR LOCATION WHERE, IT IS PROPOSED TO UNDERTAKE THE ACTIVITY.

The project proposal entails a mining right application over ±1 550 ha of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667, within the boundaries of the GPS coordinates listed in Table 4 and depicted in Figure 3.

Mining rights may only be applied for in areas where such rights are not already held by other companies or individuals. In addition, mining activities can only take place where the targeted minerals are present, which is determined by the underlying geological formations. In this case, the MWP outlines that the proposed open-pit mining at MIOM will focus on extracting the primary ore required for the operation, with a strong emphasis on sustainable practices that aim to maximise resource efficiency. Accordingly, the proposed footprint for the mining right application corresponds with that of the prospecting right (NC 2292 PR), as informed by the outcomes of the prospecting activities and available geological data.

The Scoping Report of this study indicated that the only viable Locality/Site Alternative for this application could be the possible exclusion of certain portions of the Makganyene farm. Based on the pit design and supporting infrastructure layout, the far southwestern portion (±292 ha) of the Remainder of Makganyene No. 667 is the only area not designated for development.

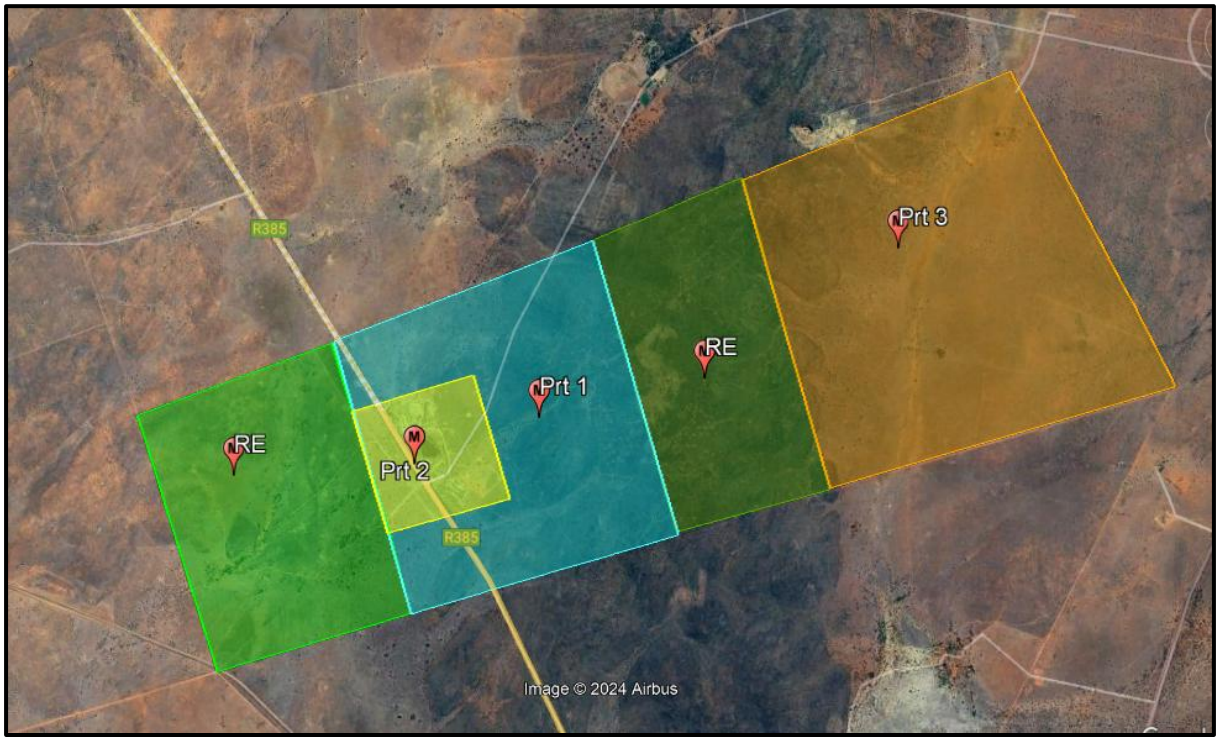


Figure 17: Satellite view of the south-western portion (light green polygon) of the Remainder of Makganyene No 667 presently not earmarked for development.

The possibility of omitting this portion of the farm from the application footprint was considered during the EIA process. The Visual Impact Assessment (VIA) noted that, from a visual perspective, the exclusion of the southwestern area could marginally reduce the spatial extent of visual exposure for receptors located to the west and south-west of the proposed mining right boundary. As no development is currently planned within this portion of the farm, the remaining specialist studies did not identify any significant environmental impacts requiring consideration in this area.

Although this portion (±292 ha) of the Remainder of Makganyene No. 667 is not currently earmarked for immediate development based on the current pit and infrastructure design, the Applicant has elected to retain this area within the mining right application footprint for the following reasons:

- **Long-Term Resource Planning**

  Future geological investigations may reveal additional economically viable mineral resources in this portion of the farm. Including the area in the mining right now will allow for flexibility to expand operations if justified, without requiring a new mining right application.

- **Operational Flexibility**

  Mining operations often evolve over time due to changes in market demand, operational efficiency, and geological factors. Retaining the full area within the mining right provides the Applicant with strategic flexibility to adjust the pit design, relocate infrastructure, or optimise haulage routes as needed.

- **Integrated Environmental Management**

  Including the entire Remainder portion in the application ensures that any future activities in this area will be subject to the same environmental conditions, management commitments, and rehabilitation obligations as the rest of the site. This allows for a more integrated and consistent approach to environmental monitoring and mitigation.

- **Land Access and Control**

  Including the area in the mining right enables the Applicant to maintain control over the entire farm portion, which may be important for managing access, preventing unauthorised activities, and maintaining safety in and around the mining operation.

- **No Anticipated Impact in the Foreseeable Future**

  The southwestern portion of the farm is not planned for any mining or infrastructure development in the foreseeable future. As such, no physical disturbance or environmental impact is expected to occur in this area during the initial phases of the mining operation. Its inclusion in the mining right is therefore a precautionary measure for long-term planning and does not imply any immediate or medium-term land use change.

CONCLUSION

In light of the above considerations, including the need for long-term resource planning, operational flexibility, integrated environmental management, and the absence of any anticipated development or impact in the foreseeable future, it was decided not to exclude the far southwestern portion (±292 ha) of the Remainder of Makganyene No. 667 from the mining right application footprint. The area will therefore remain part of the proposed mining right area, albeit with no planned activities during the initial phases of the mining operation. Accordingly, no viable property or locality alternatives were identified for this application.

(b) TYPE OF ACTIVITY TO BE UNDERTAKEN

(b)1 PREFERRED LAND USE – MINING

The Applicant proposes to mine the iron ore of the mining footprint using opencast methods as discussed in *Part A(1)(d)(ii) Description of the activities to be undertaken*.

(b)2 LAND USE ALTERNATIVE – AGRICULTURE

The only realistic land use alternative considered is the continuation of agricultural activities, including livestock grazing and game farming, which currently dominate land use across the farm. This option would preserve the rural character of the area and avoid any visual transformation of the landscape.

MOTIVATION FOR MINING AS PREFERRED LAND USE ALTERNATIVE

Although the continuation of agricultural activities, such as livestock grazing and game farming, was identified as the only realistic land use alternative, the site-specific conditions and specialist findings indicate that mining represents a more viable, sustainable, and beneficial use of the land in this instance.

The Soil, Land Use and Land Capability Assessment (Appendix Q) confirmed that the site is currently used for extensive livestock grazing, with no evidence of small-scale or commercial cultivation in the surrounding area. The dominant soil forms (Mispah/Glenrosa) are shallow, with limited rooting depth, and are typically unsuitable for intensive agriculture. Furthermore, the

grazing potential of ±14 ha/LSU is considered insufficient to support small-scale or commercial livestock operations, particularly in the arid regional climate. The land was also found to have low agricultural sensitivity, and it does not fall within protected agricultural zones, meaning the loss of agricultural potential is minimal and not of concern for food security.

From a visual perspective, the VIA noted that continued agricultural use would maintain the current landscape character. However, it also acknowledged that the inclusion of the southwestern portion of the farm within the mining right would only marginally increase the visual exposure, and no significant impacts were identified in the remaining specialist assessments due to the absence of development in that area.

Importantly, while the mining right application covers the full extent of the earmarked farms (±1 549 ha), the proposed mining activity will only physically transform approximately 113 ha during the life of the mine. This represents less than 10% of the total footprint, with the remainder of the land remaining undisturbed or available for compatible land uses.

In contrast to the limited economic output and viability of agriculture in the area, the proposed mining operation offers clear and tangible socio-economic benefits. The Socio-Economic Impact Assessment concluded that the project would contribute meaningfully to local development through:

- Job creation, particularly for communities within the Tsantsabane Local Municipality;
- Stimulation of the local economy via direct and indirect employment and procurement opportunities;
- Alignment with national strategies for sustainable mining and economic empowerment;
- Support for infrastructure development and improved service delivery in a region characterised by high unemployment and poverty.

In addition, the mine has been designed and assessed in line with rigorous environmental management standards and will be subject to ongoing monitoring, impact mitigation, and progressive rehabilitation, ensuring that the transformation of land is managed responsibly.

LOSS OF GRAZING LAND AND LANDOWNER CONSIDERATIONS

It is acknowledged that the establishment of the proposed mine will result in the loss of access to grazing land for the affected landowners over the disturbed footprint of:

- ±24 ha on Portion 3 of Makganyene No 667; and
- ±89 ha on Portion 1 and the Remaining Extent of Makganyene No 667.

However, these portions represent a small fraction of the total farm area:

- 560.59 ha of Portion 3 of Makganyene No 667 (±4.3%), and
- 989.02 ha of Portion 1, 2, and the Remaining Extent of Makganyene No 667 (±9.0%)

, and the land currently supports low-density livestock grazing due to the limited carrying capacity of ±14 ha/LSU. As such, the agricultural productivity of the affected area is low, and its removal is not anticipated to significantly impact the economic viability of the remaining farming activities.

Furthermore, the proposed mining operation presents a potential alternative or supplementary livelihood opportunity for the landowners and surrounding community members through:

- Direct and indirect employment opportunities;
- Payment of surface lease fees to landowners;
- Possible post-mining land uses, including restored grazing areas, or game farming opportunities.

The Applicant resolved that the landowners would retain access to undisturbed portions of the farms, outside the mining area and 500 m blasting radius, for continued agricultural use where safe and appropriate. Opportunities for progressive rehabilitation could enable the reintroduction of grazing on rehabilitated areas during the later stages of the mining lifecycle, subject to environmental and safety constraints.

An additional long-term benefit for the landowner of the Remaining Extent of Makganyene No 667 is that, following the closure of the mine, the rehabilitated pits are expected to gradually fill with water through natural groundwater rebound and surface inflows. These water bodies have the potential to become a valuable future water resource for the landowner, particularly in this semi-arid region where water availability is limited.

Depending on the final water quality and post-mining land use objectives, the pits could support livestock watering or serve as supplementary water storage for agricultural and domestic use. This future resource could offer lasting value beyond the operational life of the mine, enhancing the long-term sustainability and utility of the land.

CONCLUSION

Given the low agricultural potential, the limited transformation footprint, and the substantial socio-economic benefits associated with the proposed mining operation, mining is considered a preferable and more sustainable land use for this site when compared to continued extensive agricultural use. The project offers a strategic opportunity to unlock economic value from otherwise marginal agricultural land while implementing a responsible and well-regulated approach to environmental management.

(c) DESIGN AND LAYOUT OF THE ACTIVITY

(c)1 MINING SCENARIO

During the planning phase, the proposed MIOM operations were evaluated with a focus on extracting primary ore, aiming to support a sustainable mining approach that optimizes resource extraction. The project team considered two design/layout options refer to as:

- Option 1: Phase 1 & 2 Scenario, or
- Option 2: Phase 1 – 4 Scenario.

OPTION 1: PHASE 1 & 2 SCENARIO

The Phase 1 & 2 design scenario includes the open cast mining of only two pits referred to as Pit 1 and Pit 2. The LoM schedule for this scenario is over 38 months.

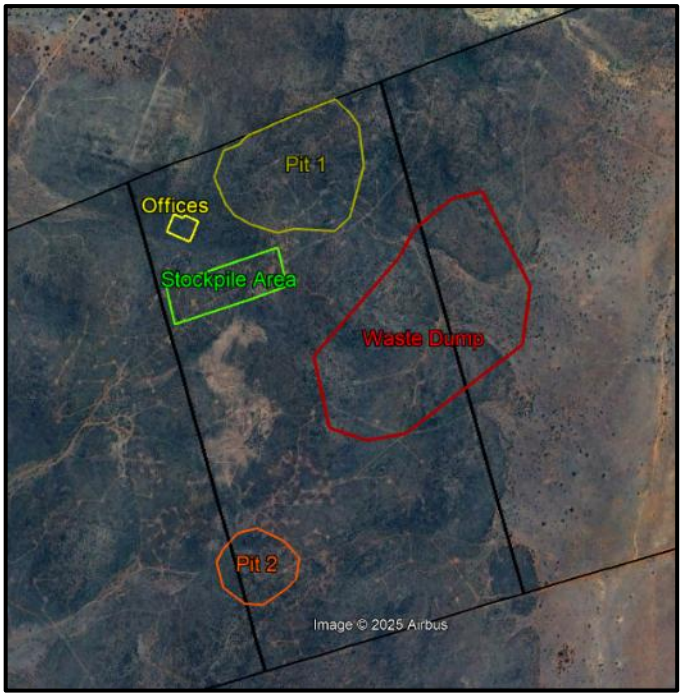


Figure 18: Phase 1 & 2 Scenario

The MWP notes that the geological setting of the ore bodies does not allow for a faster ramp up period as the ore bodies that were identified do not sub-outcrop on the surface. Hence a fair amount of overburden and topsoil needs to be removed before the ore can be accessed. Free digging is limited but can be done up to ±5 m in vertical depth whereafter blasting will be required. For Phase 1 & 2 the selected go forward case is shown in the following figure, waste production will build up to 1.9 million tonnes per month in month 4. Continue at this rate for another 6 months when first ore will be reached, with an average of 250 000 tonnes per month. The open pits will have an initial aggressive waste stripping requirement to open the ore horizon. Waste stripping will continue for the full period of the project up to month 28 from where it will drop to month 38 when life of mine is complete. Refer to Figure 10 – 14.

OPTION 2: PHASE 1 – 4 SCENARIO

The Phase 1 – 4 scenario entails the mining of Pit 1 and Pit 2 with an eventual Phase 3 and 4 extension of the two pits (respectively) as presented in the following figure. Initially this scenario indicated some sound approaches by targeting pushback areas (Phase 3 and 4) on Pits 1 and 2 but was not economical viable due to increase waste mining

that would be required. Therefore this scenario was not pursued further.

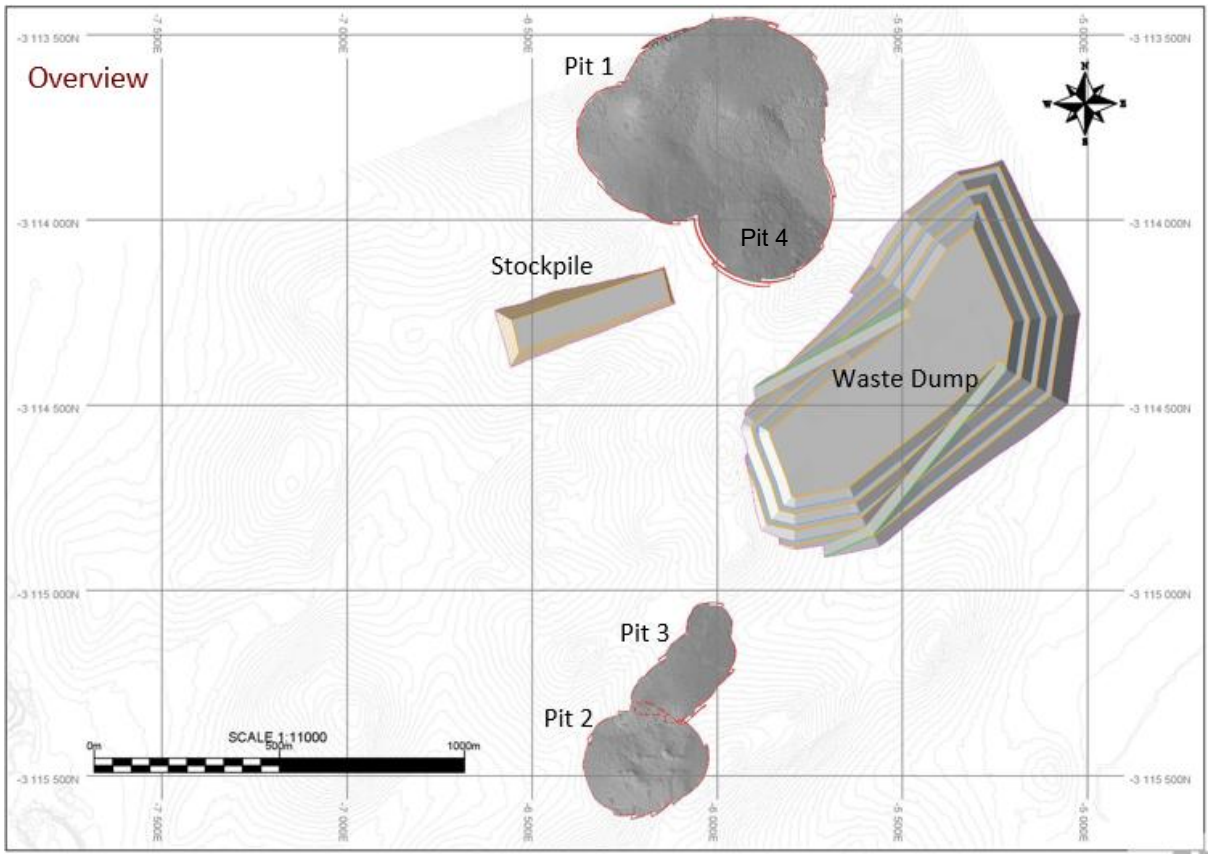


Figure 19: Phase 1 to 4 Scenario (ABG).

CONCLUSION: PREFERRED MINING SCENARIO

Based on the geological, technical, and economic assessments undertaken, the Phase 1 & 2 design scenario has been identified as the preferred and most feasible option for implementation. This scenario allows for a targeted and phased approach to access the ore bodies, which are located below surface and require significant overburden and topsoil stripping before mining can commence. Although initial waste stripping requirements are substantial, the schedule and production profile are considered operationally achievable and economically justifiable, with ore access projected from month 10 and an average production rate of 250,000 tonnes per month thereafter.

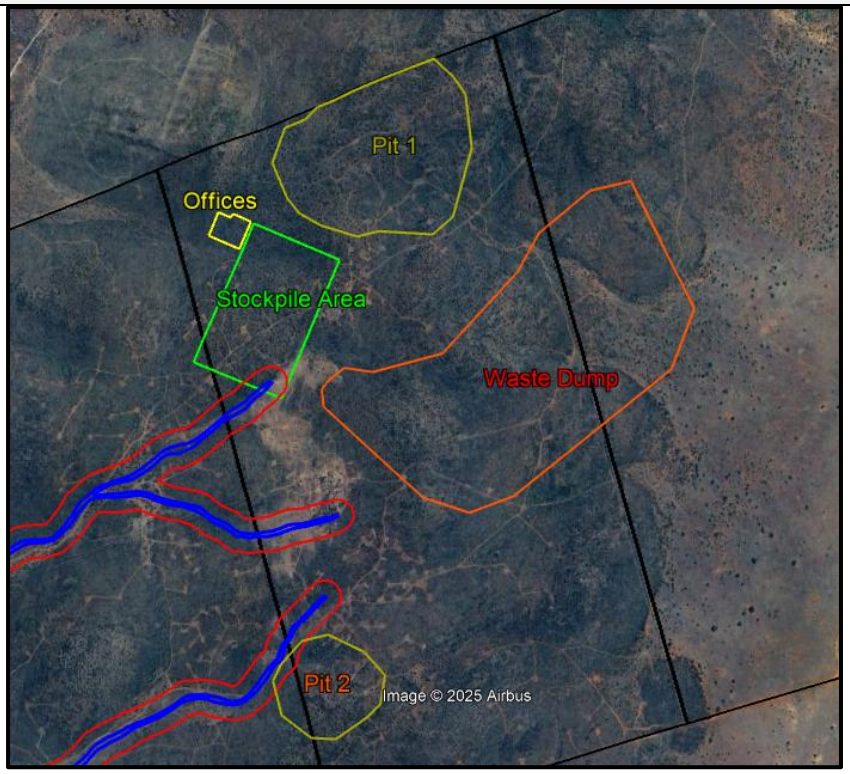
In contrast, the Phase 1 – 4 scenario was determined to be economically unviable due to the excessive increase in waste volumes required to access deeper ore zones. As such, this extended scenario has not been pursued further.

Accordingly, the Phase 1 & 2 scenario is the selected go-forward case, offering a practical balance between resource access, waste management, and financial viability, while minimising unnecessary land disturbance beyond the initial pit designs.

(c)2 DEVELOPMENT LAYOUT

LAYOUT OPTION 1

Table 11: Layout option 1.

LAYOUT OPTION 1


PURPOSE	AREA (HA)
Pit 1	±26.7 ha
Pit 2	±8.6 ha
Office Complex	±1 ha
Stockpile Area	±15 ha
Waste Rock Dump	±64 ha

Layout Option 1 was the initial proposal for the MIOM activity. However, during the Freshwater Ecosystem Assessment (conducted by SAS) the presence of two Episodic Drainage Lines (EDLs) were identified in the

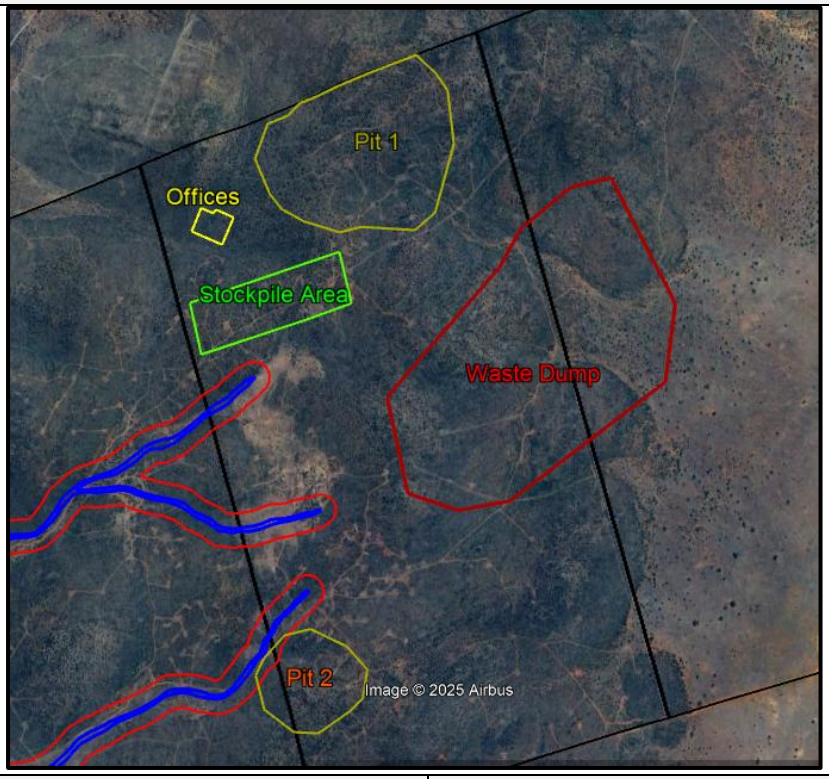
western portions of the focus and investigation areas. The DWS Risk Assessment Matrix (2023) was used to determine the significance of impacts of the proposed mining and associated activities on the receiving freshwater environment. The construction and operation of the proposed stockpile area and Pit 2 (Layout Option 1) were assessed to have a moderate risk significance on the EDLs. The moderate risk was ascribed to the fact that the proposed stockpile area is located in the upper reach of the northern EDL and would results in the loss of 0.1 ha of freshwater habitat unless the position of the stockpile is changed to avoid encroachment on the system. The loss in freshwater habitat was not seen as a fatal flaw, however in line with the mitigation hierarchy and best practice principles, the specialist proposed that the stockpile area be moved and re-shaped to avoid the freshwater ecosystem and the associated 48 m. SAS further noted that the Pit 2 area is located adjacent to and within in the 48 m ecological buffer of the western EDL and would result in numerous indirect impacts which will need to be appropriately managed as per their recommendations.

Furthermore, the initial Stormwater Management Plan (SWMP) recommended that the layout of the stockpile area be reconsidered, as it crossed over a ridge ±7 m high, with the southern portion draining towards the nearby EDL. The SWMP also noted that the layout of the eastern portion of the waste rock dump (WRD) area should be reassessed, as it similarly extends across a ridge and drains towards the existing EDL.

The specialist recommendations were taken into consideration, and the layout of both the stockpile area and the WRD were subsequently revised, resulting in Layout Option 2.

LAYOUT OPTION 2

Table 12: Layout option 2.

LAYOUT OPTION 2	
	
PURPOSE	**AREA (HA)**
Pit 1	±26.7 ha
Pit 2	±8.6 ha
Office Complex	±1 ha
Stockpile Area	±9 ha
Waste Rock Dump	±61 ha

Layout Option 2 entailed the repositioning of the stockpile area and WRD in consultation with the relevant specialists. This resulted in the reduction of the stockpile area footprint from ±15 ha to ±9 ha, and a change in the geometry of the WRD footprint, which was reduced by ±3 ha.

Following the layout revision, SAS reassessed the impact significance on the receiving freshwater environment using the DWS Risk Assessment Matrix (2023). The specialist concluded that most of the

activities associated with the development would pose a low degree of risk to the freshwater environment. This is attributed to the appropriate siting of infrastructure and the reshaping and redesign of disturbance areas, carried out in consultation with the specialists and in line with the mitigation hierarchy.

However, the development of Pit 2 was assessed to have a moderate risk significance on the southern EDL. This was due to Pit 2 remaining within the 48 m ecological buffer of the EDL, which may result in various indirect impacts that must be effectively managed in accordance with the recommendations provided by SAS.

The specialists further concluded that, if the mitigation measures outlined in the Freshwater Ecosystem Assessment and the SWMP are strictly implemented, the proposed MIOM can be considered acceptable for authorisation from a water resource management perspective, in terms of the Environmental Authorisation (EA) and Water Use Authorisation (WUA) processes.

CONCLUSION: PREFERRED LAYOUT OPTION

In summary, Layout Option 2 is considered the preferred option as it reflects a more environmentally responsible and technically informed design. Through consultation with specialists, the layout was revised to avoid unnecessary encroachment into sensitive areas, reduce overall disturbance footprints, and minimise potential impacts on the receiving freshwater environment. The repositioning and resizing of both the stockpile area and WRD have significantly lowered the risk ratings associated with the development, as confirmed by the updated Freshwater Ecosystem Assessment and the SWMP. By aligning infrastructure placement with the mitigation hierarchy and specialist recommendations, Layout Option 2 supports a more sustainable implementation of the project and is therefore deemed the most suitable layout for authorisation in terms of both the Environmental Authorisation (EA) and Water Use Authorisation (WUA) processes.

(d) TECHNOLOGY TO BE USED IN THE ACTIVITY

The mining process will be as described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operational Phase*. This project does not require complex technology to allow the winning of the intended mineral/s, nor will processing take place on site and therefore no mining related technology alternatives were deemed applicable.

Groundwater Complete however discussed the following dewatering techniques in the Geohydrological Investigation.

(d)1 DEWATERING TECHNIQUE 1

The most commonly employed dewatering technique involves blasting a sump in the deepest part of the pit to collect and remove groundwater. This method is effective, as it allows large pumps to access and remove water efficiently. One disadvantage, however, is that groundwater seepage through the pit walls can result in localised wetting of the pit faces. From a geotechnical and rock engineering perspective, saturated pit walls exhibit reduced shear strength, which necessitates flatter slope angles to maintain safe and stable working conditions. Even a small reduction in slope angle can significantly affect the economic viability of the mining project due to increased stripping ratios.

(d)2 DEWATERING TECHNIQUE 2

An alternative or complementary solution to sump dewatering is the use of strategically placed dewatering boreholes. These boreholes are pumped at controlled rates to lower groundwater levels in advance of mining. For such a system to be viable, a well-distributed network of high yielding boreholes must be developed within transmissive fracture zones. The findings of the geohydrological investigation report and the pump test program however indicate that the majority of boreholes already drilled within the MIOM area are effectively ‘dry’, having failed to intersect transmissive fractures below the water table.

CONCLUSION: PREFERRED DEWATERING TECHNIQUE

The specialist concluded that in an earlier study (conducted in 2023), when the conceptual designs for the opencast pits were considerably larger

(Phase 1 – 4), a dual dewatering strategy was proposed. This included both sump pumping and the installation of scavenger boreholes to intercept groundwater before it could seep into the pit. At the time, this approach was justified by the anticipated high volumes of groundwater inflow.

However, following the refinement and downsizing of the pit geometry (Layout Option 2), the predicted inflows have been significantly reduced. As a result, the practicality and cost-effectiveness of deploying multiple boreholes were reconsidered. Current model results indicate that the expected groundwater inflow volumes per quarter (refer to Table 51) are sufficiently low to be managed entirely by strategically placed sump pumps within the pits. As a result, the exclusive use of sump pumping (Dewatering Technique 1) has emerged as a more viable and cost-effective solution. Not only does this approach eliminate the need for costly borehole infrastructure and maintenance, but it also enables more focused water control in areas prone to saturation, thereby contributing to improved slope stability and overall geotechnical performance.

As mentioned earlier, the handling of water abstracted from the pits will be finalised through the WULA process, and subject to approval by the DWS. One potential management option under consideration involves pumping the abstracted water into nearby boreholes situated outside the relevant aquifer. In addition, the northern neighbouring farmers whose boreholes may be influenced by the groundwater depression cone may be supplied with water from the pits as a mitigation measure.

(e) OPERATIONAL ASPECTS OF THE ACTIVITY

The operational phase of the proposed MIOM involves a range of activities necessary to extract, handle, and manage ore and associated materials in a manner that ensures both efficiency and environmental compliance. This section focuses on key operational aspects that may influence the environmental performance of the project. While detailed alternatives for dust suppression are presented and assessed below, other operational considerations — such as visual management, management of soil regimes, stormwater handling, road maintenance, fauna and flora protection etc. — have been addressed through specialist input. The mitigation measures proposed by the various specialists have been incorporated into the EMPR

and, if effectively implemented, collectively represent the best-case operational scenario for minimising environmental impact.

DUST SUPPRESSION SCENARIO 1

The Atmospheric Impact Report (AIR) developed two dispersion modelling scenarios to assess the potential impact of particulate matter (PM_{10} and $PM_{2.5}$) emissions on ambient air quality.

Scenario 1 represented a conservative baseline case in which only the following dust control measures were considered:

- Spraying water on all haul roads twice per day, and
- Application of a chemical dust suppressant on the haul road to the main gate.

This scenario provided a worst-case estimate of potential air quality impacts based on the dust mitigation measures to be used on site.

DUST SUPPRESSION SCENARIO 2

Scenario 2 evaluated the potential reduction in emissions that could be achieved through the implementation of additional dust control measures beyond those included in Scenario 1. These enhancements include:

- Installation of windbreaks or three-sided enclosures around the ore stockpile, waste rock dump and open pits to reduce wind-blown dust, with associated control efficiencies sourced from the WRAP Fugitive Dust Handbook.
- Application of a chemical dust suppressant in addition to water spraying on the road between the Pit 1 and the WRD, in response to the high PM emissions predicted in Scenario 1 for this route.

CONCLUSION: PREFERRED DUST SUPPRESSION SCENARIO 2

The AIR concluded that the modelling results from Scenario 1 indicate that both the daily and annual NAAQS for PM_{10} and $PM_{2.5}$ would be exceeded at locations along the northern fence line of the site, particularly in the vicinity of the waste stockpile and ore stockpile. These exceedances highlight the need for additional dust control measures to ensure compliance during the operational phase of the mine.

In Scenario 2, the implementation of additional dust mitigation measures results in notable improvement in predicted ambient PM concentrations. All $PM_{2.5}$ concentrations remain below both the daily and annual NAAQS, and the predicted annual PM_{10} concentrations also comply with the applicable standard. While the daily PM_{10} NAAQS is still exceeded, the extent and magnitude of the daily exceedance is significantly reduced compared to Scenario 1.

The specialist noted that based on the results of the dispersion modelling, the implementation of additional dust control measures, such as windbreaks and chemical suppressants, would significantly reduce the predicted ambient concentration of PM at the proposed site. Scenario 2 was therefore adapted as the preferred operational aspect for the proposed MIOM, and the recommendations of the specialist were added to this report and the EMPR.

(f) OPTION OF NOT IMPLEMENTING THE ACTIVITY (NO-GO ALTERNATIVE)

The no-go alternative represents a continuation of the *status quo* and, therefore, must be considered as a legitimate option. If implemented, the land use within the proposed footprint will remain agricultural, with livestock farming, while the manganese, iron, and diamond resources will remain unmined. The no-go alternative would also result in the loss of employment opportunities, as well as the socio-economic benefits and growth opportunities that the project could provide. Given the high levels of unemployment and poverty in the Tsantsabane district, the loss of these opportunities is considered to be significant.

The positive implications of the no-go alternative are that there will be no impact on the biophysical environment of the earmarked area, nor a change to the current land use.

The negative impact of the no-go alternative will entail:

- δ Loss of employment opportunities, both direct (within the mining operation) and indirect (through supporting services and industries).
- δ Missed opportunities for local skills development and knowledge transfer, which could enhance long-term employability in the region.

- δ Reduced economic stimulus at both local and regional levels, including the loss of potential multiplier effects from increased activity in the mining sector.
- δ Absence of socio-economic development initiatives, including community projects and corporate social responsibility commitments outlined in the Social and Labour Plan.
- δ Foregone infrastructure improvements and associated economic benefits, which could have had a lasting positive impact on the surrounding communities.

CONCLUSION: NO-GO ALTERNATIVE

The No-Go alternative would result in the proposed MIOM not being implemented. While this would prevent all project-related environmental impacts, it would also result in the loss of potential socio-economic benefits, including direct and indirect employment, skills development, and local economic stimulation. Planned infrastructure upgrades and community development initiatives aligned with the project's Social and Labour Plan would similarly not be realised.

All specialist studies conducted as part of the environmental assessment process found that, with appropriate mitigation and management, the potential environmental impacts could be reduced to levels considered acceptable in terms of applicable legislation and best practice. No fatal flaws were identified that would render the project environmentally unfeasible.

Considering the findings of the specialist studies, the ability to mitigate anticipated impacts, and the socio-economic benefits associated with the development, the No-Go alternative is not considered the preferred option. Proceeding with the proposed mining activity, subject to the implementation of mitigation measures and ongoing environmental management, is therefore considered the more sustainable and balanced outcome.

(g) SUMMARY: FINAL PROJECT PROPOSAL

From the above discussions, it is deduced that the Final Project Proposal entails the following:

(a) Inclusion of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667 (1 549.61 ha) as part of the mining right footprint;

(b) Mining is considered a preferable and more sustainable land use for this site when compared to continued extensive agricultural use.

(c) The Phase 1 & 2 design scenario has been identified as the preferred and most feasible option for implementation. Furthermore, Layout Option 2 is considered the preferred option as it reflects a more environmentally responsible and technically informed design.

(d) The exclusive use of sump pumping (Dewatering Technique 1) emerged as a more viable and cost-effective solution and is therefore preferred.

(e) Dust Suppression Scenario 2 was adapted as the preferred operational aspect for the proposed MIOM. The mitigation measures proposed by the various specialists have been incorporated into the EMPR and, if effectively implemented, collectively represent the best-case operational scenario for minimising environmental impact.

(f) Considering the findings of the specialist studies, the ability to mitigate anticipated impacts, and the socio-economic benefits associated with the development, the No-Go alternative is not considered the preferred option. Proceeding with the proposed mining activity, subject to the implementation of mitigation measures and ongoing environmental management, is therefore considered the more sustainable and balanced outcome.

ii) Details of the Public Participation Process Followed

Also refer to Appendix D2 for Proof of the Public Participation Process.

1. INITIAL (SCOPING) PUBLIC PARTICIPATION PHASE

The relevant stakeholders and I&AP's were informed of the mining right application by means of an advertisement in the Gemsbok and the Noordkaap Bulletin, and on-site notices that were placed at two entrances to Makganyene No 667/2 where it turns off the R385. On-site notices were also placed at the Postmasburg Library and Municipal Offices.

A notification letter inviting comments on the draft Scoping Report (DSR) over a 30-days commenting period (ending 07 January 2025) was also sent to the landowners, neighbouring landowners, stakeholders, and other I&AP interested in the project. All the notices and advertisements were available in both Afrikaans and English.

The comments received on the DSR were incorporated into the final Scoping Report (FSR) that was approved by the DMPR on 17 February 2025. The following table provides a list of the I&AP's and stakeholders that were informed/invited to comment/register on the project during the initial public participation phase.

Table 13: List of the landowners, I&AP's and stakeholders that were informed/invited to comment/register on the project during the initial public participation phase.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: δ Mr JC Wessels Makganyene No 667/RE, 1, 2 δ Chris Cla Konstruksie CC (Mrs AP Claassens) Makganyene No 667/3 **Surrounding Landowners and I&AP's:** δ Kouwater Boerdery (Pty) Ltd Metseatsididi No 666/RE, 2 δ Mr CC Claassens Magoloring No 668/RE δ Me GHJ Claassens Vlakfontein No 433/RE δ Sishen Iron Ore Co (Pty) Ltd Farm No 432/1, 2 Farm No 364/0 δ Lynpunt Trust Mapedi No 653/RE δ Slabcon Trust Metseatsididi No 666/1	δ Department of Agriculture, Environmental Affairs, Rural Development and Land Reform; δ Department of Agriculture, Land Reform and Rural Development; δ Department of Economic Development and Tourism; δ Department of Labour; δ Department of Roads and Public Works (DRPW); δ Department of Water and Sanitation (DWS); δ South African Heritage Resources Agency (SAHRA); δ Tsantsabane Local Municipality (TLM); δ Tsantsabane Local Municipality (Ward 6); δ ZF Mgcawu District Municipality (ZMDM).

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
δ Makganyane Resources (Pty) Ltd Interested and Affected Party δ Hlabaki Mining Group (Pty) Ltd Interested and Affected Party δ Mr G Skhosana Interested and Affected Party	

The following table presents a list of stakeholders, landowners, and/or I&AP's that commented/registered on the project during this phase.

Table 14: List of the landowners, I&AP's and stakeholders that commented/registered on the project during the initial public participation phase.

REGISTERED STAKEHOLDERS, LANDOWNERS AND/OR I&AP'S
δ Department of Water and Sanitation; δ Makganyane Resources (Pty) Ltd; δ Mr G Skhosana; δ Mr JC Wessels; δ Mrs AP Claassens; and δ Sishen Iron Ore Co (Pty) Ltd.

2. SECOND (EIA) PUBLIC PARTICIPATION PHASE

Upon approval of the Scoping Report, this report, the Draft Environmental Impact Assessment Report (DEIAR) was compiled that incorporates all the specialist studies and will be circulated for public commenting over a 30-day period extending until **23 October 2025**. The comments received on the DEIAR will be incorporated into the final EIAR and EMPR to be submitted to the DMPR for decision making. The following table provides a list of the I&AP's and stakeholders that will be invited to comment on the DEIAR.

Table 15: List of the landowners, I&AP's and stakeholders that will be invited to comment on the project during the second public participation phase.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: δ Mr JC Wessels Makganyene No 667/RE, 1, 2 δ Chris Cla Konstruksie CC (Mrs AP Claassens) Makganyene No 667/3 **Surrounding Landowners and I&AP's:** δ Kouwater Boerdery (Pty) Ltd Metseatsididi No 666/RE, 2 δ Mr CC Claassens Magoloring No 668/RE δ Me GHJ Claassens Vlakfontein No 433/RE δ Sishen Iron Ore Co (Pty) Ltd Farm No 432/1, 2 Farm No 364/0 δ Lynpunt Trust Mapedi No 653/RE δ Slabcon Trust Metseatsididi No 666/1 δ Makganyane Resources (Pty) Ltd Interested and Affected Party δ Hlabaki Mining Group (Pty) Ltd Interested and Affected Party δ Mr G Skhosana Interested and Affected Party δ Mr K Venter Interested and Affected Party	δ Department of Agriculture, Environmental Affairs, Rural Development and Land Reform; δ Department of Agriculture, Land Reform and Rural Development; δ Department of Economic Development and Tourism; δ Department of Labour; δ Department of Roads and Public Works (DRPW); δ Department of Water and Sanitation (DWS); δ Eskom; δ South African Heritage Resources Agency (SAHRA); δ Tsantsabane Local Municipality (TLM); δ Tsantsabane Local Municipality (Ward 6); δ ZF Mgcawu District Municipality (ZMDM).

3. REGULATION 41 OF THE NEMA EIA REGULATIONS

Refer to the table below for an explanation of how the public participation process for this project has thus far incorporated the methods stipulated in Regulation 41 of the NEMA Regulations.

Table 16: Table comparing Regulation 41 of NEMA with the public participation process of this project.

REQUIREMENTS IN TERMS OF NEMA REGULATION 41	PUBLIC PARTICIPATION PROCESS FOLLOWED
δ Regulation 41(2)(a): *Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of-* *(i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and* (ii) *Any alternative site.* δ Regulation 41(3): *A notice, notice board or advertisement referred to in subregulation (2) must—* *(a) give details of the application or proposed application which is subjected to public participation; and* *(b) state—* *(i) whether basic assessment or S&EIR procedures are being applied to the application;* *(ii) the nature and location of the activity to which the application relates;* *(iii) where further information on the application or proposed application can be obtained; and* (iv) *the manner in which and the person to whom representations in respect of the application or proposed application may be made.* δ Regulation 41(4): *A notice board referred to in subregulation (2) must—* *(a) be of a size of at least 60cm by 42cm; and* (b) *display the required information in lettering and in a format as may be determined by the competent authority.*	Notice boards were fixed at the following conspicuous and public accessible areas: δ Two entrances to Makganyene No 667/RE where it turns off the R385; δ Postmasburg Library and Municipal Offices. The notice boards that were placed complied with the requirements of Regulation 41(3) as presented in Appendix D2 attached to this document. The notices were printed on notice boards of 60 x 42 cm in Arial font of sufficient size and were available in both Afrikaans and English.
δ Regulation 41(2)(b): *giving written notice, in any of the manners provided for in section 47D of the Act, to-*	(i) The Applicant is in discussions with the Landowners.

REQUIREMENTS IN TERMS OF NEMA REGULATION 41	PUBLIC PARTICIPATION PROCESS FOLLOWED
(i) *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;* (ii) *owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;* (iii) *the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;* *(iv) the municipality which has jurisdiction in the area;* *(v) any organ of state having jurisdiction in respect of any aspect of the activity;* *(vi) any other party as required by the competent authority;*	(ii) The landowners also registered on the project and commented on the DSR. They will also be invited to comment on the DEIAR. (iii) The directly surrounding landowners were informed of the project and invited to comment on the DSR. Those that registered and/or comment were added to the Registered I&AP List, and they will also be invited to comment on the DEIAR. (iv) The Ward Councillor of Ward 6 was invited to comment on the project and DSR. He will also be invited to comment on the DEIAR. (v) Both the Tsantsabane Local Municipality and the ZF Mgcawu District Municipality were invited to comment on the project and DSR. They will also be invited to comment on the DEIAR. (vi) As listed in Table 14 & 15 the relevant state departments and entities were invited to comment on the project and DSR and will also be invited to comment on the DEIAR. (vii) As listed in the FSR Acceptance Letter, DWS, DENC, DALRRD – Land Use and Soil Management and the Local Municipality were all invited to comment on the project and the DSR. They will also be invited to comment on the DEIAR.
δ Regulation 41(2)(c): *Placing an advertisement in-* *(i) One local newspaper; or* *(ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations.*	The project and availability of the DSR was advertised in the Noordkaap Bulletin on 14 November 2024 and the Gemsbok on 15 November 2024.
δ Regulation 41(2)(d): *Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken…*	Not applicable to this project as the proposed activity does not extend beyond the boundaries of the metropolitan or district municipality in which it will be undertaken.
δ Regulation 41(2)(e): *Using reasonable alternative methods, as agreed to by the competent authority, in those instances where*	

REQUIREMENTS IN TERMS OF NEMA REGULATION 41	PUBLIC PARTICIPATION PROCESS FOLLOWED
a person is desirous of but unable to participate in the process due to— *(i) illiteracy;* *(ii) disability; or* (iii) *any other disadvantage.*	Not applicable to this project as no I&AP indicated that he/she was desirous but unable to participate in the public participation process.
δ Regulation 41(5): *Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d)…*	Not applicable to this application.
δ Regulation 41(6): *When complying with this regulation, the person conducting the public participation process must ensure that—* *(a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and* (b) *participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.*	The DSR containing the first set of facts in respect of this application was available to the stakeholders and potential I&AP's for perusal and commenting over a 30-days commenting period. The DSR was also available on the Greenmined website. I&AP's and stakeholders were invited to contact the EAP should additional information be required. Upon approval of the FSR, the DEIAR was compiled that will also be available to I&AP's and stakeholders for their perusal.
δ Regulation 41(7): *Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.*	Not applicable to this project.

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iii) Summary of issues raised by I&AP's

Table 17: Summary of issues raised by I&AP's.

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
AFFECTED PARTIES		-	-	-
Landowner/s	**X**	-	-	-
Mr JC Wessels δ Makganyene No 667/RE, 1, 2	X	22/11/2024	Mr Wessels registered on the project and commented as summarised below.	Greenmined responded to the registration and comments received from Mr Wessels as listed below.
Mr Wessels noted that upon receipt of the DSR notification, he contacted Assmang to discuss outstanding matters regarding the prospecting right held over his property. Feedback was sought regarding fences, soil contamination, possible water contamination and the removal of Shepherd's Trees (*Boscia albitrunca*). There were also matters regarding the PR service use agreement that had to be discussed. Mr Wessels enquired whether it was possible to extend the DSR commenting period to allow additional time to resolve the listed matters and requested that Assmang and Greenmined visit the farm before 01 December 2024. Mr Wessels further noted that there are two graveyards on the farm plus a solitary grave.				
Greenmined responded as follows to the correspondence receive from Mr Wessels: "Thank you for your email regarding the mining right application submitted by Assmang (Pty) Ltd ("Applicant") over the Remaining Extent, Portion 1 (Remaining Extent), Portion 2 (Portion of Portion 1) and Portion 3 of the farm Makganyene No 667 with reference number NC 30/5/1/2/2/10255 MR. In support of our telephonic discussion of Friday (22 November 2024), kindly receive our response to your comments as follows: 1. Can you please share the correspondence with Mr Pumezo David with us? 2. I confirm receipt of the video clips (also sent to me) showing some of the contaminated boreholes on the farm. This matter will be added to the agenda of the meeting (refer to Point 4) to be held between yourself, the Applicant, and Greenmined;				

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
3. The other grievances listed in your email (removal of the Witgat trees, damages to fences, service use agreement matters) will also be added to the proposed agenda (Point 4); 4. During the EIA (environmental impact assessment) process there are at least two opportunities for I&AP's (interested and affected parties including landowners) to comment on the project and EIA documents. This project is now in its first phase where all I&AP's (including landowners) have the opportunity to register on the project and if interested comment on the draft Scoping Report (DSR). For this project the first phase commenting period ends on the 7th of January 2025 as the final Scoping Report (including all the registrations and comments received on the DSR) must be submitted to the DMRE by latest 10 January 2025 (departmental requirement). Once the final Scoping Report was submitted to the DMRE, the authority will consider the report and whether the EIA may be allowed to continue. Should the final Scoping Report be approved, we (Greenmined) will commence with the proposed specialist studies (as listed in the DSR) and the compilation of the draft Environmental Impact Assessment (DEIAR) and Environmental Management Programme (EMPR) that will then also be published for public perusal and commenting. This will present the registered I&AP's with another (second) opportunity to comment on the project. Considering the above, we would like to propose that Greenmined arrange a virtual meeting between yourself and the Applicant before the 12th of December 2024 where the grievances listed in your email will be discussed. Following the meeting, minutes of the meeting will be distributed to all the attendees for approval. The agenda, attendance register, and minutes of the meeting will then be incorporated into the final Scoping Report (to be submitted to the DMRE by 10 January 2025). Should the DMRE approve the final Scoping Report and allow the EIA to continue, Greenmined will then arrange an inspection (in the new year) with yourself and representative/s of the Applicant to visit the farm and gather the site-specific information that will be shared with the specialists and assessed as part of the EIA documents. The discussions/findings of the inspection, as well as the specialist input and impact assessment will all form part of the DEIAR & EMPR that will be available for your perusal and commenting before the final report is submitted to the DMRE. We thank you for highlighting the additional gravesites on the farm. The matter will be amended in the final Scoping Report and upon approval of the document by the DMRE, the information will also be shared with the archaeologist that will have to visit the application footprint prior to the compilation of the DEIAR & EMPR." The virtual meeting was subsequently arranged for 05 December 2024.			
A virtual meeting was arranged between Mr Wessels, Assmang and Greenmined on 05 December 2024, and the main discussion points entailed the following (refer to Appendix 8.2 for a copy of the Meeting Minutes) δ All PR related comments/matters will be discussed in a separate meeting between Mr Wessels and Assmang;			

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
δ The MR Application is for a life of mine of 30 years; δ Mr Wessels noted that pangolin (*Smutsia temminckii*) and hedgehog (*Erinaceus auropaeus*) also occur on the farms; δ The FSR must be submitted to the DMRE by 10 January 2025, the DMRE then has 43-days to review the document and if accepted the final environmental impact assessment report (FEIAR) must be submitted to the DMRE within 106 days of acceptance of the FSR. The draft EIAR will include all the specialist studies, a discussion on the alternatives that were considered, the final layouts and maps and will be available for a 30-days commenting period. δ Diamonds form part of this MR application. δ Mr Wessels informed the meeting that SIOC applied for a PR for gold, copper and other minerals over his property. He also mentioned that Hlabaki Mining Group (Pty) Ltd (HMG) applied for a quartzite PR over Makganyene No 667. Since the meeting, the following matters were actioned: δ Assmang and Mr Wessels met on 18 December 2024 regarding the PR matters and remain in discussion. As agreed at the meeting, the legal counsel of Mr Wessels will formally submit all PR related grievances to Assmang. (Received by Assmang on 05 September 2025); δ The additional gravesites, and occurrence of pangolin and hedgehogs on the farm were added to the FSR; δ SIOC and HMG were invited to comment on the project and DSR.			
On 20 December 2024 Mr Wessels submitted the following comments (summarised and translated to English for ease of reference). The comments were submitted as part of the public participation process for this application and were therefore included in the FSR. The comments however relate to the PR held by Assmang (Pty) Ltd on the property and must therefore form part of the prospecting right discussions to be held between Mr Wessels and Assmang. 1. A water sample taken at MEX 23 was contaminated with oil. Assmang can also test the diamond mine water for contamination because their two pumps, driven by diesel engines, stood in the water for a long time before I pointed oil leaks out to them. Even when it was removed to the side of the water the drip pans overflowed with oil and necessitated the removal of the contaminated soil. All diamond boreholes must be tested for water pollution, even though Assmang confirmed that the drilling oil is not harmful to the environment. The water tests must be done by an independent company, and the results must also be sent to the Department of Water and Sanitation and farm owners (Wessels and Claassens). 2. All boreholes must be properly sealed and raised above the ground surface to prevent further contamination. 3. The Shepards trees that have been destroyed must be re-established in areas that will not be affected by mining activities. 4. The fence that was damaged to provide passage to Makganyene 3 for prospecting work needs to be properly repaired.			

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
5. The drilling of wells over 500 boreholes on the farm must be referred to the DMR for investigation because no further application for additional boreholes is available on the DMR systems. Assmang paid ±R165000.00 for a PWP for which the drilling of 197 boreholes was requested. An updated PWP could not be found, and Mr David Selemo of Assmang refused to provide me with an updated PWP. By law, the DMR must inspect the site to confirm that they are satisfied. 6. It appears that Assmang has little or no interest in the mining of Diamonds. The DMR, with a recommendation to the Minister, can take the right to mine diamonds away from Assmang to enable disadvantaged persons to take advantage of the opportunity. It must be remembered that during 13 years of prospecting no prospecting of Diamonds was done. This is very serious as the opportunity is being taken away from disadvantaged miners of which there are many. 7. If the DMR requested Assmang to stop prospecting work in May 2024 for whatever reason it must be viewed in a serious light. 8. The opportunity has arisen many times to modify the current contract to suit both Wessels and Assmang but no success. 9. Assmang was informed to provide proper toilet facilities for the security personnel who since Assmang vacated the farm have no toilet facilities. The staff have been using the veld, and these areas must be identified and cleaned.			
On 04 January 2025 Mr Wessels added the following comments regarding the prospecting right held by Assmang on his property: "….White paper 2008. 1.3.6 Government policy 1.3.6.1 Ownership of Mineral rights. (iv) Government will promote minerals development by applying the USE IT/ LOSE IT: USE IT/ KEEP IT principle. From my side in 13 years of prospecting only 2 months where spend mining the dumps and even Assmang since December 2021 has done no prospecting on Diamonds, and they apply to mine diamonds which is absurd. The mining right must be changed to only Iron ore and Manganese ore plus the other minerals included except Diamonds. Applications from others were withdrawn even up to December 2023 and the first come principle must apply. The prospecting rights are available from DMR up to October 2018. They were withdrawn to make space for the application from Mr Chalton Rex."			
Greenmined acknowledged receipt of the additional comments on 07 January 2025 and confirmed that it will be incorporated into the FSR. It was highlighted that Assmang must respond to the PR related matters, and the comments were subsequently shared with the Applicant for their actioning.			

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Furthermore, it must be stressed that the MPRDA allows an Applicant to apply for any mineral if no other person holds a prospecting right, mining right, mining permit or retention permit for the same mineral and land. The inclusion of diamonds as part of this application is therefore justified.				
Assmang is in consultation with Mr Wessel's legal counsel regarding the prospecting related matters and proof of correspondence is available from Assmang on request.				
On 25 June 2025, Mr Wessels informed GE that he had commissioned a seer to identify areas with high potential for diamond on his properties. The positions identified by the seer encompass the following portions: δ Remainder of Portion 1 of Makganyene No 667, δ Portion 2 (a portion of Portion 1) of Makganyene No 667 and δ The western portion of the Remainder of Makganyene No 667.				
The diamond positions identified by the seer were recorded; however, as all of these locations fall outside the proposed development footprint of the MIOM, the project is not expected to negatively affect the potential source.				
Chris Cla Konstruksie CC (Mrs AP Claassens) δ Makganyene No 667/3	X	03/12/2024	Mrs Claassens registered on the project and commented as follows.	Greenmined registered Mrs Claassens and responded as follows.
Comments received from Mrs Claassens on the DSR on 03 December 2024: "….. I would like to request that the following aspects be addressed in the scoping report and the subsequent impact assessment: 1. **Blasting Activities**: The potential impacts of blasting on my agricultural activities must be evaluated and addressed. 2. **Dust Impacts**: Dust generated by mining activities and its effects on agricultural activities and veld conditions should be included. 3. **Water Use License Application (WULA)**: I must be kept informed about all developments regarding the WULA to provide relevant feedback as an I&AP. 4. **Noise Impact**: The impact of noise from mining activities on my property and operations must be assessed.				

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT

5. **Vibrations**: The effects of vibrations on my agricultural activities should be analysed.

6. **Security Risks**: The potential for increased theft and poaching risks due to mining activities must be addressed. I would like to request a high fence to be erected between my portion and the mining activities to protect my farming activities from any security risks. I would also like to request for the possibility of security cameras to be installed for this purpose.

7. **Dewatering Impacts**: The effect of dewatering activities on my agricultural business and farm operations requires thorough evaluation.

8. **Water and Topsoil Storage**: The locations of water storage and topsoil storage areas are absent from the maps. Please ensure these are communicated.

9. **Fire Risks**: Firebreaks must be planned to prevent fire risks associated with mining activities.

10. **Continuous Rehabilitation**: Ongoing rehabilitation after mining is critical to mitigate impacts on agricultural activities.

11. **Prospecting Impacts**: Rehabilitation of all previous prospecting impacts on Portion 3 must be incorporated into the rehabilitation plan.

12. **Access Agreements**: Clear access agreements need to be established with the mining company.

13. **Waste Rock Dump Location**: The current proposed location of the waste rock dump will reduce grazing capacity on my farm. Since the farm is not for sale, alternative locations must be considered. If alternatives are not viable, land access agreements should be discussed to compensate for lost land and grazing capacity.

14. **Report Sharing**: Please ensure all scoping and impact assessment reports are shared with me directly."

Greenmined responded as follows to the registration and comments received from Mrs Claassens:

"Greenmined herewith acknowledges receipt of the email and confirm that you are registered as an I&AP's on the mining right application submitted by Assmang (Pty) Ltd over, amongst others, Portion 3 of Makganyene No 667 with reference number NC 30/5/1/2/2/10255 MR.

The matters listed in your email as well as our response will be incorporated into the final Scoping Report (FSR) to be submitted to the DMRE for decision making. Should the FSR be approved, and the EIA process be allowed to continue, the matters will be fully assessed and discussed as part of the draft Environmental Impact Assessment Report

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT

(DEIAR) and Environmental Management Programme (EMPR) that will also be available for your perusal and commenting. Also, please find our response to the individual matters as listed below.

1. **Blasting Activities**: The potential impacts of blasting on my agricultural activities must be evaluated and addressed.

   This matter will be referred to the soil scientist responsible for the Agricultural Impact Assessment and his findings will be incorporated into the DEIAR & EMPR.

2. **Dust Impacts**: Dust generated by mining activities and its effects on agricultural activities and veld conditions should be included.

   This matter will be referred to the soil scientist responsible for the Agricultural Impact Assessment, as well as the Air Quality Specialist. Their findings will be incorporated into the DEIAR & EMPR.

3. **Water Use License Application (WULA)**: I must be kept informed about all developments regarding the WULA to provide relevant feedback as an I&AP.

   Greenmined will be applying for the WULA on behalf of Assmang (Pty) Ltd and I have listed you as registered I&AP with the consultant responsible for the WULA. Mrs Murchellin Saal (copied into this email) will be in contact with you regarding the WULA as soon as the application commences.

4. **Noise Impact**: The impact of noise from mining activities on my property and operations must be assessed.

   The noise impact will be assessed during the EIA phase (after approval of the FSR) and discussed in the DEIAR & EMPR.

5. **Vibrations**: The effects of vibrations on my agricultural activities should be analysed.

   The geotechnical specialist, geohydrologist and soil scientist will be tasked to assess this matter during the EIA phase, and their findings will be incorporated into the DEIAR & EMPR.

6. **Security Risks**: The potential for increased theft and poaching risks due to mining activities must be addressed. I would like to request a high fence to be erected between my portion and the mining activities to protect my farming activities from any security risks. I would also like to request for the possibility of security cameras to be installed for this purpose.

   This matter will be discussed with the Applicant, and we will revert back to you regarding the outcome. All management measures will form part of the DEIAR & EMPR.

7. **Dewatering Impacts**: The effect of dewatering activities on my agricultural business and farm operations requires thorough evaluation.

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT

The hydrologist and geohydrologist will assess this matter and provide their findings that will be incorporated into the DEIAR & EMPR.

8. **Water and Topsoil Storage**: The locations of water storage and topsoil storage areas are absent from the maps. Please ensure these are communicated.

   These locations will be determined/finalised as part of the EIA phase and receipt of all the specialist inputs. The proposed locations will be communicated to you as soon as identified.

9. **Fire Risks**: Firebreaks must be planned to prevent fire risks associated with mining activities.

   Fire management measures will form part of the mitigation and management measures to be implemented by the mine (should the application be successful) and will be part of the EMPR to be approved by the DMRE.

10. **Continuous Rehabilitation**: Ongoing rehabilitation after mining is critical to mitigate impacts on agricultural activities.

    Continuous rehabilitation will be part of the rehabilitation objectives to be elaborated on in the Rehabilitation Plan that will form part of the DEIAR & EMPR.

11. **Prospecting Impacts**: Rehabilitation of all previous prospecting impacts on Portion 3 must be incorporated into the rehabilitation plan.

    We will convey this request to the Applicant, and if possible, it will be incorporated into the rehabilitation plan of the mining right.

12. **Access Agreements**: Clear access agreements need to be established with the mining company.

    This request will be communicated with the Applicant (Assmang (Pty) Ltd) and incorporated as management measure into the DEIAR & EMPR.

13. **Waste Rock Dump Location**: The current proposed location of the waste rock dump will reduce grazing capacity on my farm. Since the farm is not for sale, alternative locations must be considered. If alternatives are not viable, land access agreements should be discussed to compensate for lost land and grazing capacity.

    We acknowledge your valuable input regarding the current location of the proposed waste rock dump and will assess the matter further and confer with the project team and specialists to identify possible alternative locations (if viable). The outcome of the assessment will be communicated to you and also form part of the DEIAR & EMPR.

14. **Report Sharing**: Please ensure all scoping and impact assessment reports are shared with me directly.

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT

We confirm that this will be done."

Additional response since the compilation of the DEIAR:

1. **Blasting Activities, 4. Noise Impact, and 5. Vibrations:** The potential impact of blasting (dust, noise and vibrations) as well as the noise impact on the agricultural activities were assessed during the EIA phase and commented on by the relevant specialists. The findings were incorporated into this report while the proposed mitigation and management measures were incorporated into the EMPR. Please refer to the following sections relevant section:
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operational Phase;
   - δ Part A(1)(g)(i) Details of the development footprint alternatives considered – (b) Type of Activity to be Undertaken;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Air Quality and Noise Ambiance;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3.6 Noise, Ground Vibrations and Airblast;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 4. Site Specific Geology, Soils and Agricultural Sensitivity;
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

2. **Dust Impacts**: Dust generation is referred to in the following sections of the DEIAR:
   - δ Part A(1)(g)(i) Details of the development footprint alternatives considered – (e) Operational Aspects of the Activity;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Air Quality and Noise Ambiance;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 12. Health Impact Assessment;
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

6. **Security Risks**: Security related matters were discussed in the DEIAR under the following headings:
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.1 Demarcation of Mining Boundaries;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Socio-Economic Environment;
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT

7. **Dewatering Impacts:** Dewatering is referred to in the following sections of the DEIAR:
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.1.2 Pit Dewatering;
   - δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 5. Geohydrology;
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

8. **Water and Topsoil Storage:**
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.3 Topsoil Stripping and Stockpiling;
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.5 Establishment of Site Infrastructure;
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.1 Water Management;
   - δ Appendix C1-5 – Site Plans.

9. **Fire Risks**:
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

10. **Continuous Rehabilitation & 11. Prospecting Impacts:**
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase;
   - δ Part A(1)(g)(i) Details of the development footprint alternatives considered – Motivation for Mining as Preferred Land Use Alternative;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).
   - δ Appendix H2: Rehabilitation, Decommissioning and Closure Plan

12. **Access Agreements:**
   - δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase;
   - δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;
   - δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
13. **Waste Rock Dump Location**: δ Part A(1)(g)(i) Details of the development footprint alternatives considered – (b) Type of Activity to be Undertaken δ Part A(1)(g)(i) Details of the development footprint alternatives considered – (c)2 Development Layout; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).				
Lawful occupier/s of the land	**N/A**	-	-	-
Landowners or lawful on adjacent properties	**X**	**-**	**-**	**-**
Kouwater Boerdery (Pty) Ltd δ Metseatsididi No 666/RE, 2	X	No comments were received thus far.		
Mr CC Claassens δ Magoloring No 668/RE	X			
Me GHJ Claassens δ Vlakfontein No 433/RE	X			
Sishen Iron Ore Co (Pty) Ltd (SIOC) δ Farm No 432/1, 2 δ Farm No 364/0 δ Makganyene No 667 PR Applicant	X	27/11/2024	SIOC registered on the project and submitted the following comments.	Greenmined responded as follows on the SIOC registration and comments.
Comments received from SIOC on 27 November 2024: "….SIOC hereby requests that it be registered as an I&AP as part of this application… Please provide information on the following aspects: 1. Air quality management				

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
a. What measures will be implemented to ensure dust are adequately monitored and effectively controlled. 2. Access road a. The additional traffic might detrimentally impact the condition of the R385 and subsequently impact road safety for other users. 3. Security and access control a. How will access to the site be managed. b. What measures will be put in place to ensure that the safety and security of neighbouring landowners will not be compromised. 4. Sensitive areas a. What measures will be implemented to avoid all possible impacts to sensitive areas (fauna/flora/regulated zones). 5. Veld fire management a. What measures will be put in place to prevent fires, and if a fire does occur, will a competent team be available to respond to the fire. 6. Water management a. What will the water source be that for the proposed activities. b. How will impacts be monitored (quality and quantity). c. Should there be a negative impact on adjacent areas (ground water quantity or quality), what will be done to mitigate the impact(s). d. Is there a formal process to follow should a complaint/grievance be raised. In addition to the above, please provide us with any other applicable information to the project…"			
Greenmined responded (29 November 2024) as follows to the comments received from SIOC: "Thank you for taking part in the public participation process of this mining right application submitted by Assmang (Pty) Ltd with reference number NC 30/5/1/2/2/10255 MR. We do acknowledge receipt of your registration and comments which will also be incorporated into the Final Scoping Report, to be submitted for approval to the Department of Mineral Resources and Energy (DMRE).			

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Due to the technical nature of the comments, it will be assessed and responded to in the Draft Environmental Impact Assessment Report (DEIAR), which report will follow should the DMRE approve the final Scoping Report. The DEIAR will furthermore incorporate the applicable specialist studies that will also consider the comments received from SIOC. As a registered I&AP, SIOC will be invited to comment on the DEIAR once available."			
Additional response since the compilation of the DEIAR: **1. Air Quality Management:** δ Part A(1)(g)(i) Details of the development footprint alternatives considered – (e) Operational Aspects of the Activity; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Air Quality and Noise Ambiance; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 12. Health Impact Assessment; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j). **2. Access Road:** δ Part A(1)(g)(i) Details of the development footprint alternatives considered – 2.1.4 Access and Internal Roads; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 13.1 Road Network and Traffic Assessment; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j). **3. Security and Access Control:** δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.1 Demarcation of Mining Boundaries; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 3. Site Specific Socio-Economic Environment; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j). **4. Sensitive Areas:** δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1.1 Demarcation of Mining Boundaries;			

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
δ Part A(1)(g)(i) Details of the development footprint alternatives considered; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j). **5. Veld Fire Management:** δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j). **6. Water Management:** δ Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.1 Water Management; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 5. Site Specific Geohydrology; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 6. Site Specific Hydrology; δ Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 7. Site Specific Freshwater Ecosystems; δ Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR; δ Part B(1) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including f) – j).			
Lynpunt Trust δ Mapedi No 653/RE	X	No comments were received thus far.	
Slabcon Trust δ Metseatsididi No 666/1	X		
Municipal councillor Ward 6	**X**	No comments were received thus far.	
Municipality	**X**		

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Tsantsabane Local Municipality (TLM)				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS etc	**X**	**-**	**-**	**-**
Department of Roads and Public Works (DRPW)	X	No comments were received thus far.		
Department of Water and Sanitation	X	18/11/2024	DWS commented as follows on the project.	Greenmined responded as follows to DWS.

Comments received from DWS on the DSR:

"This office acknowledges receipt of the draft Scoping Report compiled for Assmang (Pty) Ltd dated November 2024, for the proposed mining activities near Aucampsrus, Northern Cape Province. Please note that a water use authorisation will be required for the following activities:

1. Waste Rock Dump, Run of Mine (RoM) stockpile, overburden stockpile, containing dirty water, water storage dam/s storing water from the pits, reuse of water from the pits for dust suppression, draining water from wash bay into an oil sump, backfilling of the pits with waste rock will trigger Section 21(g) water use of the National Water Act, 1998 (Act 36 of 1998).

2. Taking water from a water resource through a borehole will trigger Section 21(a) of the National Water Act, 1998 (Act 36 of 1998).

3. Dewatering of the pits will trigger Section 21(j) of the National Water Act, 1998 (Act 36 of 1998).

Please note that no activity should take place within a horizontal distance of 500m from the boundary of a wetland/pan or within the scale of 1:100-year flood line of a river/drainage line (perennial/non-perennial) without an authorisation from this Department. A water use authorization must be applied via the Electronic Water Use Licence Application and Authorisation (EWULAA) system (www.dws.gov.za/ewulaas)."

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Greenmined acknowledged on 18 November 2024 receipt of the DWS comments and confirmed that a water use licence application will be submitted in due course. Also refer to *Part A(1)(e) Policy and Legislative Context* regarding the WULA application.				
Department of Public Works	X	No comments were received thus far.		
Eskom	X	Any comments received on the DEIAR will be incorporated into the final EIAR & EMPR.		
Communities		No communities border the mining area or were identified within 100 m from the site.		
-	-	-	-	-
Dept. Land Affairs	-	18/11/2024	The Commission on Restitution of Land Rights confirmed that no land claims appear on their database in respect of the earmarked properties.	
-	-	-	-	-
Traditional Leaders		No tradition leaders borders the mining area or were identified within 100 m from the site.		
-	-	-	-	-
Dept. Environmental Affairs	**X**	-		
Department of Agriculture, Environmental Affairs, Rural Development and Land Reform	X	No comments were received thus far.		
Other Competent Authorities affected		-	-	-

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Department of Agriculture, Land Reform and Rural Development	X	No comments were received thus far.		
Department of Economic Development and Tourism	X			
Department of Labour	X			
South African Heritage Resources Agency (SAHRA)	X	24/01/2025	SAHRA commented as listed below on the project.	The Heritage Impact Assessment is attached as Appendix K to this document, while the Palaeontological Impact Assessment is attached as Appendix L. These documents will also be loaded onto the SAHRIS website for ease of reference.

SAHRA comments received on the project:

"……Interim Comment

The SAHRA Development Applications Unit (DAU) requests that an assessment of the impact to heritage resources that complies with section 38(3) of the NHRA as required by section 38(8) of the NHRA must be conducted as part of the EA process. The HIA must include an archaeological and palaeontological component. The field-based archaeological component of the HIA must be conducted by a qualified archaeologist and must comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports…...

A portion of the proposed development is located within an area of moderate Palaeontological Sensitivity as per the SAHRIS PalaeoSensitivity map. As such, a desktop Palaeontological Impact Assessment (PIA) must be undertaken by a qualified palaeontologist. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments. The Minimum Standards refer to a Letter of Recommendation for Exemption for further studies should the specialist deem it appropriate. SAHRA reserves the right to insist on a field based assessment should the Letter of Recommendation not provide ample information to make an informed comment.

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed. Further comments will be issued upon receipt of the above requested reports and a revised DBAR that incorporates the results of the specialist assessment. The applicant is advised to extend the EA process in terms of section 19(1)b of the NEMA EIA regulations in order to address this comment…."				
ZF Mgcawu District Municipality	X	No comments were received thus far.		
OTHER AFFECTED PARTIES		-	-	-
-		-	-	-
INTERESTED PARTIES		-	-	-
Makganyane Resources (Pty) Ltd	X	09/09/2024	Makganyane Resources (Pty) Ltd submitted the following comments on the application.	The correspondence received from Makganyane Resources (Pty) Ltd was acknowledged on 12 September 2024 and it was confirmed that the company will be provided with the documents that are available to all registered I&AP's as part of the environmental authorisation process.
Comments received from Makganyane Resources (Pty) Ltd: "Makganyane Resources (Pty) Ltd hereby provides formal notification to register as an interested and affected party in terms of Assmang Mining Right ("Mining Right") and Environmental Authorization ("EA") in terms of an application submitted for a Mining Right for iron ore and manganese over Portion 2 (a Portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the Farm Makganyene No. 667, situated in the administrative district of Kuruman, in the Northern Cape province ("the Property") under DMRE reference NC 30/5/1/1/2/2/10255 MR. Makganyane Resources (Pty) Ltd hereby requests to be furnished with the entire mining right application, including the mining works programme, technical and supporting documentation, environmental authorization application and all other appropriate documentation in terms of the High Court, Gauteng Division judgement of Baleni and Others with case number: 96628/2015…"				
Hlabaki Mining Group (Pty) Ltd (HMG)	X	No comments were received thus far.		

INTERESTED AND AFFECTED PARTIES		DATE COMMENTS RECEIVED	ISSUES RAISED	EAP'S RESPONSE TO ISSUES RAISED BY THE APPLICANT
δ Makganyene No 667 PR Applicant.				
Mr G Skhosana δ Interested Party	X	14/11/2024	Mr Skhosana requested to be registered on the project and comment on the DSR.	Greenmined confirmed that Mr Skhosana was registered on the project and invited him to comment on the DSR. To date no comments were received from Mr Skhosana.
Mr K Venter δ Interested Party	X	Any comments received on the DEIAR will be incorporated into the final EIAR & EMPR.		

iv) The Environmental attributes associated with the development footprint alternatives.

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

This section describes the general biophysical-, cultural- and socio-economic environment as well as baseline conditions of the greater environment that may be affected by the proposed project but should also be read in conjunction with *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site*.

1. CLIMATE

The project area has a semi-desert climate with hot summers and mild to cold winter temperatures. Average temperatures vary from approximately 25 °C in the summer month of January to nearly 20 °C in the July. The mean annual precipitation (MAP) for the project area is in the region of 320 mm, with most rainfall occurring mainly during summer (Steenkamp, 2024).

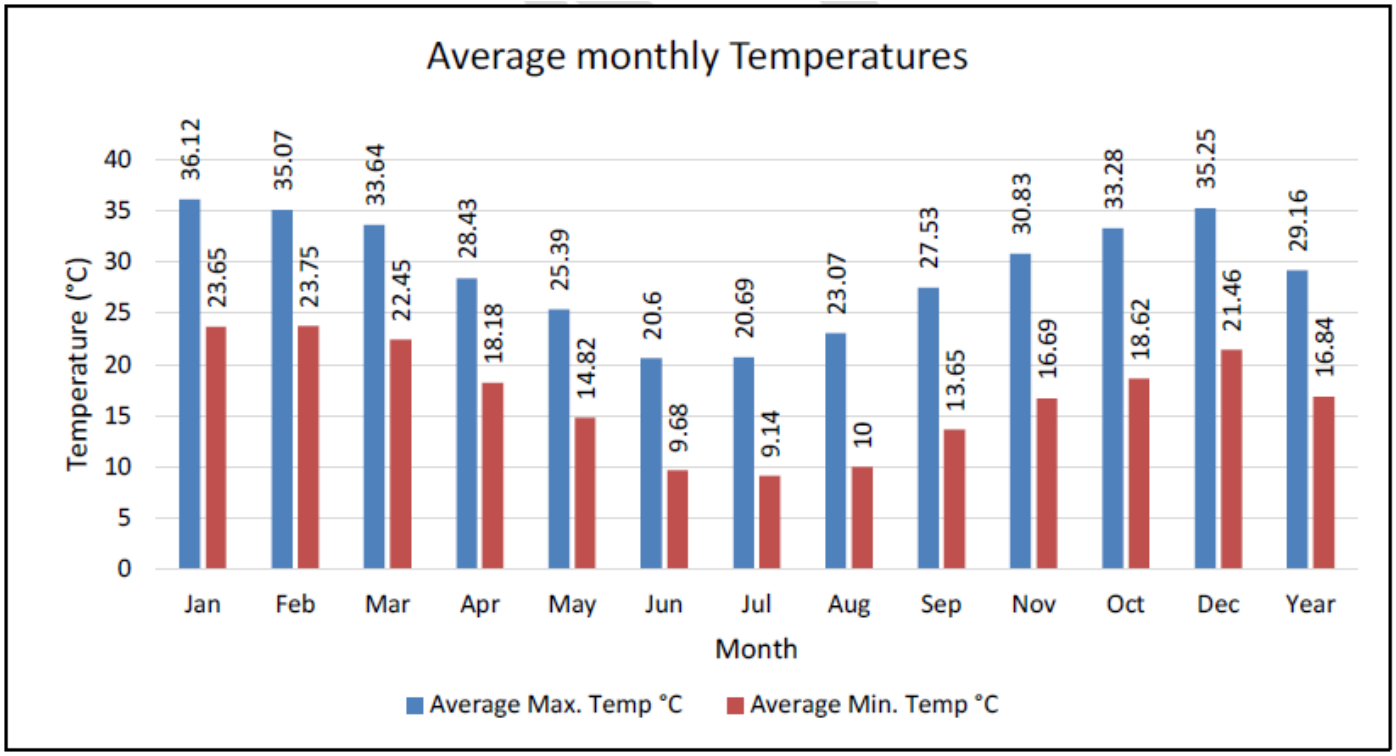


Figure 20: Average monthly temperatures for the Postmasburg area (weatherandclimate.com/)

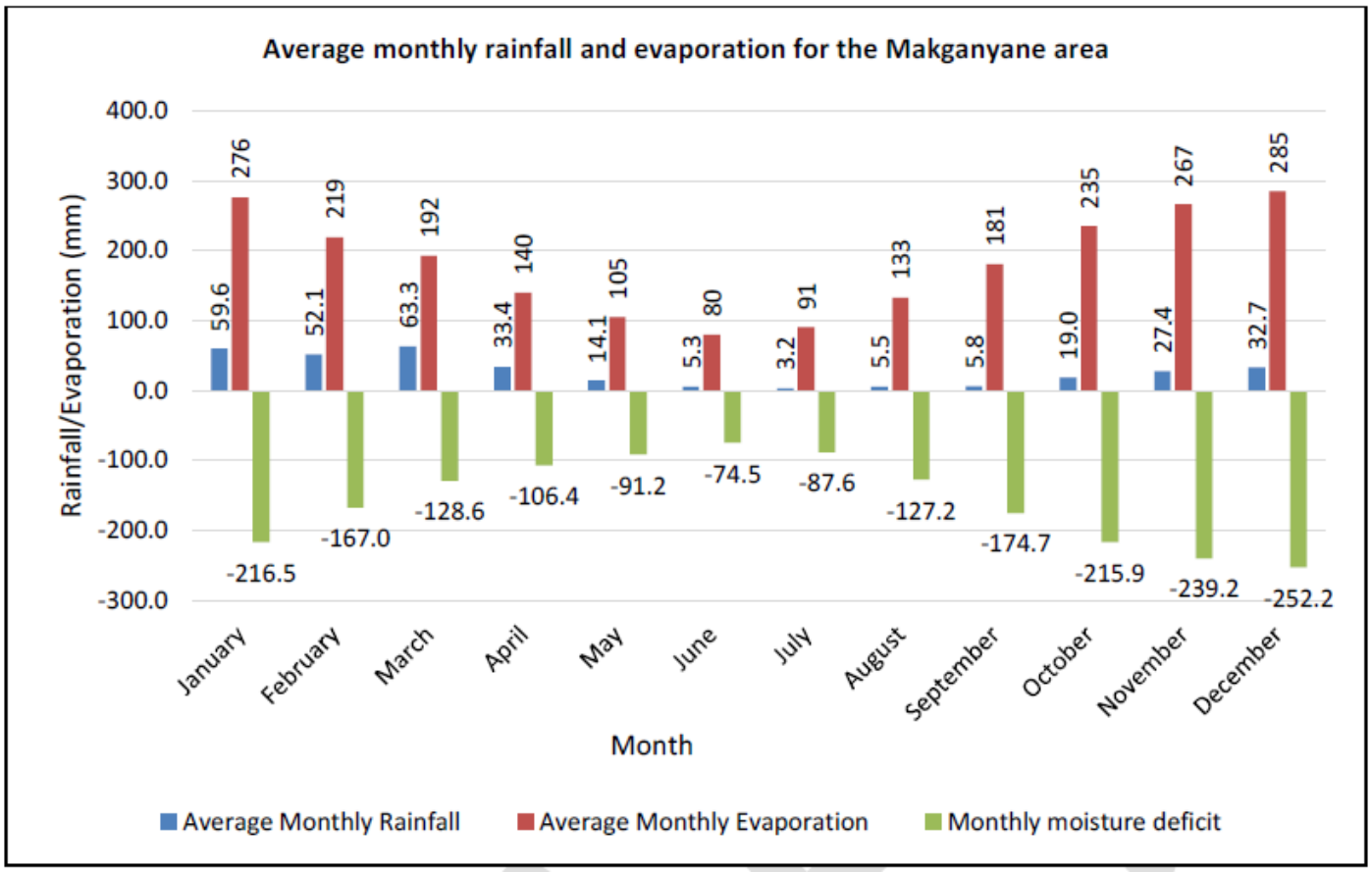


Figure 21: Mean annual rainfall and evaporation for the project area (DWS, 2024).

The prevailing wind direction of Postmasburg is fairly constant ranging from north to west-northwest, with the average wind speed being ±6 knots (11.11 km/h) as shown in the following figure.

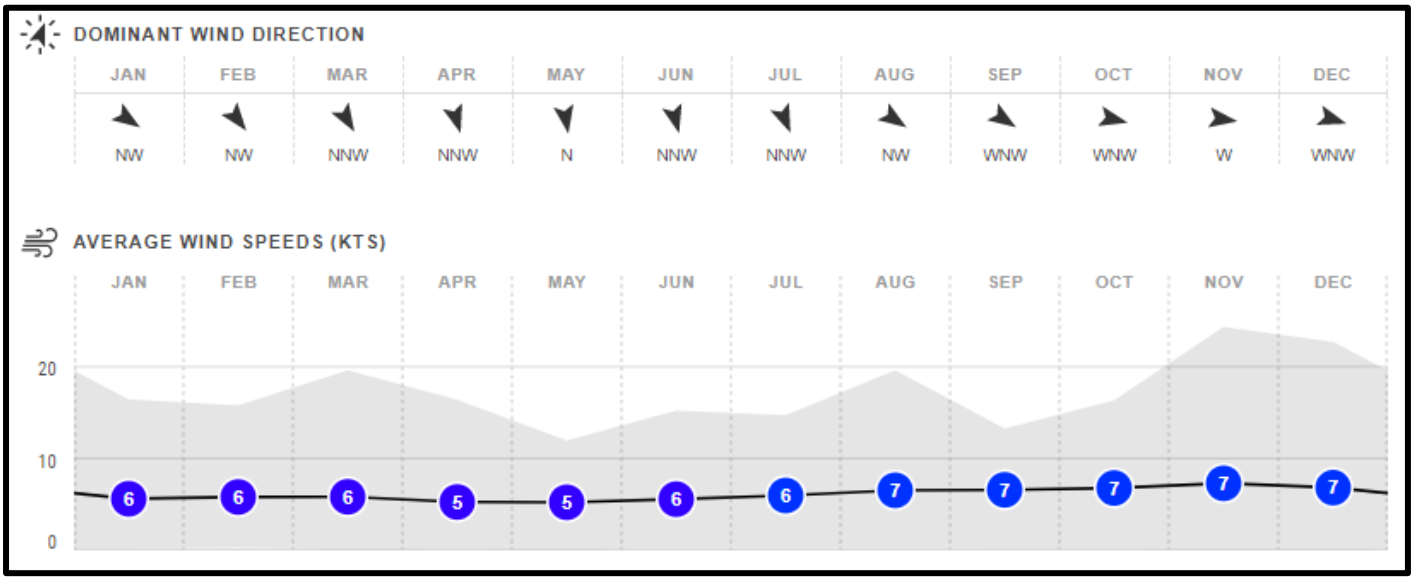


Figure 22: Image showing the dominant wind direction and average wind speed over a 12 month period for the Postmasburg area. (Image obtained from www.windfinder.com/windstatistics/postmasburg)

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – 6. Site Specific Hydrology.*

2. TOPOGRAPHY

The topography of the greater Postmasburg – Olifantshoek area is shown in the following figure. The area forms part of the inland plateau of South Africa with elevations generally at about 1 400 mamsl. The topography is of the inselberg type, displaying rounded or sharp crested peaks and ridges projecting through sand or calcrete covered flats.

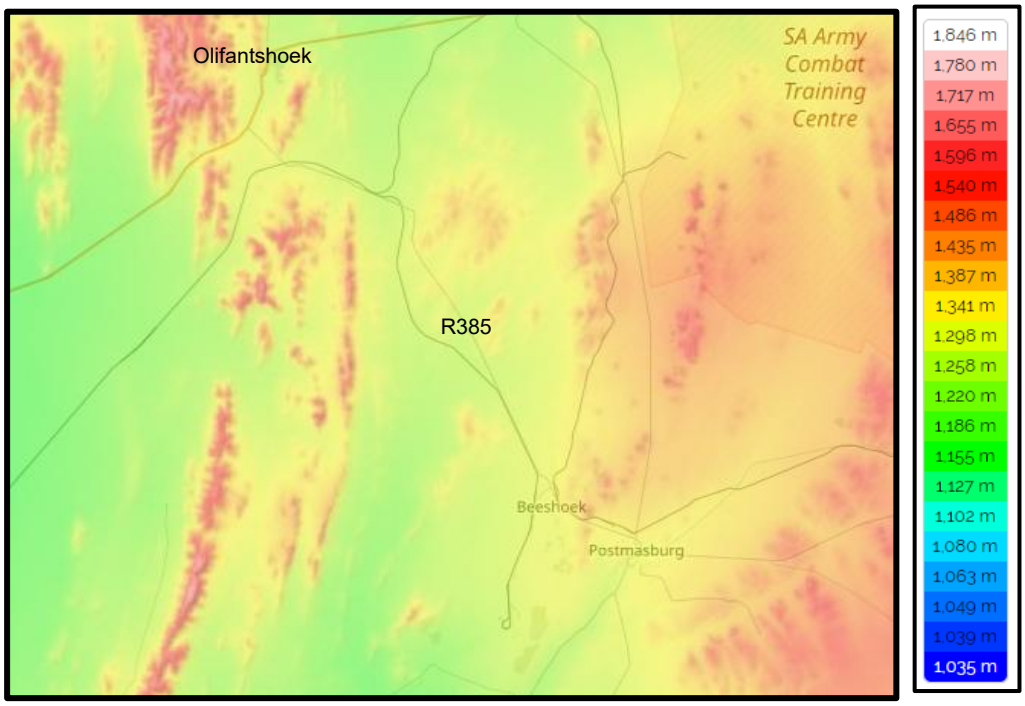


Figure 23: Map showing the topography of the greater Postmasburg – Olifantshoek area (image obtained from www.en-za.topographic-map.com/maps/7136/Postmasburg/).

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – 1. Site Specific Topography.*

3. VISUAL CHARACTERISTICS

The visual character of the greater study area mainly comprises of an agricultural setting intersected by mining, road-, railway- and electricity infrastructure. Through the years the area gained recognition for its manganese and iron ore potential and mines such as Kumba Iron Ore, Beeshoek-, Heuningkranz-, and Kolomela Mine were established. The towns of both Olifantshoek and Postmasburg have a low aesthetic value.

The immediate surrounding land uses, adjacent of the mining area, include agricultural activities (grazing) and mining (Kumba Heuningkranz). A diamond

mine (Metseatsididi) operates along the northern boundary of the farm, and the historic diamond pit on the Makganyene farm was abandoned and remains a landscape feature. Various target areas on the earmarked properties were prospected in the past five years. Considering this, the aesthetic ambiance of the region is that of a rural area with natural landscapes altered, in places, by mining/prospecting.

Also refer to:

- *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 1. Site Specific Topography.*
- *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 2. Site Specific Visual Characteristics*.

4. AIR QUALITY AND NOISE AMBIANCE

Due to the low rainfall, the air quality of the study area is characterised as dry, arid and dusty. Dust is the most important pollutant given the area's rural character predominantly affected by agriculture and mining.

The noise ambiance of the study area is classified as ambient rural or pastoral with noise levels mainly modified by traffic along the R385, railway traffic, farming equipment and mining related operations.

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 3. Site Specific Air Quality and Noise Ambiance.*

5. REGIONAL GEOLOGY AND SOIL

(Information extracted from the Mining Work Programme, 2024)

Iron ores of the Transvaal Supergroup occur in the Northern Cape Province within the Maremane Dome, along an approximately 90 km long north-south trending line between the towns of Sishen in the north and Postmasburg in the south. The Maremane Dome dips gently to the east and is mostly composed of the dolostones of the Campbellrand Subgroup and iron formations of the Asbesheuwels Subgroup (Kuruman and Griquatown iron formations) (Smith and Beukes, 2016).

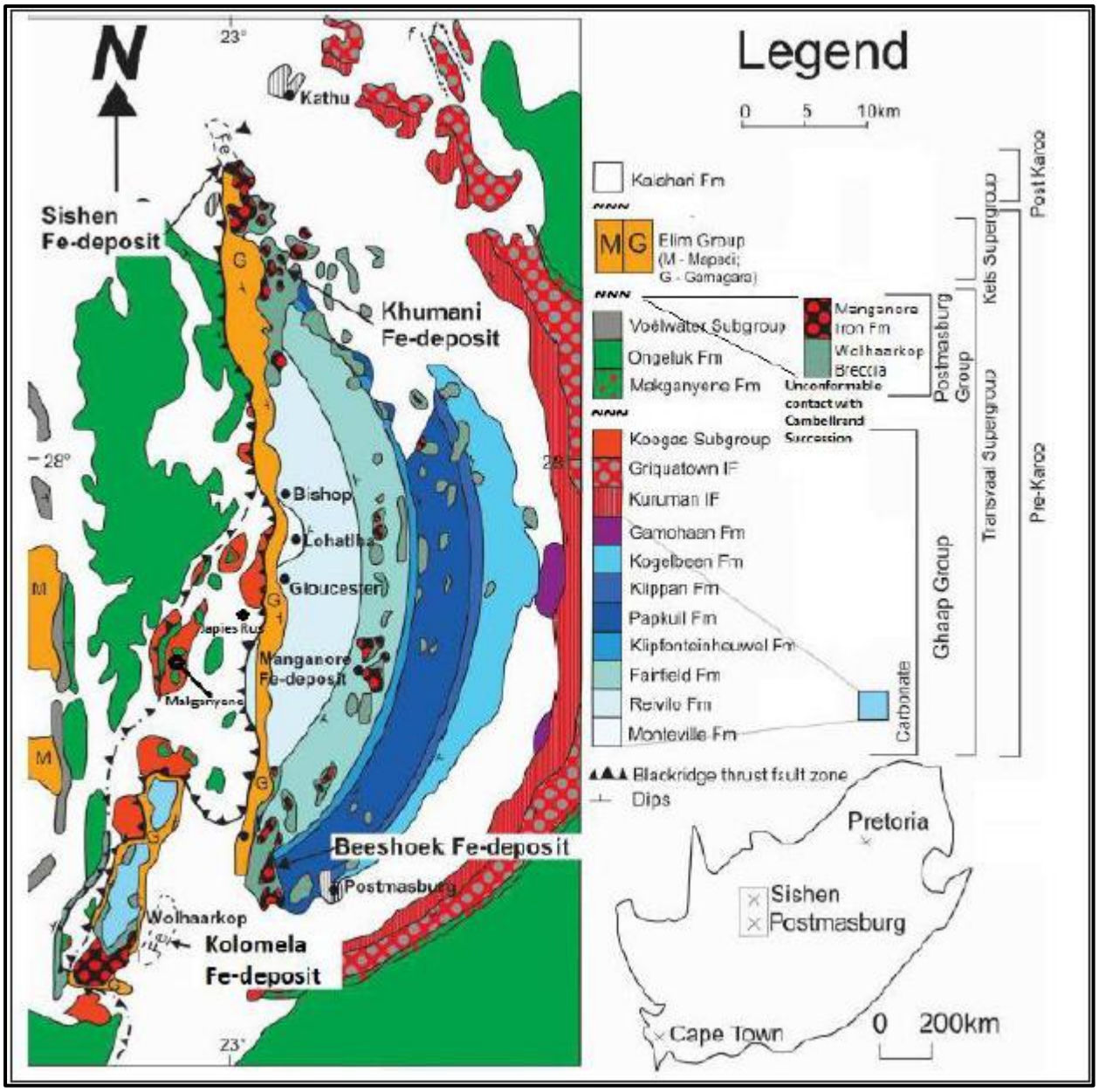


Figure 24: Regional geological map of the Maremane Dome region in the Northern Cape Province indicating the location of the Sishen, Khumani, Beeshoek and Kolomela iron ore deposits (image obtained from the MWP).

An erosional unconformity called the pre-Gamagara/Mapedi unconformity, cuts through the Maremane anticline and is succeeded by the Gamagara/Mapedi red bed succession. The unconformity, which is regionally developed over the entire Griqualand West area, is consistently marked by the presence of a ferruginous lateritic weathering profile in the rocks immediately below it. Formation of the unconformity and weathering took place around 2.2 to 2.0 Ga, at the time of lower Elim Group deposition (Dalstra and Rosière, 2008), following a period of folding and uplift of Transvaal Supergroup strata. Because of the folded nature of the strata below, the unconformity transects a wide variety of rocks, the compositions of which determine lateral variations along the lateritised surface. Towards the west

of the Maremane Dome, older rocks of the Transvaal Supergroup, including the Koegas Subgroup, Makganyene diamictite and Ongeluk lava, have been thrust over the post-Mapedi/Gamagara units along the Black Ridge thrust (Beukes and Smit, 1987), (Smith and Beukes, 2016).

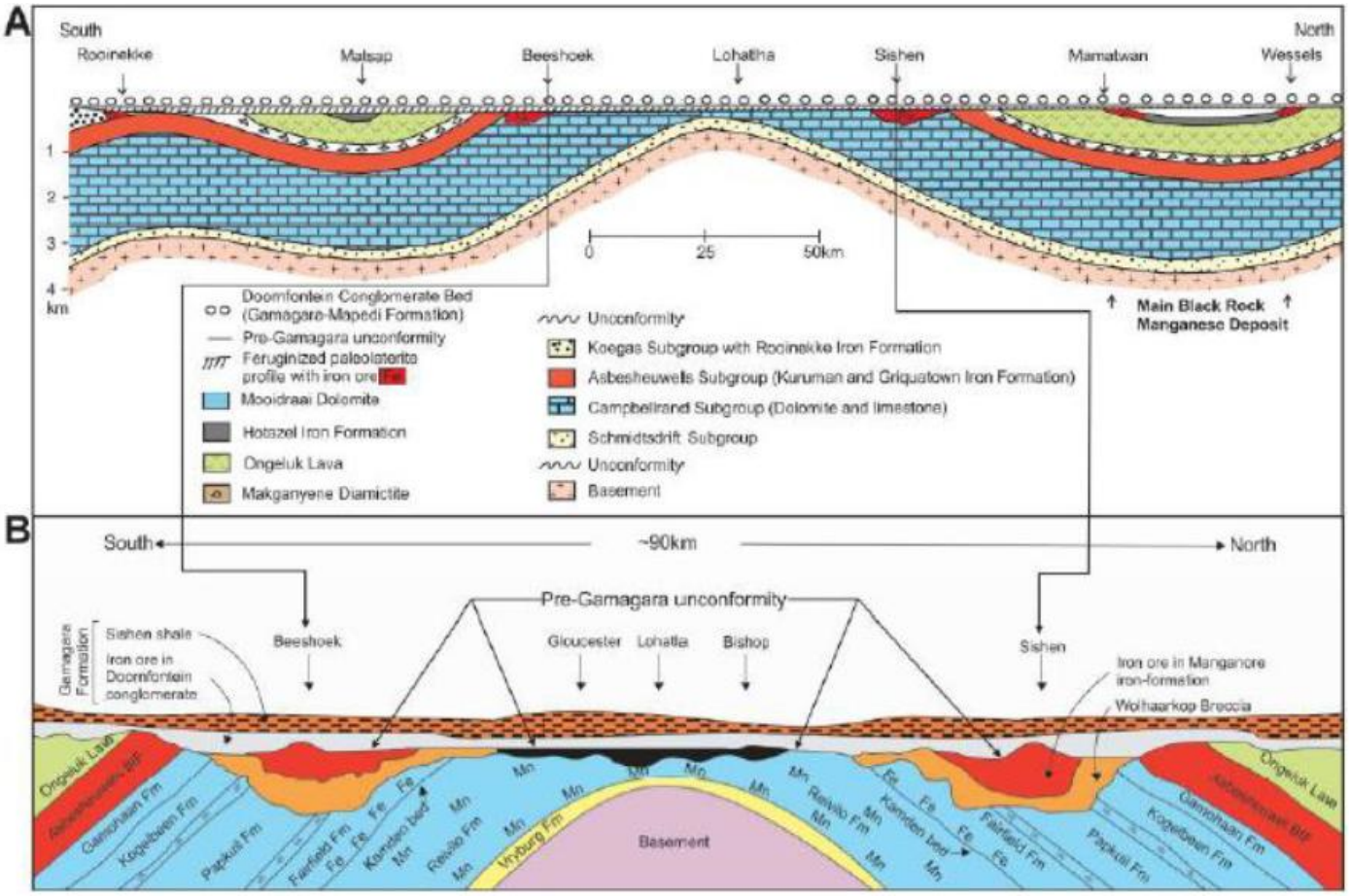


Figure 25: Schematic north-south cross section through (A) the western margin of the Griqualand West area and (B) the Maremane Dome (modified after Cairncross et al., 1997; Van Deventer, 2009). Sub-surface dips of lithologies are exaggerated for illustrative purposes (image obtained from the MWP).

The name Manganore Iron Formation was introduced by Beukes (1977, 1978) to describe the iron formation unit which overlies the Wolhaarkop Breccia on the Maremane dome because its correlation with the other units in the Transvaal Supergroup was uncertain (Van Schalkwyk and Beukes, 1986). Van Schalkwyk and Beukes (1986) correlates the Manganore Iron Formation with the Kuruman Iron Formation. They based their conclusion mainly on sedimentary structures in cycles zones that may correlate. The differences in mineralogical composition between the Kuruman Iron Formation with its ferrous minerals such as magnetite, siderite, greenalite, minnesotaite and stilpnomelane and the Manganore Iron Formation which comprise mainly of hematite, raised questions regarding the validity of the proposed correlation. Since the Kuruman Iron Formation went through periods of metamorphism, processes which are absence in the Manganore

Iron Formation, it was proposed by writer that the Manganore Iron Formation was a separate banded iron formation.

It was suggested by writer that the Manganore Iron Formation was deposited much later in the erosional deep structured synclinal basins and troughs that formed during the uplifting of the Maremane dome. The Wolhaarkop Breccia, a siliceous chert breccia, marks the dissolution surface between the dolomite and overlying ore-bearing iron formation formed in these deep structural basins. In some areas where the Manganore Iron Formation was deposited, karstic slump structures developed in these troughs (depressions) causing a high degree of brecciation of the BIFs and hematite ores.

The Makganyene iron ore deposits are located south-west of the farm Mogoloring 668 (Japies Rus). This western limb of the Maremane Dome represents the edge of the Kaapvaal craton and has been subjected to intensive folding, faulting, and thrusting. Early regional tectonism played a critical role in the genesis, deformation, and preservation of the ores from younger erosive events. As a result of regional tectonism, the lithological units in the area did not maintain their original sequence of depositional layering due to major thrust faulting of the lithological units associated with the Kheis-Korannaberg orogeny (Stowe, 1986) which caused large scale deformation.

The geology of the farm Makganyene consists of a basement of the Campbellrand Subgroup, Maremane dome dolomites. In the core of the dome erosion has laid bare Gamagara quartzites, overlain on all sides by banded jaspers of the Koegas Subgroup. The quartzites have been crushed and turned into a glassy-looking purplish rock near the contact with the over-riding banded jaspers, which are local at least 30 m thick. The latter have been finely granulated along the contact and pass upwards through more and less brecciated varieties onto the normal banded or thickly bedded jaspers, dipping gently to the west and to the east. The Gamagara quartzites represent remnants- originally laid down on the Dolomite or Koegas beds and which have probably taken part in previous horizontal movement (Visser,1944).

Most of the iron ore occurs as hematite clasts in the lower Doornfontein Member of Gamagara Formation overlaying the blinkklip breccia and Cambellrand dolomite. Manganese mineralization with a high Fe% content, occurs most often below the iron ore and in a few areas above the iron ore.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – 4. Site Specific Geology, Soils and Agricultural Sensitivity.*

6. HYDROLOGY & FRESHWATER ECOSYSTEMS

(Information extracted from the Hydrological Assessment, 2025 attached as Appendix I, the Lower Vaal Water Management Area: Internal Strategic Perspective, October 2004, and the Report on Geohydrological Investigation, 2025 attached as Appendix E)

6.1 Catchment Hydrological Characteristics

The mining area falls within the Molopo Sub-Water Management Area (SWMA) which is managed as part of the Vaal-Orange Water Management Area (WMA ID 4). The project area is located within the D73A Quaternary Catchment, which covers an area of just over 3 238 km^2. The following figure presents the hydrological setting.

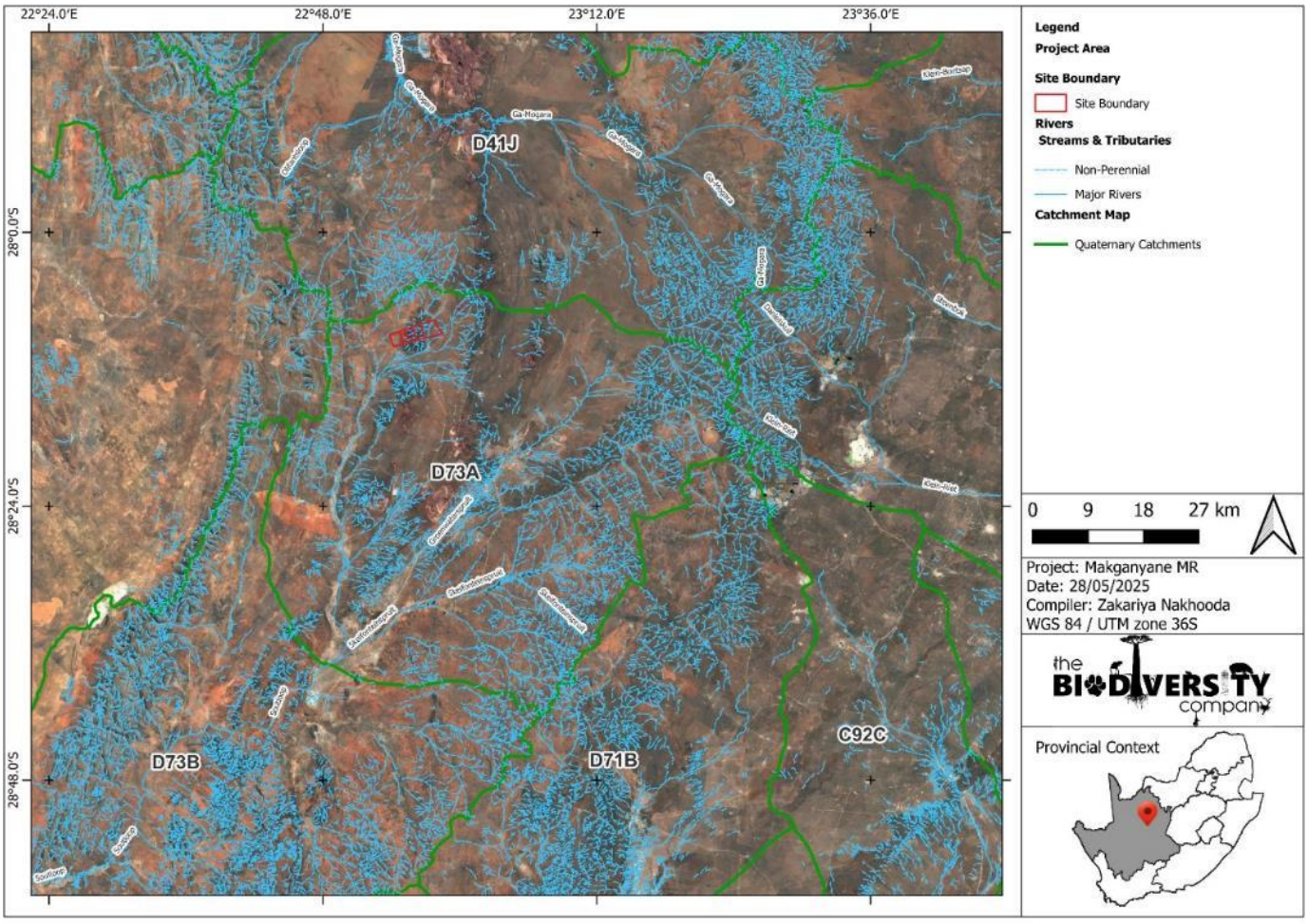


Figure 26: Hydrological setting (TBC, 2025).

Although the Molopo SWMA forms part of the Vaal-Orange WMA, it does not form part of the model for the Vaal River System as drainage of surface water

from the Molopo SWMA occurs in the direction of the Orange River and not the Vaal River. The Molopo SWMA is considered an endoeric area as flows from the Molopo River have not reached the Orange River in recorded history.

The project area is drained by tributaries of the Soutloop watercourse, which is always dry apart from run-off during and directly after significant rainfall events. The watercourse and tributaries occur as flat, open valley-bottom areas that are often up to 1 km wide.

According to the National Freshwater Ecosystem Priority Areas (NFEPA) map as presented by SANBI, a NFEPA of conservation importance extends over the study area (see figure below). Two ephemeral drainage lines passes through the greater study area as shown in the figure below. The eastern drainage line feeds a small pan to the south, while the western drainage line feeds an extensive wetland area so the south-west of Postmasburg.

Figure 27: National Wetlands and NFEPA BGIS Map Viewer showing the position of the NFEPA (dark green polygon). The lighter green represents an Upstream FEPA. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA).

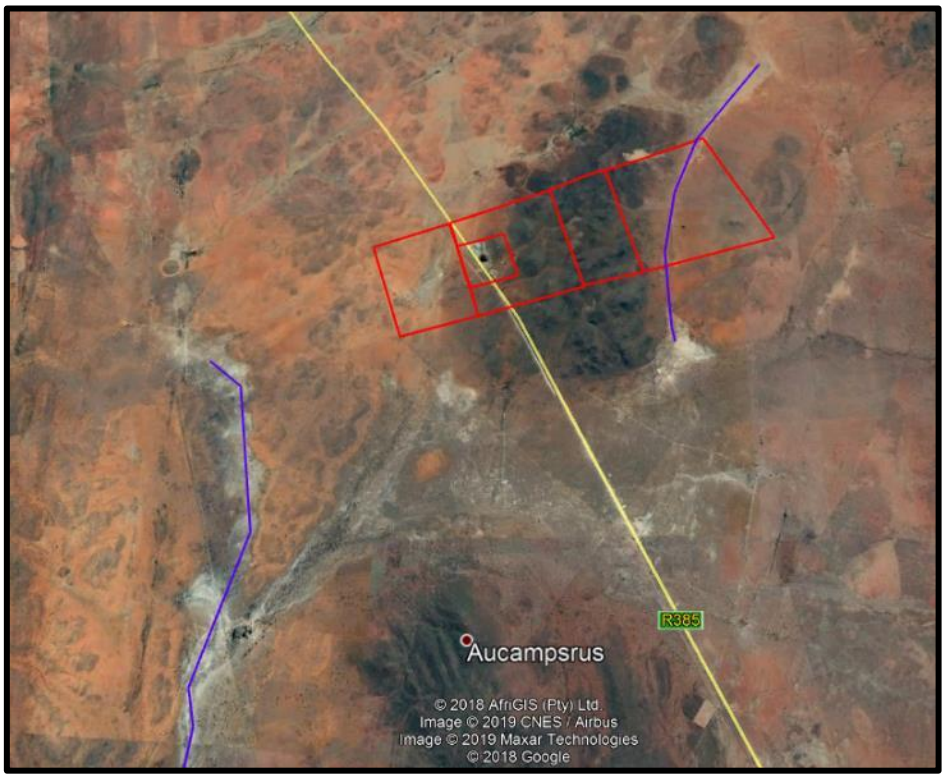


Figure 28: Satellite view of the two ephemeral drainage lines (blue lines) in the greater study area (image obtained from Google Earth).

Also refer to:

- δ *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 5. Site Specific Geohydrology.*
- δ *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 6. Site Specific Hydrology.*
- δ *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 7. Site Specific Freshwater Ecosystems.*

7. MINING AND BIODIVERSITY

(Information extracted from the Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector, Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, 2013).

The Mining and Biodiversity Guideline, compiled by the South African Mining and Biodiversity Forum (SAMBF) provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the developmental and operational phases of a mine, from exploration through to closure.

When the study area is placed on the Mining and Biodiversity Map, as shown in the figure below, Makganyene No 667/3 (north-eastern section of the proposed

mining footprint) is within an area of highest biodiversity importance with a corresponding rating of highest risk for mining.

The Mining and Biodiversity Guideline's definition for areas of highest biodiversity importance stipulates that: "*these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being"*. The guidelines note that environmental screening, the EIA, and specialists should focus on confirming the presence and significance of biodiversity features and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

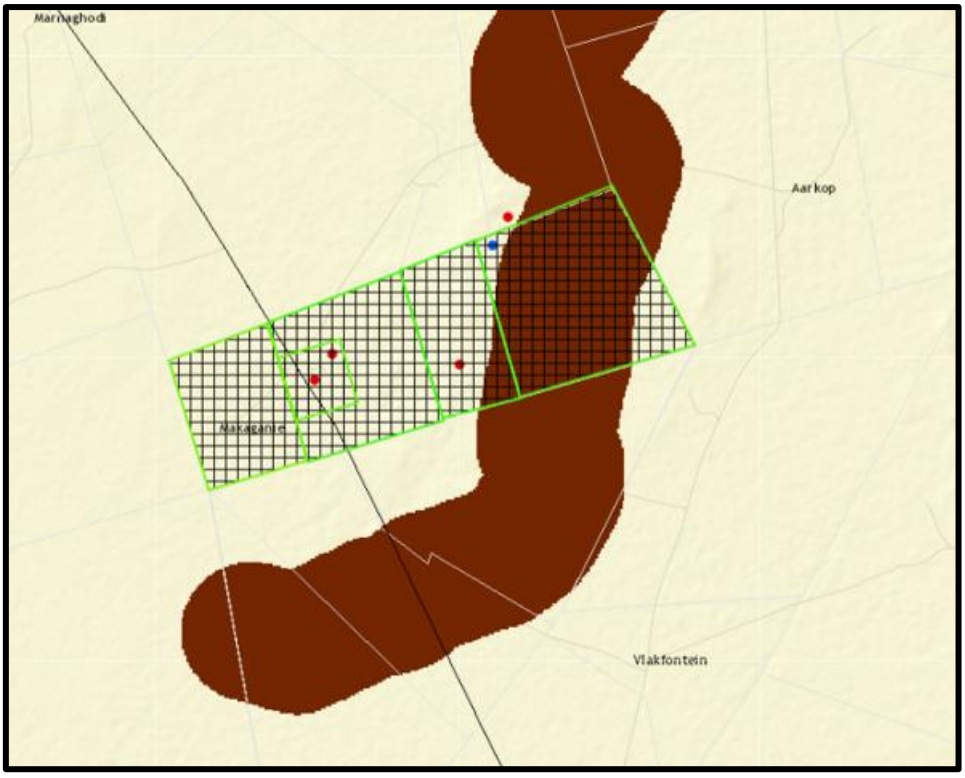


Figure 29: The Mining and Biodiversity importance map with the proposed mining footprint shown by the green polygon. The dark brown area shows an area of highest biodiversity importance with highest risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines).

It must be noted that there was a prospecting right (NC 30/5/1/1/2/2292 PR) over the proposed mining right application area that expired in November 2024. As such, the entire area (including the area marked as highest risk) was previously approved for prospecting related activities.

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.*

8. BIODIVERSITY CONSERVATION AREAS

(Information extracted from the Biodiversity Assessment attached as Appendix J)

According to the 2016 Northern Cape CBA BGIS Map Viewer, the proposed mining footprint extends across an area classified as Critical Biodiversity Area 1 (CBA1).

The Lexicon of Biodiversity Planning in South Africa provides the following definition for a CBA:

- Critical Biodiversity Area (CBA): *"an area that must be maintained in a good ecological condition in order to meet biodiversity targets. CBA's collectively meet biodiversity targets for all ecosystem types as well as for species and ecological processes that depend on natural or near-natural habitat, that have not already been met in the protected area network."*

Figure 30: 2016 Northern Cape CBA BGIS Map Viewer showing the proposed mining area over the CBA1 (green polygon).

Also refer to *Section 1(h)(iv)(1)(c) Description of specific environmental features and infrastructure on site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.*

9. GROUNDCOVER

(Information extracted from the Biodiversity Assessment attached as Appendix J)

According to Mucina and Rutherford (2012) three vegetation types extends into the earmarked area i.e. the Kuruman Mountain Bushveld (SVk 10), the Olifantshoek Plains Thornveld (SVk 13), and the Postmasburg Thornveld (SVk 14).

Figure 31: National vegetation cover map showing the proposed mining area within the Kuruman Mountain Bushveld (light sandy colour), the Olifantshoek Plains Thornveld (light grey-brown colour), and the Postmasburg Thornveld (darker brown-green colour). (Image obtained from BGIS Map Viewer – National Vegetation Map).

9.1 Kuruman Mountain Bushveld (SVk 10)

The Kuruman Mountain Bushveld is characterized by rolling hills with generally gentle to moderate slopes and hill pediment areas with an open shrubveld with *Lebeckia macrantha* prominent in places.

Some of the important taxa found in this vegetation type include Se*arsia lancea, S. pyroides, Diospyros austro-africana, Euclea crispa, E. undulate, Olea earopaea, Tarchonanthus camphoratus, Amphiglossa triflora, Anthospermum rigidum, Helichrysum zeyheri;* Grammnoids*: Andropogon chinensis, Anthephora pubescens, Aristida congesta, Digitaria eriantha, Themeda triandra.* Biogeographically Important Taxa: *Lebeckia macrantha* (Griqualand West endemics), *Tarchonanthus obovatus, Euphorbia wilmaniae, E. planiceps, Digitaria polyphylla, Sutera griquensis.*

The vegetation type is classified as Least Concern and according to Mucina and Rutherford (2012) none of it is conserved in statutory or private conservation areas. A conservation target of 16% was set for the vegetation type.

9.2 Olifantshoek Plains Thornveld (SVk 13)

The Olifantshoek Plains Thornveld is a very wide and diverse unit on plains with usually open tree and shrub layers with for example Ac*acia luederitzii, Boscia albitrunca* and *Searsia tenuinervis*, and with a usually sparse grass layer.

Some of the important taxa found in this vegetation type include *Acacia erioloba, A. mellifera, Boscia albitrunca, Terminalia sericea, Lycium hirsutum, Rhigozum obovatum, Searsia tridactyla, Tarchonanthus camphoratus, Aptosimum procumbens, Grewia retinervis, Solanum tomentosum.* Grammnoids*: Schmidtia papophoroides, Stipagrostis uniplumis, Aristida congesta, Digitaria eriantha.* Biogeographically Important Taxa: *Acacia luederitzii, Lebeckia macrantha, Hermannia burchelli, Justicia puberula, Tarchonanthus obovatus.*

The vegetation type is classified as Least Concern and according to Mucina and Rutherford (2012) only 0.3% is statutorily conserved in the Witsand Nature Reserve. Approximately 1% of the vegetation type has been transformed and the occurrence of erosion is very low. A conservation target of 16% was set for the vegetation type.

9.3 Postmasburg Thornveld (SVk 14)

The vegetation and landscape features of the Postmasburg Thornveld is described as flats surrounded by mountains supporting open, shrubby thornveld characterised by dense shrub layer often lacking a tree layer, the grass layer is very sparse. Shrubs are generally low with a karroid affinity.

Some of the important taxa found in this vegetation type include *Acacia erioloba, A. karroo, Searsia lancea, S. tridactyla, Ziziphus mucronata, Diospyros lycioides, Ehretia rigida, Tarchonanthus camphoratus, Grewia flava, Felicia muricata, Melolobium microphyllum, Sutera linariifolia,* Grammnoids*: Digitaria eriantha, Enneapogon scoparius, Eragrostis*

lehmanniana, Aristida adscensionis, A. congesta, A. diffusa.
Biogeographically Important Taxa*: Euphorbia bergii, Digitaria polyphylla.*

The vegetation type is classified as Least Threatened and according to Mucina and Rutherford (2012) none of it is conserved in statutory or private conservation areas. Very little of the vegetation type has been transformed and the occurrence of erosion is very low. A conservation target of 16% was set for the vegetation type.

9.4 2018 SANBI Vegetation Map

The vegetation types listed above corresponds with the latest vegetation map of South Africa (SANBI, 2018), as shown below.

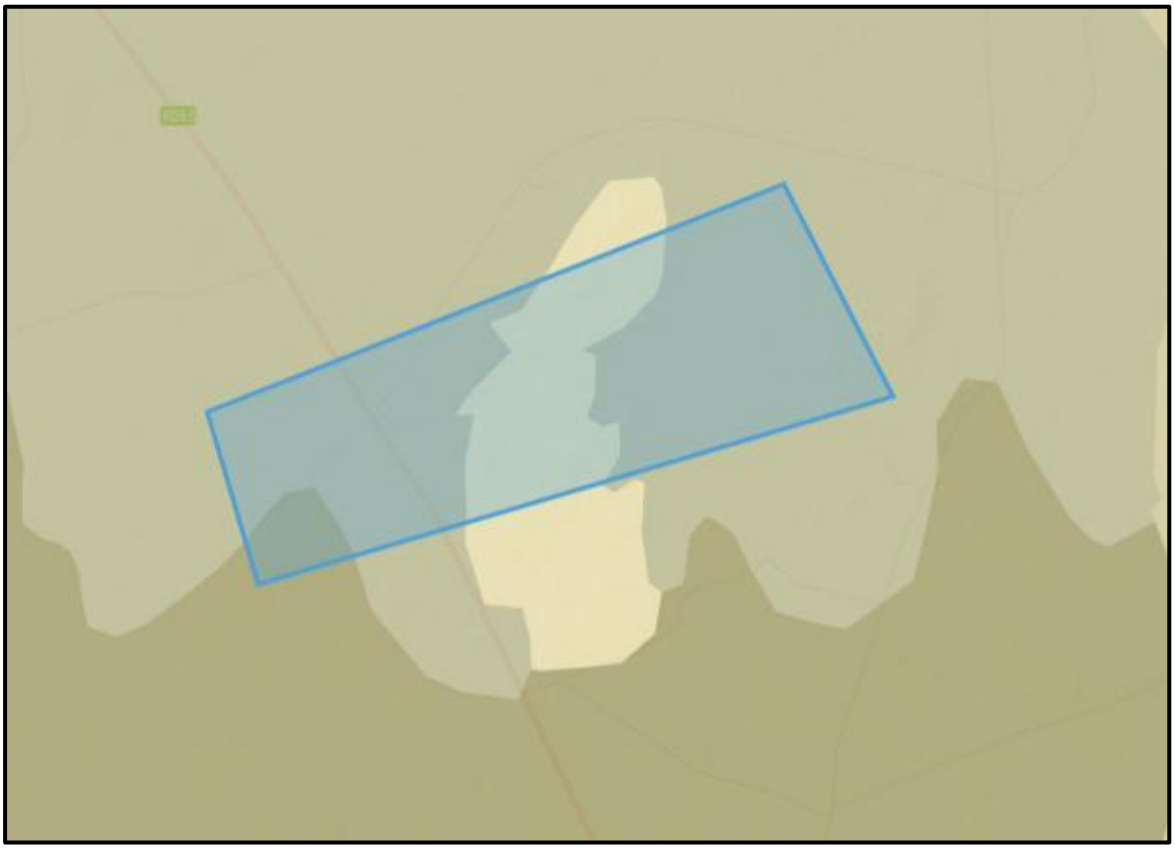


Figure 32: BGIS 2018 National Vegetation Map showing the proposed mining area within the Kuruman Mountain Bushveld (light sandy colour), the Olifantshoek Plains Thornveld (light grey-brown colour), and the Postmasburg Thornveld (darker brown-green colour). (Image obtained from BGIS Map Viewer – 2018 National Vegetation Map).

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover*.

10. FAUNA

(Information extracted from the Biodiversity Assessment attached as Appendix J)

The study area is mainly used for stock grazing. Apart from the domestic animals and game, the indigenous faunal action of the area is high and shows a rich diversity with various protected species still present. The following faunal species are known to occur in/around the study area (non-exhaustive list):

Mammals

- Aardvark (*Orycteropus afer*)
- Bat-eared Fox (*Otocyon megalotis*) (VU)
- Black-footed Cat (*Felis nigripes*) (VU)
- Bushveld Gerbil (*Gerbilliscus leucogaster*)
- Cape Fox (*Vulpes chama*)
- Cape Porcupine (*Hystrix africaeaustralis*)
- Desert Pygmy Mouse (*Mus indutus*)
- Ground Squirrel (*Xerus inauris*)
- Hedgehog (*Erinaceus auropaeus)* (NT)
- Horses (*Equus* spp.)
- Kudu (*Tragelaphus strepsiceros*)
- Namaqua Rock Mouse (*Aethomys namaquensis*)
- Pangolin (*Smutsia temminckii)* (VU)
- Slender Mongoose (*Galerella sanguinea*)
- Smith's Red Rock Hare (*Pronolagus rupestris*)
- Southern Multimamate Mouse (*Mastomys coucha*)
- Springbok (*Antidorcas marsupialus*)
- Springhare (*Pedetes capensis*)
- Steenbok (*Raphicerus campestris*)
- Yellow Mongoose (*Cynictis penicillata*)
- Warthog (*Phacochoerus africanus*)

Birds

- African March-harrier (*Circus ranivorus*)
- Black Stork (*Ciconia nigra*) (VU – SA Red List)
- Chestnut-banded Plover (*Charadrius pallidus*) (NT)
- Kori Bustard (*Ardeotis kori*) (NT)
- Lanner Falcon (*Falco biarmicus*)
- Lesser Kestrel (*Falco naumanni*) (VU – SA Red List)

- δ Martial Eagle (*Polemaetus bellicosus*) (VU)
- δ Ostrich (*Struthio camelus*)
- δ Secretarybird (*Saggittarius sepentarius*) (VU)
- δ Tawny Eagle (*Aquila rapax*) (VU)
- δ Yellow-billed Stork (*Mycteria ibis*)

Invertebrates

- δ Baboon Spiders
- δ Boomslang (*Dispholidus typus typus*)
- δ Burrowing Scorpions
- δ Namaqua Plated Lizard (*Gerrhosaurus typicus*)
- δ Namaqua Sand Lizzard (*Pedioplanis namaquensis*)
- δ Striped Skaapsteker (*Psammophylax tritaeniatus*)

Also refer to Part A(1)(g)(iv)(1)(c) *Description of specific environmental features and infrastructure on site – Site Specific Fauna.*

11. CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT

(Information extracted from the Heritage Impact Assessment for the Proposed Makganyane Iron Ore Mine – Mining Right, Northern Cape Province, 2025 as well as the Palaeontological Impact Assessment for the Opencast Mining Right Application on Farm Makganyene 667, Northwest of Postmasburg, Northern Cape Province, 2025)

11.1 Archaeological Background

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

11.1.1 Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age (LSA), the Middle Stone Age (MSA), and the Earlier Stone Age (ESA (Arch)). The larger study area has a wealth of pre-colonial archaeological sites (Morris & Beaumont 2004). Famous sites in the region include the world renowned Wonderwerk Cave to the north of the study area. Closer to Kuruman two shelters on the northern and southern faces of GaMohaan (in the Kuruman Hills north-west of the town) contain Later Stone Age remains and rock paintings. Rock art is known to occur at Danielskuil to the north-east and on Carter Block (Morris 2008). Middle Stone Age material is on record around the study area.

According to Morris (2005) in the immediate area to the north of the study area, the Earlier Stone Age is represented by 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 sites (one on King, one at Mashwening and eight at Kathu). Rock engravings have been identified from Sishen and Bruce (the Bruce site was salvaged and recorded by Fock & Fock 1984), as well as Beeshoek, to the east of the study area (Fock & Fock 1984; Morris 1992; Beaumont 1998). Specularite sources are known on Demaneng and Lylyveld and were mined in Stone Age times at a site on Doornfontein to the east of the study area (Beaumont 1973; Beaumont & Boshier 1974) and at Tsantsabane to the east of Postmasburg (Beaumont 1973; Thackeray et al. 1983): numerous other specularite workings have also been recorded (Beaumont 1973).

Stone Age artefacts are often recorded at industrial sites similar to the mining activities at Makganyane and the effects of heavy-duty earth moving machinery on the formation of lithic debitáge at open-air Stone Age/Palaeolithic sites was examined by Bradfield and Van der Walt (2018) at a site close to Kathu. The experiment with heavy-duty machinery produced only one pseudo-formal tool, most of the debitáge produced mimics that occasioned by knapping and this could attribute to some of the debitage/ artefacts identified on industrial sites.

11.1.2 Iron Age

Iron Age expansion southwards past Kuruman into the Ghaap plato and towards Postmasburg dates to the 1600's (Humphreys, 1976 and Thackeray, 1983). Definite dates for Tswana presence in the Postmasburg area are around 1805 when Lichtenstein visited the area and noted the mining activities of the Tswana (probably the Thlaping) tribes in the area. The Thlaro and Thlaping settled the area from Campbell in the east to Postmasburg and towards the Langeberg close to Olifantshoek in the north-west before 1770 (Snyman, 1988). The Korana expansion after 1770 started to drive the Thlaro and Thlaping further north towards Kuruman (Shillington, 1985); Morris (2005) indicated that three Iron Age sites close to the study area are on record (Demaneng, Lylyveld and Kathu).

11.2 Historical Information

It could not yet be determined with certainty what group of people had lived in the Postmasburg area before the Bushmen. However, a large number of stone tools, as well as glass beads, have been found in the Blinkklipkop ("Shiny Stone Hill"), which testifies to early human activity. (Snyman 1983: 1).

Rock paintings in the area serve as evidence that the hunter gatherer Bushmen had inhabited Griqualand West for centuries. In the 1770s, the Korana (people of Nama ancestry) moved into the Postmasburg area and disrupted the Bushmen's way of life. The Korana regularly visited a primitive mine in the Blinkklipkop, which today forms part of the town of Postmasburg, to exploit shimmering substances, namely hematite and specularite, which were mixed with fat and applied to the skin to give a sought-after shiny red appearance. With the later arrival of the Tswana, Korana, Griqua and Europeans the Bushmen gradually emigrated to the Kalahari, Botswana and Namibia. (Snyman 1983: Foreword, 1-3).

The Tswana (Western Sotho) invaded the Northern Cape about 500 years ago, but the later Hay district in which Postmasburg was located was only occupied in the early 1800s. Long before settling in this area the Tswana also undertook journeys to Blinkklipkop to mine for the cosmetic substance that they called sibilo.

In the 1820s the Griqua leader Andries Waterboer was able to expel his enemies, the Bergenaars of the Langeberge, from Blinkklip, as the area was called at the time. This became a permanent outpost of the Griqua tribe. By the 1830s the Blinkklip population had grown to the extent that missionary of the London Mission Society, John Baillie, was stationed there for a time. Nikolaas Waterboer succeeded his father in 1853, and after this the tribe's authority in the area started to wane. Waterboer and his tribe became British subjects in 1871 after the British annexed Griqualand West. The discovery of diamonds further paved the way for white settlement in this district. (Snyman 1983: 4-5; Breutz 1963:8)

Farms were surveyed by the British in the Griekwastad district in the 1870s, and between 1876 and 1878 the first farms owned by Europeans were purchased in this area. It was only in 1891 that 82 town plots were surveyed around the existing police station at Blinkklip. In the same year members of

the church petitioned the Commissioner of Crown Lands to rename this town Postmasburg, in remembrance of Professor Dirk Postma, a minister of the Dutch Reformed Church in South Africa. This name change was affected in April 1892. (Snyman 1983: 10). By June 1892 there were only three buildings in the town of Postmasburg: a police station, a church building and a small house belonging to a policeman. This soon changed, and by March 1893 the little settlement that was established around a church had a post office, two shops, a partially complete school building and twenty dwelling houses. The town's first town management council was elected in May of that year. (Snyman 1983: 10-11)

The manganese fields in the Postmasburg area were opened for prospecting in 1922, and this greatly boosted the development of the town and caused an influx of new residents. The economic depression of the 1930 adversely affected mining in the area, but the town economy could still rely on the agricultural sector. Postmasburg became a municipality in 1936. (Snyman 1983:12)

11.3 Anglo-Boer War

There are no battlefields or concentration camp sites close to the study area.

11.4 Geology and Palaeontology

11.4.1 Project Location and Geological Context

The project lies in the Kalahari Basin where young windblown sands overlie much older rocks of the Olifantshoek and Transvaal Supergroups (following figure).

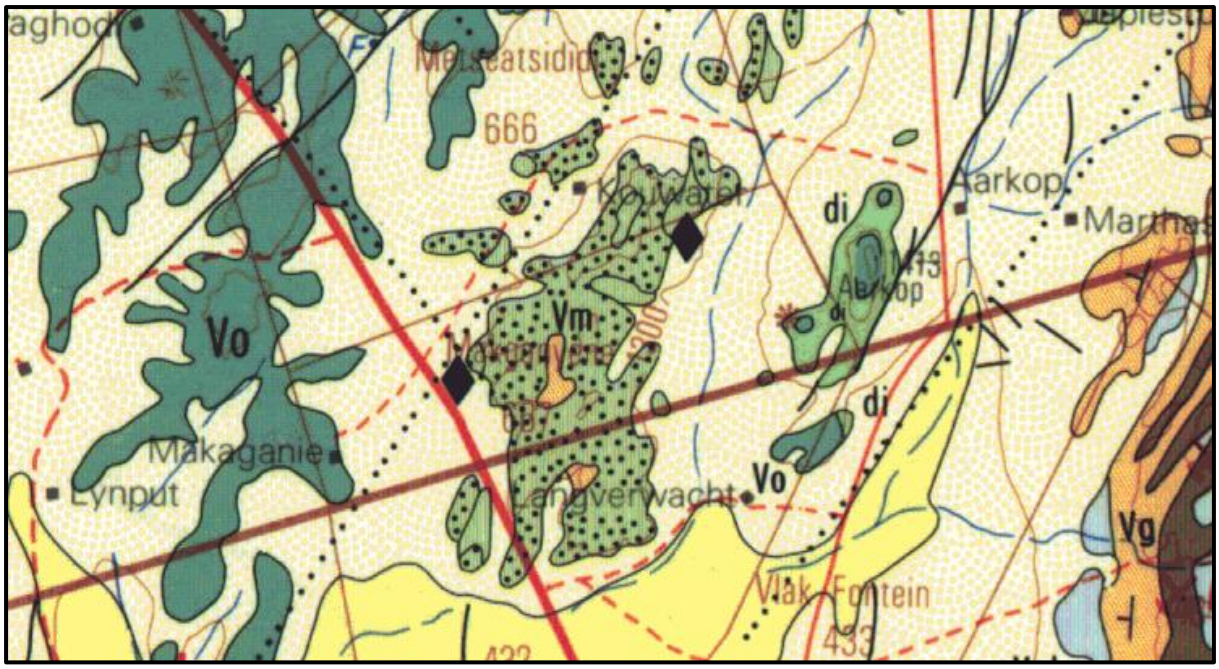


Figure 33: Geological map of the area around the Farm Makganyene 667 with the MRA area shown within the blue outline. Abbreviations of the rock types are explained in Table 18. Map enlarged from the Geological Survey 1: 250 000 map 2822 Postmasburg (Bamford).

Table 18: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project (Bamford).

SYMBOL	GROUP/FORMATION	LITHOLOGY	APPROXIMATE AGE
Qs	Kalahari Group	Windblown sands and sand dunes	Quaternary, ca 2,5 Ma to present
Ql	Kalahari Group	Surface limestone	Quaternary, ca 2,5 Ma to present
Vl	Lucknow Fm, Olifantshoek SG	White quartzite and shale with subordinate dolomite and conglomerate	Palaeoproterozoic Ca 1893 Ma
Vv	Voelwater Fm, Postmasburg Group	Banded Iron, jasper, dolomite	Palaeoproterozoic < 2222 Ma
Vo	Ongeluk Fm, Postmasburg Group	Basaltic andesitic lava	2222 Ma
Vm	Makganyane Fm, Postmasburg Group	Diamictites of glacial origin	Ca 2420 – 2222 Ma
Vg	Gamagara Fm, Postmasburg Group	Shale, flagstone, quartzite, conglomerate	Ca 2420 – 2222 Ma

The Late Archaean to early Proterozoic Transvaal Supergroup is preserved in three structural basins on the Kaapvaal Craton (Eriksson et al., 2006). In South Africa are the Transvaal and Griqualand West Basins, and the Kanye Basin is in southern Botswana. The Griqualand West Basin is divided into the Ghaap Plateau sub-basin and the Prieska sub-basin. Sediments in the lower parts of the basins are very similar, but they differ somewhat higher up the sequences. Several tectonic events have greatly deformed the southwestern portion of the Griqualand West Basin between the two sub-basins.

Above the basal Ghaap Group that has extensive iron and manganese deposits, is the upper Postmasburg Group that is divided from the base upwards, into the Makganyene, Ongeluk, Hotazel and Mooidraai Formations (Eriksson et al., 2006; Schröder et al., 2016). Lying above the Asbestos Hills Subgroup is the Makganyene Formation that has diamictites and shales from glacial conditions. Disconformably overlying these are the Ongeluk Formation basaltic andesitic lavas. According to Cornell et al. (1996) and Schroder et al. (2016) the Ongeluk Formation is equivalent to the lavas of the Hekpoort Formation in the Transvaal Basin.

11.4.2 Quaternary

There were two large basins dominating southern Africa during the Cenozoic, with the Kalahari Basin to the west and the Bushveld basin to the east. Both basins are bounded along their southern extent by the more or less west-east trending Griqualand-Transvaal Axis (Partridge et al., 2006). These sediments are not easy to date but recent attempts are gradually filling in the history of the sands, sand dunes and inter-dunes (Botha, 2021).

Quaternary Kalahari sands cover large parts of the rocks in this region, especially to the west. This is the largest and most extensive palaeo-erg in the world (Partridge et al., 2006) and is composed of extensive aeolian and fluvial sands, sand dunes, calcrete, scree and colluvium. Periods of aridity have overprinted the sands, and calcrete and silcrete are common. Most geological maps indicate these sands simply descriptively (aeolian sand, gravelly sand, calcrete) or they are lumped together as the Gordonia Formation because the detailed regional lithostratigraphic work has not been done, Nonetheless, these sands have eroded from the interior and have been transported by wind or water to fill the basin. Reworking of the sands

or stabilisation by vegetation has occurred. Probable ages of dune formation are around 100 kya (thousand years), 60 kya, 27-23 kya and 17-10 kya (in Botha, 2021).

Also refer to Part *A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on site – Site Specific Cultural, Heritage and Palaeontological Environment.*

12. SOCIO-ECONOMIC ENVIRONMENT

(Information obtained from the Socio-Economic Impact Assessment, 2025 attached as Appendix M)

The proposed MIOM is situated approximately ±24km north-west of the town of Postmasburg within the Z F Mgcawu District Municipality (ZMDM) and Ward 6 of the Tsantsabane Local Municipality (TLM) in the Northern Cape Province.

The following provides an overview of the socio-economic environment of the District Municipality (DM), and Local Municipality (LM) within which the MIOM is proposed and provides the socio-economic basis against which potential issues can be identified. Refer to the Socio-Economic Impact Assessment (Appendix M) for an overview of the socio-economic environment of the province.

12.1 ZF Mgcawu District Municipality (ZMDM)

The ZF Mgcawu District Municipality, formerly known as Siyanda District Municipality, is a Category C municipality located in the mid-northern part of the Northern Cape Province, bordering Botswana to the north and Namibia to the west. Covering an area of 102,504 km², the district encompasses much of the Kalahari Desert, the Kgalagadi Transfrontier Park, and parts of the former Bushmanland. It includes five local municipalities: Dawid Kruiper, Kai !Garib, Tsantsabane, !Kheis, and Kgatelopele, with Upington serving as the administrative centre.

Key towns within the district include Postmasburg, Kakamas, Keimoes, Kenhardt, Danielskuil, Lime Acres, and Beeshoek. The district's economy is primarily driven by agriculture, mining, and tourism, supported by its natural landscapes, mineral wealth, and agricultural productivity.

Figure 34: Local municipalities of ZMDM (Eco Thunder).

12.1.1 Population

ZMDM spans ±102 504 km² and had a population of 252 692 in 2016, representing 21% of the Northern Cape's population. Population growth has been notable at 17.8% between 2001 and 2016, with Dawid Kruiper accounting for 42.4% of the district population. There are an estimated 74 091 households with an average household size of 3.4. Approximately 68.1% of the population falls within the economically active age group (15–64 years), indicating potential for labour-driven economic development, although service backlogs persist in rural areas.

12.1.2 Economy

The district is the second-largest contributor to the Northern Cape economy, accounting for 21% of provincial GDP as of 2015. Key economic sectors include mining (16%), agriculture (15%), and wholesale/retail trade (15%). Mining activities, especially in Tsantsabane and Kgatelopele, are significant employers. The Orange River supports intensive irrigation agriculture, particularly in Kai !Garib and Dawid Kruiper, where grapes, dates, and dried fruits are major outputs. Despite these strengths, economic diversification is limited. Infrastructure gaps, lack of SMME support, and weak industrial linkages constrain long-term economic resilience.

12.1.3 Employment and Unemployment

Employment in the district is primarily in mining, agriculture, and community services. Although mining offers relatively high wages, it is not sustainable in the long term due to finite resources. The agricultural sector provides seasonal work but is vulnerable to drought and fluctuating market conditions. Unemployment is particularly high among youth and women, and informal employment remains prevalent in remote areas. The district recognises the need to stimulate inclusive local economic development and skills training to promote job creation beyond extractive industries.

12.1.4 Education

Educational attainment in ZMDM is below the national average. As per 2011 data, a large share of the population has only completed some primary or secondary education. Only 13.7% of residents had completed Grade 12, and just 1% held tertiary qualifications. Access to post-school education remains concentrated in larger towns like Upington, leaving rural youth with limited prospects. Challenges include high dropout rates, under-resourced schools, and a shortage of skilled educators, particularly in smaller municipalities like !Kheis and Kgatelopele.

12.1.5 Health Care

Healthcare services in the district are unevenly distributed. There are five hospitals and 52 clinics across ZMDM, but most are located along main transport routes such as the N10 and N14. Kai !Garib has the most clinics (18), followed by Dawid Kruiper (14). Access remains a challenge in remote settlements, with some clinics only staffed monthly. HIV/AIDS and tuberculosis continue to pose major public health challenges. Malnutrition and child health concerns are closely tied to poverty and illiteracy. Health service delivery is hindered by staff shortages and poor access to specialised care, particularly in the Kalahari and Bushmanland areas.

12.2 Tsantsabane Local Municipality (TLM)

Tsantsabane Local Municipality is situated in the ZMDM and covers geographic area of 5 887 km^2 (Surveyor General, 2008). Tsantsabane Local Municipality is bordered by Siyancuma LM, Dawid Kruiper LM, !Kheis LM, Gamagara LM and Kgatelopele LM.

12.2.1 Population

According to Statssa (2016) and CSIR (2022), TLM in 2021 had a population 43 758 people, which reflected an increase of 8 678 people between 2011 (had a population of 35 093) and 2021, also indicating a population increase of 17 345 between 2001 (had a population of 31 014) and 2021. As such, by 2031 it is expected that TLM will reach 55 345 people, adding an approximate number of 11 590 to the 2021 figures. This population growth trend is expected to increase the number of people that the municipality must provide services to, keeping in mind that the municipality is currently facing challenges in meeting its present demand on water, sanitation, and electricity provision.

Table 19: Population dynamics (Eco Thunder)

Settlement	Population 1996	Population 2001	Population 2011	Population 2021	Change 2001-2021	Change 2011-2021
Beeshoek Mine	954	965	551	634	-332	83
Boitshoko	6105	6643	8140	9402	2759	1261
Glosam SP	180	177	117	131	-46	14
Goedgedacht SP	2153	538	748	963	425	214
Groenwater SP	169	522	739	1043	522	304
Lohatlha Military	80	43	146	196	152	49
Marenteng	1760	3304	3383	4395	1091	1012
Near Groenwater (New)	15	3	12	22	19	11
Near Iftimasum Motalib (New)	388	438	1478	2948	2510	1471
Near Skeyfontein (New)	55	4	13	22	18	9
New Town	3026	4322	6249	7158	2836	910
Postdene	5493	5379	6928	8047	2668	1120
Postmansburg SP	2019	794	4293	5978	5184	1685
Skeyfontein (New)	59	4	13	18	14	5
Rest of area	3947	3277	2271	2801	-476	530
Grand Total	**26402**	**26413**	**35080**	**43758**	**17345**	**8678**

The 2021 Stats SA data on TLM on age and gender distribution enables population comparisons from earlier periods 2011, 2016 until 2021 to be drawn for the purpose of establishing trends, but also for forecast planning. These data include whether specific age bands in the population are growing or declining. The graphical comparison in the form of an overlayed growth pyramid below shows the TLM population age and gender breakdown for the years 2011, 2016 and 2021.

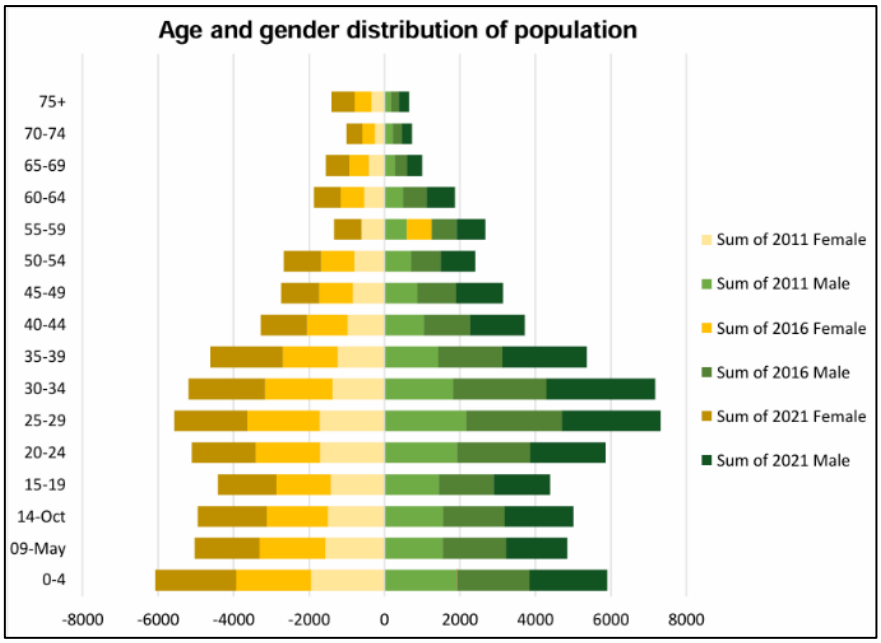


Figure 35: Trends in age and gender distribution of population for years 2011, 2016 and 2021 (Eco Thunder)

This information is critical to support decision-making in the prioritisation of resource allocation to sustain basic service delivery and facilitation of social and economic development within the TLM area. TLM and key stakeholders must reflect on the following issues:

- δ Implications of age distribution in the Municipality for the provision of social development services (e.g. community facilities, educational facilities, settlement planning, etc)
- δ Implication of age distribution on employment in the Municipality and on socioeconomic development by key stakeholders.
- δ Implications for the municipality and key stakeholders to address gender inequalities and how effectiveness of development interventions and their benefits to the elderly, disabled, women, men, and children.

12.2.2 Employment and Unemployment

The 2011 Census by StasSA depicts that unemployment figures have drastically reduced from 4 466 in 2001 to 3 795 in 2011 which shows a decrease of 15%. Employment increased by 69% in 2011, which is attributable to various socio-economic sectors' investment in the area linked to the upsurge in mining and solar industrial investment. The 2019 Kumba Kolomela Social Impact Assessment Survey, conducted in the whole of Tsantsabane Local Municipality, capturing 4 039 respondents, give the

following details in terms of employment status and per sector in the Tsantsabane Municipal Area.

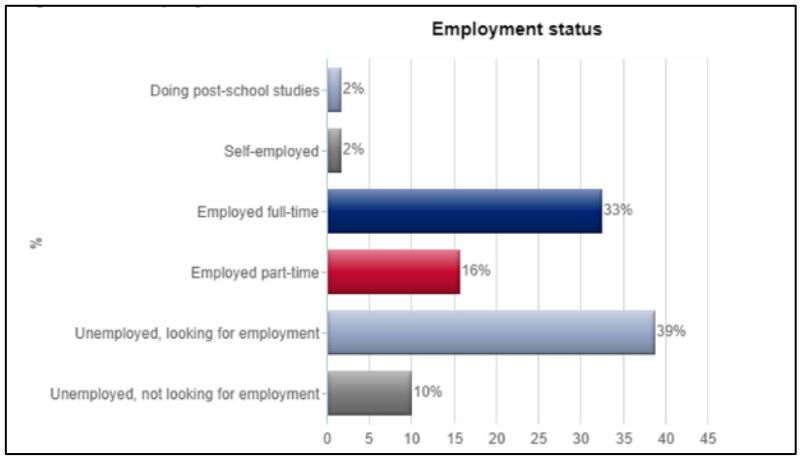


Figure 36: Employment status (Eco Thunder)

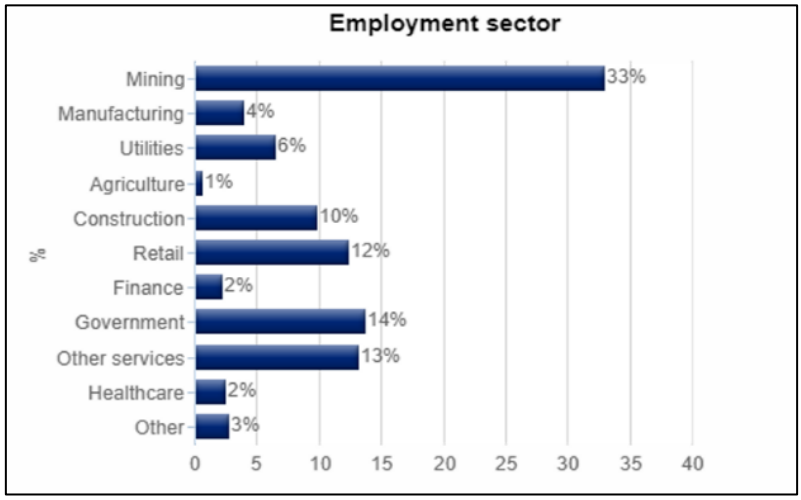


Figure 37: Employment sector (Eco Thunder).

Whilst the above picture creates comfort, the concern for Tsantsabane Municipal Council remains the sustainability of this picture or its positive impact on the local population, given the data on education levels, impact on special groups (youth, women & disabled), impact of the COVID-19 pandemic on the above. Moreover, the concern remains the importing and extraction nature of the solar and mining industries in relation to production requirements and lack of beneficiation, respectively.

12.2.3 Education

It is important to understand the level of education of people in a particular area, as one is then able to have a clear understanding of the human resource capital of the area and gauge its potential to respond to socio-economic environmental factors, both for social and economic development

of the area. From the 2011 StasSA Census data, the following is the educational data for the TLM area.

Table 20: Education levels (Eco Thunder)

Group	Percentage
No Schooling	4,6%
Some Primary	41%
Completed Primary	6,4%
Some Secondary	32,1%
Completed Secondary	13,7%
Higher Education	1%
Not Applicable	1,2%

The above table, when compared with the 2019 Kumba Kolomela Social Impact Assessment Survey conducted in the whole of TLM through 1 284 respondents there shows no improvements. The graphs below show data for both school and post-school education.

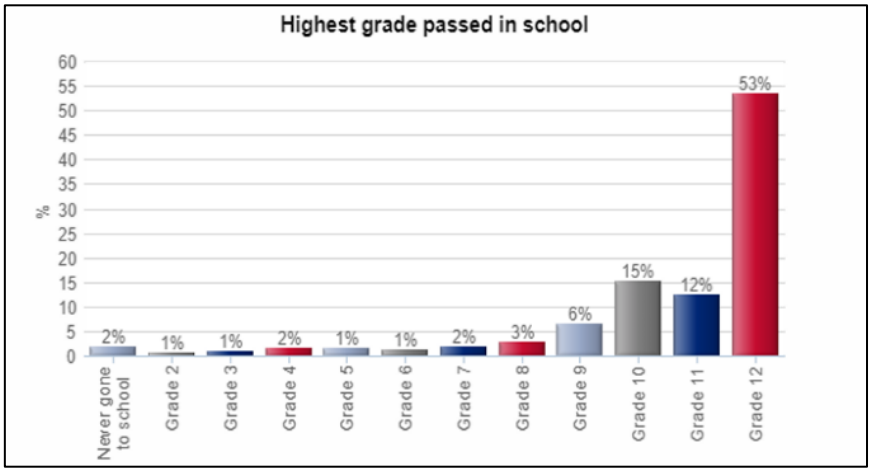


Figure 38: Highest grade passed in school (Eco Thunder)

From the above, it's evident that the Municipality and all key stakeholders need to put concerted efforts to address the structural flaws contributing to the above concerning picture on education levels in TLM. The statistics indicate that although a high number of students enrol for primary school, a very low number of students complete grade 12. This has resulted in a very low probability of tertiary education enrolment or employment opportunities. Only 5% of those who enrolled for grade 1 make it into tertiary. Less than 15% of the population has a tertiary qualification or has completed Grade 12. It must, however, be mentioned that the education level is affected negatively

by the urbanisation process, in the past, since it mostly involved matriculates and those with better qualifications, due to the local lack of job opportunities. This can also be attributed to the fact that the nearest University of Technology (Central University of Technology, in Bloemfontein) is almost 400 km away, and the Sol Plaatjie University has recently started a limited offering of some courses.

With regards to education levels per gender, the diagram below depicts data of a concerning picture of low education level in general, and its negative impact, particularly on the ability of females to gain exposure and perform well at various levels of the education system. The general implications are dire for the whole population and its ability to take advantage of socioeconomic opportunity presented by the mining and solar industry investment in the area, both with regard to enterprise development and employment.

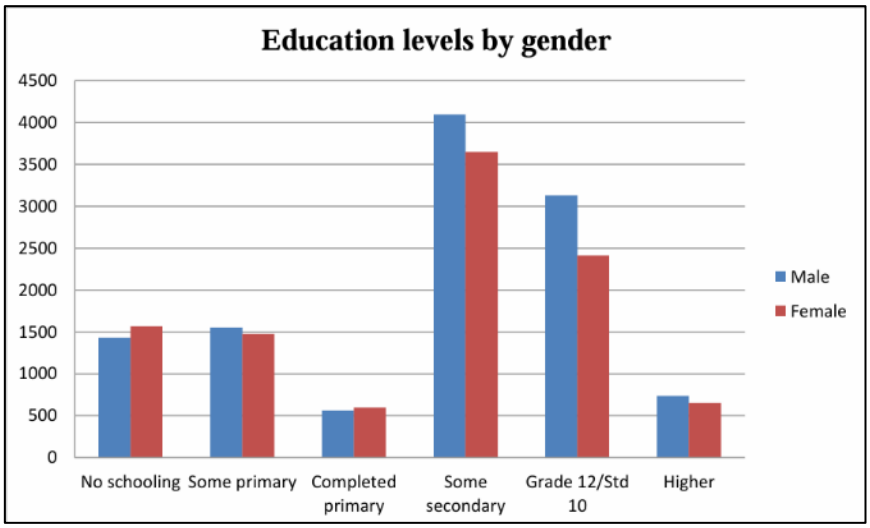


Figure 39: Education levels by gender (Eco Thunder)

12.2.4 Economy

Local government is mandated to create the necessary conditions for economic growth and job creation. The municipality has a LED Strategy, which is due for review. The municipal area plays an important role in the economy of the region/province, as it is in the Gamagara Development Corridor. The TLM SDF cited that Provincial Treasury (2014) indicated that "during 2012, the primary sector contributed 76% of all the sectors' contribution to the GDP of TLM. Mining is the single biggest contributor of all industries to the GDP. Mining contributed 74%, namely R3.9 billion, and the tertiary sector contributed 4% and 20% respectively. However, the

concern remains a lack of invention to create sustainability and leverage the potential of the sector.

12.2.5 Basic Services

The constitution of South Africa mandates local government to make sure that people have access to basic services, such as access to proper sanitation, clean/drinkable water, energy and waste removal. The following table representation below provides a high-level summary of the basic services delivery status at the Tsantsabane Local Municipality as per StasSA 2011 Census.

Table 21: Access to basic services (Eco Thunder)

Basic services	2001	2007	2011	2014	2019	2020
Electricity for lighting	74,4 %	77,8 %	83,5 %	86,2 %	81,9 %	80,8 %
Flush toilets	61,7 %		66,7 %	69,6 %	61,0 %	64,8 %
Piped water	35,5 %	62,0 %	45,3 %	71,5 %	66,9 %	56,2 %
Weekly refuse removal	67,5 %		57,4 %	76,1 %	67,4 %	67,1 %

There are backlogs in service delivery in the settlement areas of Tsantsabane Municipality that, through incremental service delivery interventions, are progressively addressed. These are a result of inward migration due to mining and solar investment, but also illegal land grabs. These illegal land grabs impact negatively on the service delivery of Water and Sanitation, Electricity and Refuse Removal, mostly in informal settlements.

Following the recent township establishment of Mountain View and Greenfield, there is a verified backlog for service delivery of water, sanitation, electricity, and refuse removal for 2600 and 2158, respectively. Despite that, the municipality as reflected in the above graphs and table there are a higher level of service in almost all the formalized areas, namely Postmansburg Town, Boichoko, Whitecity, Newtown, Groenwater, Jean Heaven, Postdene, Maranteng, Skeifontein 1, Stasie area, and Carnation. In these areas TLM provide electricity (mainly by ESKOM, except Town and Carnation), refuse removal water and sanitation.

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features* and *infrastructure on the site – 11. Site Specific Socio-Economic Environment*.

(b) Description of the current land uses

(Information obtained from the Visual Impact Assessment, 2025 attached as Appendix N)

1. DFFE SCREENING TOOL RESULT

The DFFE Screening Tool Report for Environmental Authorizations as required by the 2014 EIA Regulations (hereafter referred to as the "DFFE Screening Report"), classifies the Agricultural Theme Sensitivity of the area as depicted in the following figure, where the green areas represent land of low capability, while the yellow areas show land of low-moderate to moderate capability.

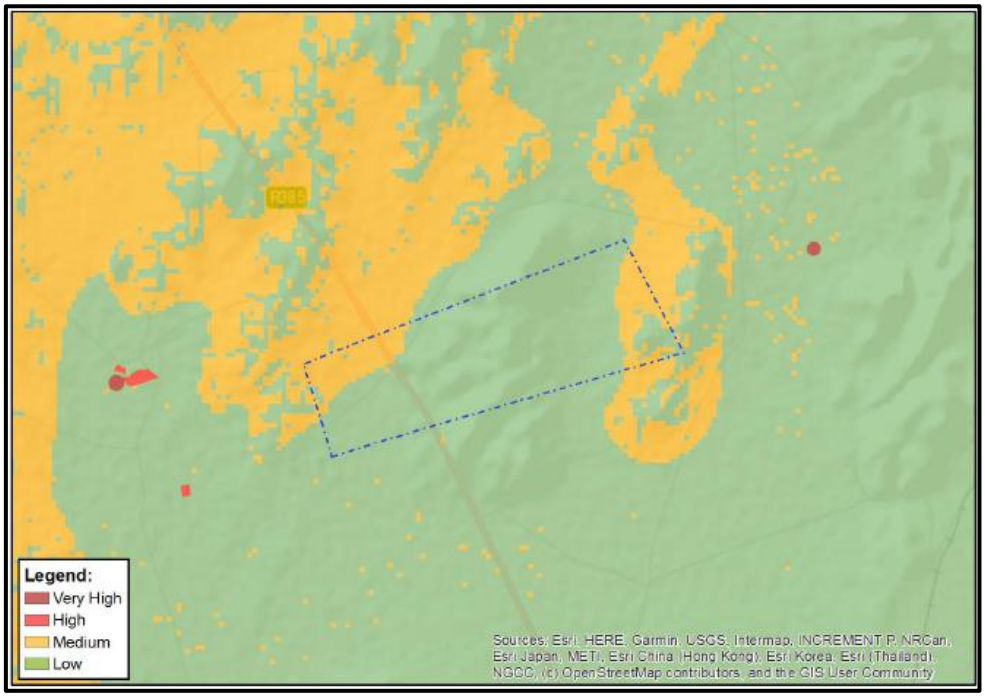


Figure 40: Agricultural theme sensitivity according to the DFFE screening report (2024).

2. LAND USE

The landscape surrounding the proposed MIOM reflects a rural environment predominantly shaped by livestock and game farming. The land is sparsely developed, with natural veld and scattered farming infrastructure such as fences, water troughs, and windmills defining the character of the area. Within the broader study area, historic mining activity has also left visual traces—most notably an abandoned open-cast diamond pit and associated spoil heaps located on Portion 2 of the Makganyene property. These features contribute to a landscape where agricultural and former mining uses are layered over a natural, semi-arid setting.

The R385 provincial road bisects the mining right area and functions as both a physical access route and a visual corridor, with intermittent views of the mining footprint anticipated from road users. This corridor is likely to become a primary

interface between the public and the proposed mining infrastructure. In the south-western corner of the site, the IOEC (Iron Ore Export Channel) railway line also intersects the landscape, reinforcing the area's association with extractive industries.

Although no formal residential or commercial land uses are present within the mining right boundary, several farm buildings and dams are located within the greater study area. These existing elements, while limited in extent, form part of the local land use mosaic. The area's current use for grazing and occasional game hunting reinforces its rural land use character, while also contributing to its open and minimally altered visual aesthetic.

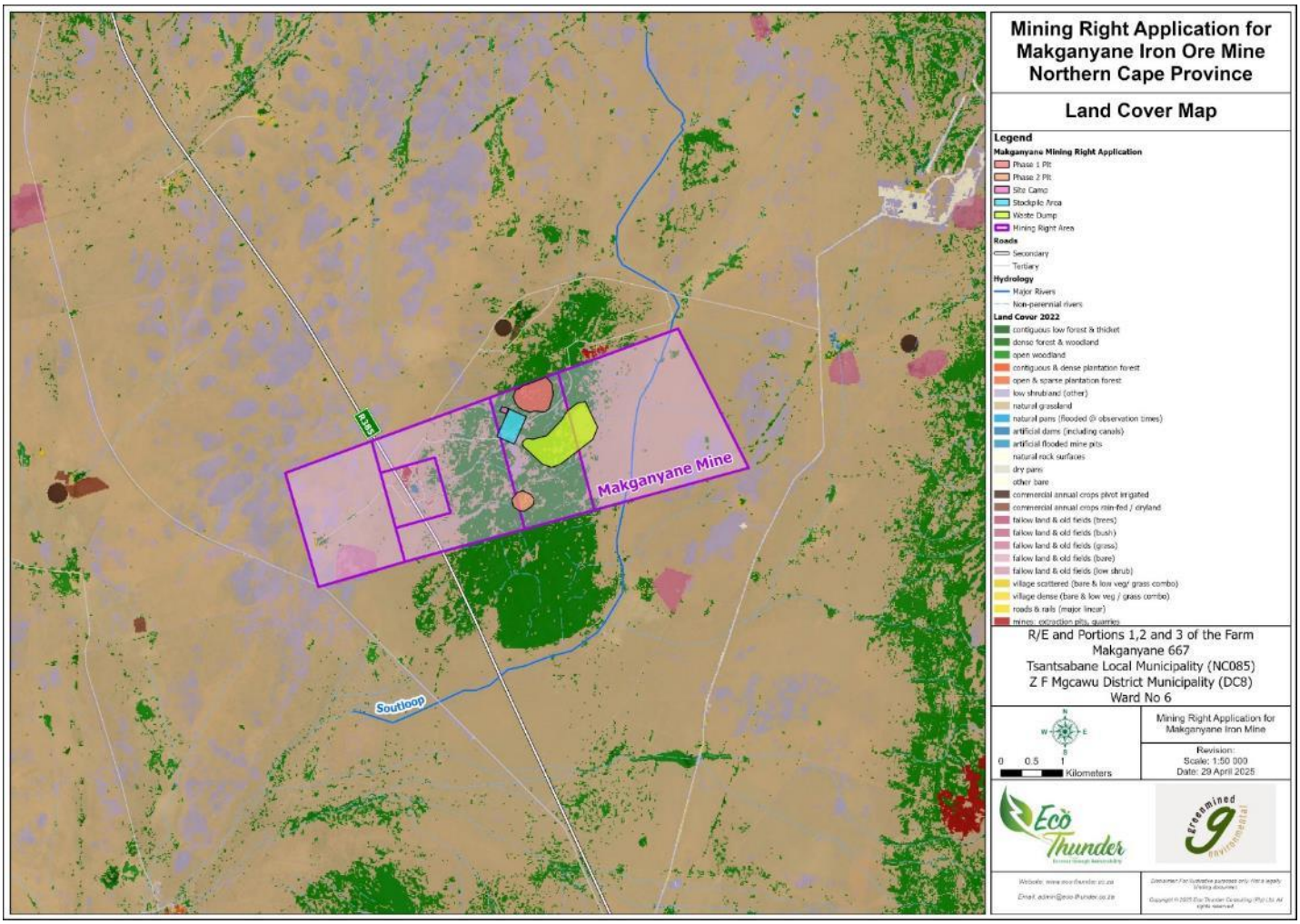


Figure 41: Land cover map of the proposed MIOM (Eco Thunder).

2.1 Mixed Land Uses

The land surrounding the proposed MIOM is characterised by a mix of livestock and game farming, historical mining remnants, and key transport infrastructure. This setting contributes to a predominantly rural landscape,

punctuated by traces of past mineral extraction and the movement of goods and people across the region.

Livestock farming is the dominant land use across the mining right and adjacent properties. The land is privately owned and typically used for extensive grazing. While no large-scale crop farming is evident, small-scale irrigation and watering points are present, supporting animal husbandry.

Mining activities have also played a role in defining the land use and visual composition of the area. The remnants of a historic open-cast diamond mining pit on Portion 2 of Makganyene No. 667 serve as a visible landmark of former extraction activities. Additionally, the Metseatsididi Diamond Mine, situated along the northern boundary of the study area, and the Kumba Heuningkranz Mining Right, located just south of the project footprint, further reinforce the co-existence of mining and agriculture in the region.

Transport infrastructure also contributes to the mixed land use character of the site. The R385 provincial road bisects the properties, providing primary access and forming a significant visual corridor. The IOEC (Iron Ore Export Channel) railway line intersects the southwestern corner of the mining right area, although its visibility is largely confined to the southern boundary.

Although the area retains a rural and agriculturally oriented sense of place, the overlapping presence of mining and transport infrastructure introduces a semi-industrial element into the landscape.

2.2 Natural and Conservation Areas

The proposed MIOM is located within a landscape that includes mapped environmental priority areas, although no formally proclaimed nature reserves or conservation areas are situated within or immediately adjacent to the project boundary.

2.3 Roads

The road network surrounding and intersecting the proposed MIOM area plays a significant role in shaping site accessibility. The R385 provincial road, a key regional route connecting Postmasburg and Olifantshoek, passes directly through the proposed mining right footprint. This road serves as the primary access route to the site and is expected to facilitate the movement of

construction vehicles, haul trucks, and operational staff throughout the life of the mine.

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 4. Site Specific Geology, Soils and Agricultural Sensitivity.*

(c) Description of specific environmental features and infrastructure on the site.

1. SITE SPECIFIC TOPOGRAPHY

(Information obtained from the Visual Impact Assessment, 2025 attached as Appendix N)

The topography of the proposed Makganyane Mining Right area is moderately undulating, featuring a combination of gradual inclines and defined elevation changes across different sections of the site.

The north-to-south elevation profile of the site indicates an overall increase in elevation, beginning at ~1 261.36 m and reaching a peak of 1 354.48 m over a linear distance of nearly 7 km. The profile shows a gain of 125.80 m in elevation, with a notable peak occurring around the 4 000 m mark, after which the terrain gradually descends again. The average elevation is 1 291.74 m. Although the slope remains relatively moderate overall, the steepest sections reach a maximum incline of 11.78% and a maximum decline of -19.48%. This suggests that certain portions of the terrain may partially obscure infrastructure depending on its siting, particularly if placed at lower elevations relative to the central ridgeline.

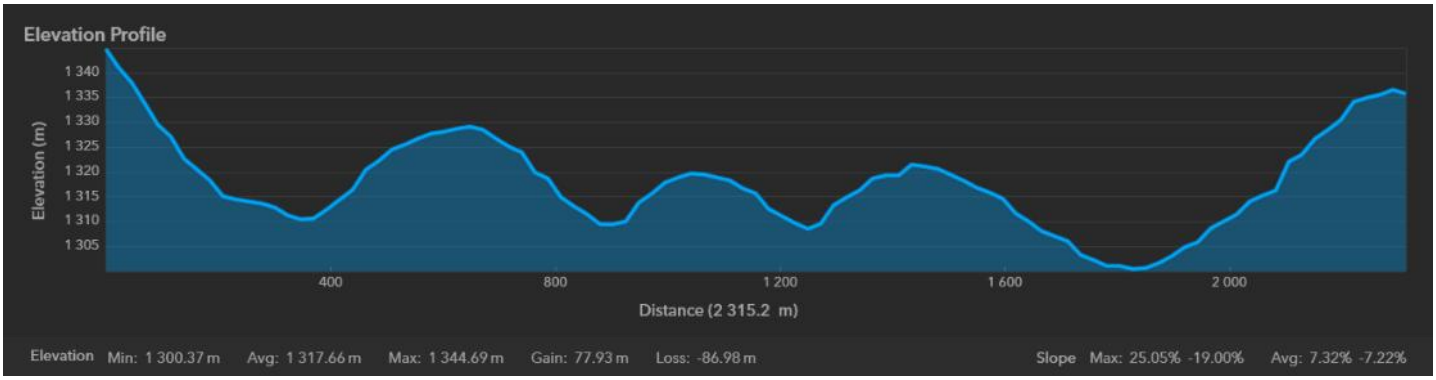


Figure 42: North to south elevation profile (Eco Thunder).

The west-to-east elevation profile presents a shorter but more varied terrain profile over a distance of ~2.3 km. Elevations range from a minimum of 1 300.37 m to a maximum of 1 344.69 m, with alternating rises and dips contributing to a more segmented terrain. The average elevation for this cross-section is 1 317.66 m, with a total elevation gain of 77.93 m and a total loss of 86.98 m. The slope variation is

more pronounced in this direction, with peak gradients reaching 25.05% in certain sections, which may limit long-distance visibility across certain valleys or low-lying areas within the site.

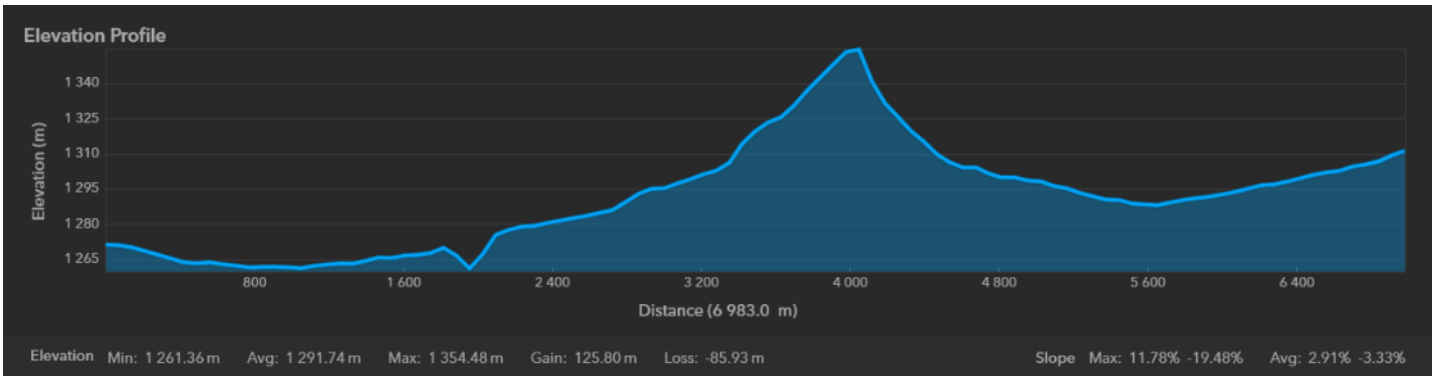


Figure 43: West to east elevation profile (Eco Thunder).

The broader landscape in which the proposed MIOM is situated exhibits a mixed terrain character — neither completely flat nor excessively rugged. Instead, it features undulating rises, modest ridgelines, and shallow depressions. While the terrain is not steep enough to significantly limit viewshed potential, certain areas of higher ground are likely to form prominent visual elements within the landscape. The variation in elevation may provide limited natural screening in some areas, but overall, much of the infrastructure associated with the proposed mining operation is expected to remain visible from medium to long distances unless artificial or vegetative screening measures are introduced. Integrating infrastructure into this varied topography will therefore require careful planning to align with the natural landscape structure and mitigate the overall visual prominence of the development.

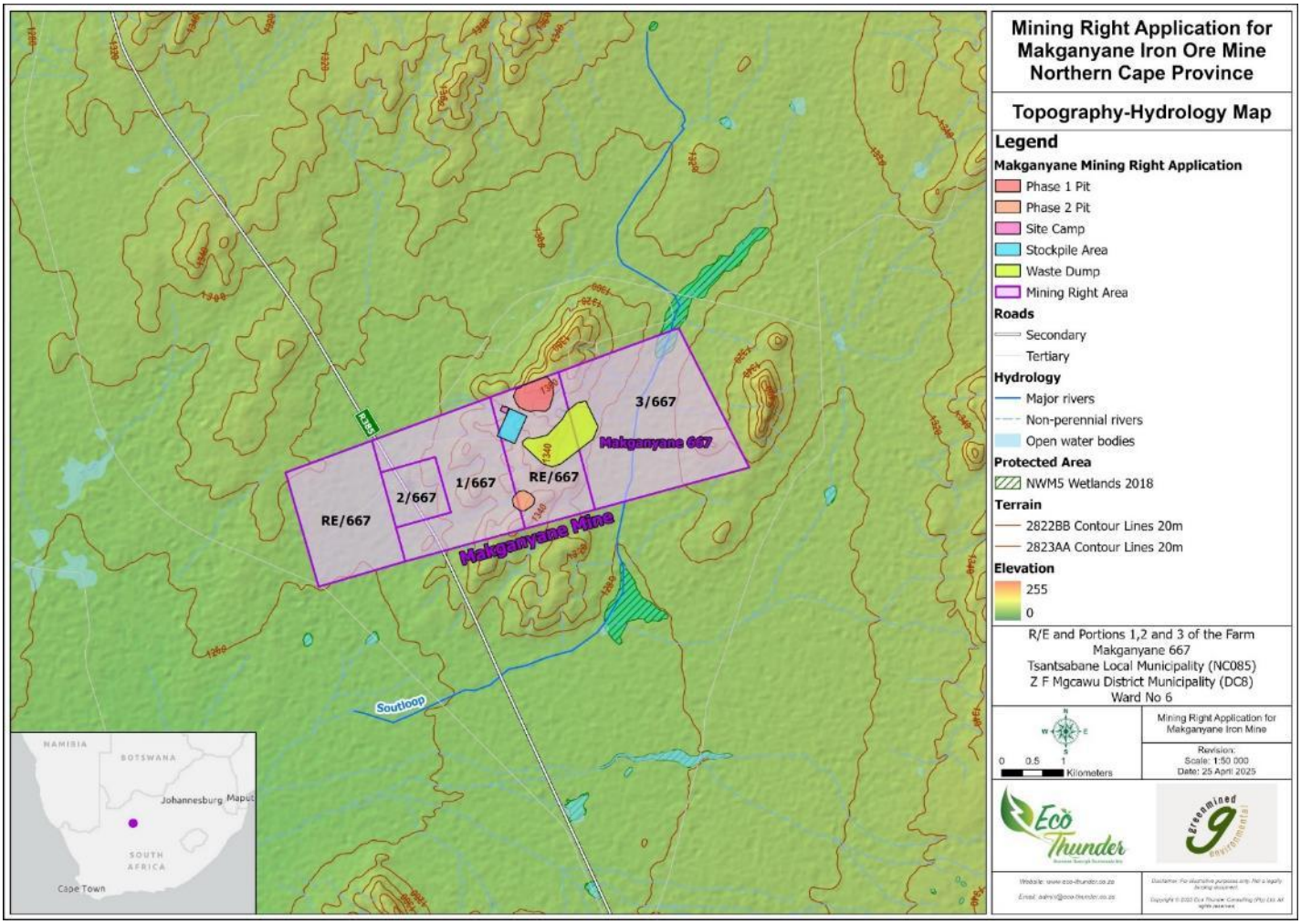


Figure 44: Map of topographical-hydrological profile of the proposed MIOM (Eco Thunder).

Also refer to:

- δ *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 2. Site Specific Visual Characteristics*.
- δ *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – 6. Site Specific Hydrology.*
- δ *Part B(1)(d)(i) Determination of closure objectives*
- δ Rehabilitation, Decommissioning and Closure Plan attached as Appendix H1.

2. SITE SPECIFIC VISUAL CHARACTERISTICS

(Information obtained from the Visual Impact Assessment, 2025 attached as Appendix N)

The Visual Impact Assessment (VIA) considered the following baseline matters applicable to the proposed MIOM area:

- δ climatic conditions,
- δ topography and landscape,
- δ natural landscapes,

- δ cultural and tourism resources, and
- δ land use.

The above listed provide important considerations for understanding how the proposed mining activities will be visually integrated into the environment.

2.1 Visual Receptors

Visual receptors, also known as viewer groups, are individuals or groups of individuals who have the potential to view or perceive the proposed development. The VIA identified the following visual receptor groups:

- δ **Local Residents:** Scattered farmsteads and grazing activities occur on and adjacent to the mining right area. These receptors may include farm owners, workers, and seasonal labourers. Although most are located some distance from the mining footprint, some may experience direct views of the development, particularly from elevated positions or informal dwellings within the broader viewshed. While not part of densely populated settlements, these receptors exhibit moderate visual sensitivity due to the rural setting and reliance on the surrounding landscape.

- δ **Road Users:** The R385 provincial road passes directly through the mining right area and serves as a key access route and prominent visual corridor. It connects Postmasburg and Olifantshoek and will be used to transport materials during construction and operations. Travellers such as local commuters, private motorists, and transport operators will likely experience varying degrees of visibility depending on topography and proximity to operational areas. As such, the R385 represents one of the most critical viewing corridors in the visual landscape.

- δ **Adjacent Mining Operations and Industrial Users:** To the north and south of the site, the Metseatsididi Diamond Mine and Kumba Heuningkranz Mining Right are active operations. Workers and contractors associated with these facilities may have visibility of the proposed Makganyane development. However, the existing industrial land uses in the area reduce overall visual sensitivity for this receptor group.

- δ **Recreational or Cultural Users:** The site does not fall within any recognised cultural or recreational nodes. There are no protected heritage

landscapes or tourism attractions in the immediate vicinity. Therefore, this receptor group is not considered relevant in the current context.

Each of these receptor groups will experience the development differently, depending on their location, the frequency and duration of views, and their cultural or social associations with the landscape.

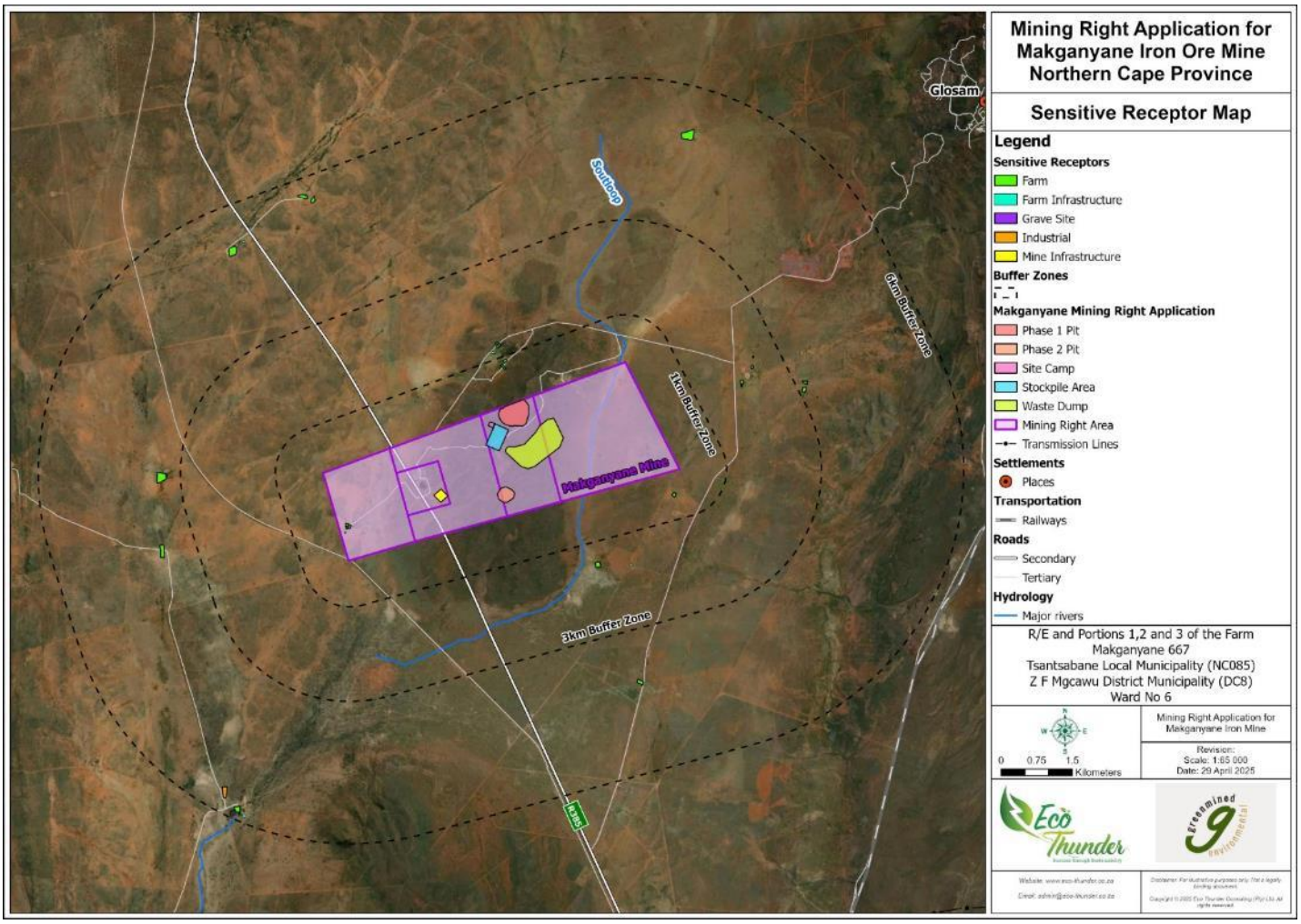


Figure 45: Visual receptors for the broader study area (Eco Thunder).

2.2 Visual Absorption Capacity

Visual Absorption Capacity (VAC) refers to the ability of a landscape to visually accommodate new infrastructure or land use changes without substantially altering its visual character. It is influenced by a combination of biophysical and perceptual factors, including topography, vegetation structure, landform diversity, and the degree of existing human modification. A high VAC indicates a landscape with features that help visually integrate or conceal new development, while a low VAC indicates limited ability to do so.

The MIOM area presents a mixed VAC profile, shaped by its rugged topography, scattered vegetation, and areas of past disturbance. While sections of the site are moderately vegetated, particularly in areas covered by bushveld and thornveld, the vegetation is generally low to medium in height and interspersed with open spaces and bare ground. This limits its screening potential, especially from elevated viewpoints such as ridgelines and roads with direct line-of-sight toward active infrastructure.

From a landform perspective, the terrain exhibits moderate variability, with small ridges, outcrops, and shallow drainage lines. These features can offer some degree of visual containment, particularly in the central and southern portions of the site. However, flatter and more open sections, particularly along the R385 and the southern buffer zone, are visually exposed and offer limited natural absorption. The presence of non-perennial river systems, including the Soutloop River, contributes to a more textured visual landscape, although these features offer minimal screening outside the rainy season.

The site has undergone some modification through historic agricultural practices, informal access roads, and livestock grazing. These existing disturbances have already introduced a degree of anthropogenic influence, which marginally increases the site's tolerance to further change from a visual character perspective. However, this influence is not widespread or heavily industrialised, meaning that large-scale development such as mining infrastructure could still represent a marked change in local visual conditions.

Perceptually, the VAC is influenced by the presence of a primary regional route, the R385, which bisects the site and serves as a key visual corridor for travellers. While some sections of the road are flanked by vegetation or follow natural depressions, other segments are more elevated and exposed, increasing visibility across the site. The orientation of proposed mining components in relation to this route will strongly influence the project's visual integration.

In summary, the MIOM site is assessed as having a moderate to low VAC. While some natural topographic and vegetative features offer partial screening, the open and variable terrain, combined with limited tall vegetation and key vantage points such as the R385, means that visual mitigation will be essential.

2.3 The Viewshed

The viewshed analysis for the MIOM identifies zones of visual influence surrounding the proposed development, highlighting areas where the mining infrastructure will be most visible. The site lies within a visually open landscape shaped by thornveld and bushveld vegetation, with limited natural screening due to grazing and informal land use.

The analysis categorises visibility into 'Very High,' 'High,' 'Medium,' 'Low,' and 'Very Low' zones. The 'Very High' visibility zone is confined to the immediate vicinity of the proposed Makganyane Mining Right, where the plant components will be highly visible, especially to the south and southeast, where rural settlements and informal dwellings are predominant. These areas will experience a noticeable change in their visual environment.

2.3.1 Very High Visual Impact Zone (Under 1 km)

Within this zone, the visual impact of the proposed MIOM is expected to be most pronounced. The proximity of infrastructure such as pits, waste rock dump, and stockpiles, combined with a lack of consistent vegetation screening, means that visual change will be immediate and unavoidable for receptors within this radius.

Viewers most affected include farm workers, residents of adjacent properties, and road users along the R385, which traverses the site and falls almost entirely within this high-exposure zone. Isolated farmsteads and farm infrastructure located north and south of the project footprint, particularly near the Phase 1 and Phase 2 pit areas, are also positioned to experience clear and continuous views of construction and operational activities.

The visual intrusion during the construction phase will be intensified by temporary infrastructure, increased vehicle movement, stockpiling, and vegetation clearance. The transformation of the local visual character from rural to industrial will be stark, particularly due to the contrast between the undisturbed areas and the exposed mining activities.

Mitigation within this zone should prioritise the use of natural vegetative screening, bunding where feasible, and context-sensitive site layout to reduce exposure. Regular communication with adjacent land users and landowners,

especially those falling within the 1 km viewshed, will be essential to manage visual expectations and foster cooperative engagement.

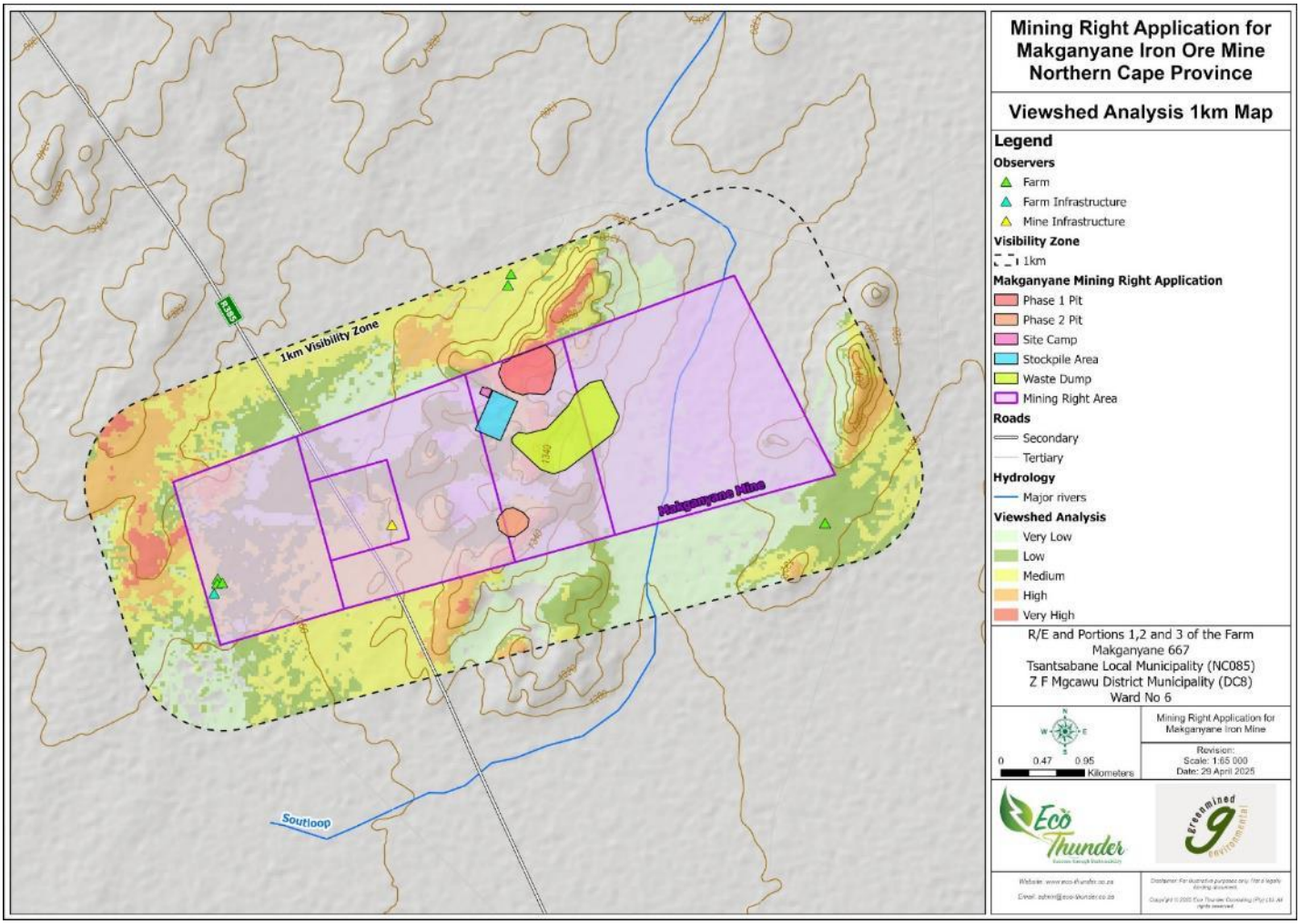


Figure 46: Viewshed analysis – Very High (under 1 km) (Eco Thunder).

2.3.2 High Visual Impact Zone (1 – 3 km)

In this zone, the visual impact of the MIOM remains prominent but begins to diminish with distance. While natural landforms and vegetation provide some degree of screening, several receptors—including scattered farmsteads, infrastructure, and rural access roads—still fall within clear line-of-sight of the mining footprint.

The topography within this range features exposed ridgelines and gentle slopes, particularly toward the north and southeast, that allow for broader views of the waste dump, pit areas, and stockpile infrastructure. Although visibility is partially mitigated by the landscape's bushveld character, elevated viewpoints may still yield uninterrupted views of the mine.

The Soutloop River and its associated drainage features continue to influence the visual experience in this zone. While offering some landscape segmentation, especially toward the south, the river does not significantly obscure infrastructure but contributes to the layered complexity of the visual scene.

Travellers on the R385 and smaller gravel routes within the zone will intermittently encounter views of mining activities. While these views may be less direct than within the 1 km zone, they are still significant enough to alter the rural visual experience, especially in areas with sparse vegetation.

Mitigation efforts in this range should focus on the softening of visual edges through rehabilitation, progressive revegetation, and strategic placement of infrastructure to blend with landform contours. As the mining activity will remain discernible, even at this distance, maintaining visual harmony with the surrounding environment remains critical.

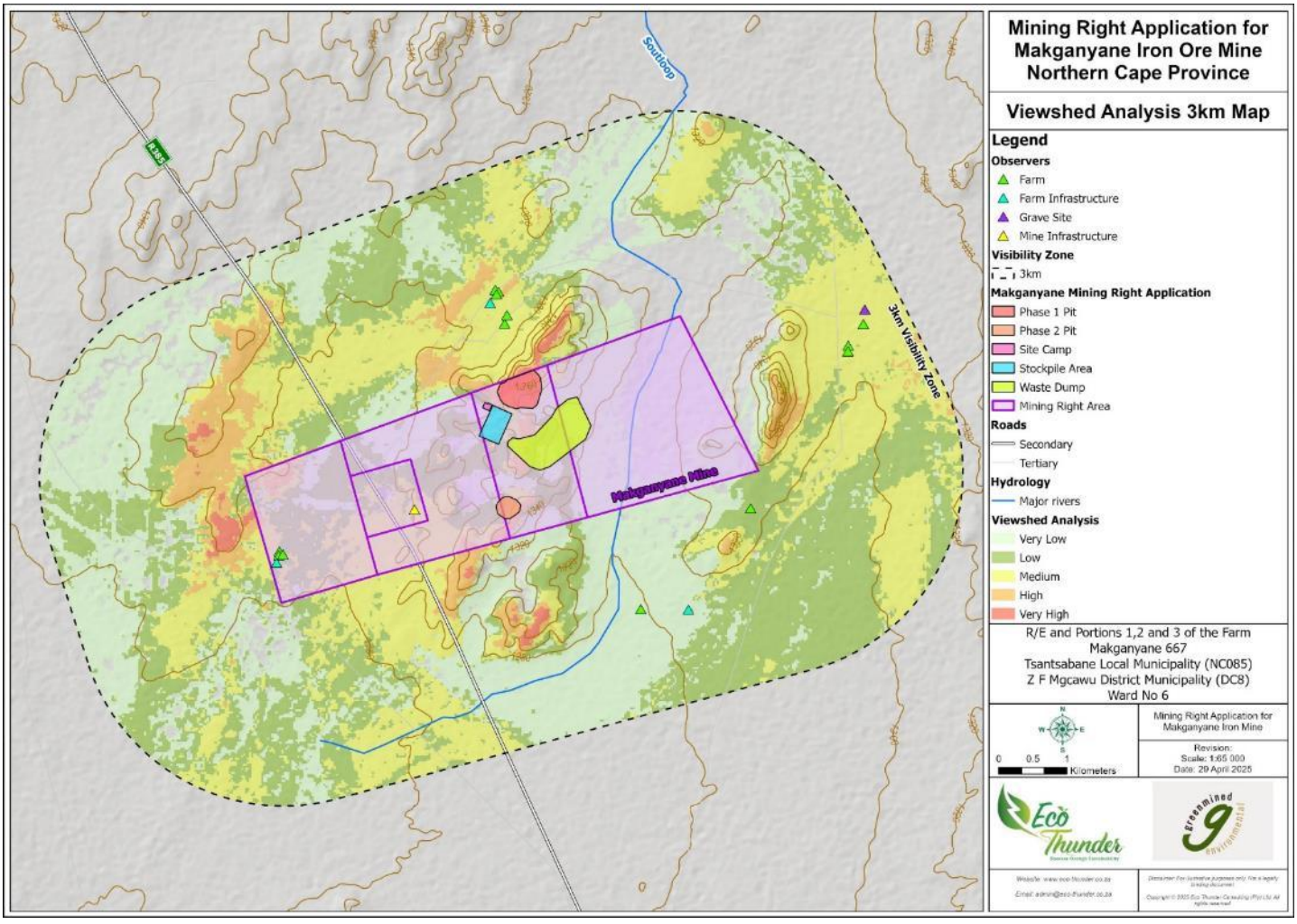


Figure 47: Viewshed analysis – High (1-3 km) (Eco Thunder).

2.3.3 Medium Visual Impact Zone (3 – 6 km)

At distances between 3 and 6 km, the visual prominence of the MIOM noticeably diminishes. While certain elevated ridgelines and slopes within this zone retain partial visibility of the site, the intervening terrain, scattered vegetation, and broader scale of the landscape significantly reduce the overall impact. Mining infrastructure becomes visually smaller and more blended into the distant horizon.

This zone includes low-density rural areas, with farmsteads and minor infrastructure located at scattered intervals. The visual experience for these receptors is generally less direct, with the mining development forming only a minor part of the wider landscape view. In flatter terrain or behind ridges, the site may be entirely obscured from view.

Road users travelling along the southern sections of the R385, as well as those navigating tertiary gravel roads within the southern and eastern buffer areas, may encounter brief, low-intensity views of the operation. These views are unlikely to dominate the visual landscape.

The Soutloop River and its associated riparian zones further fragment sightlines in this zone, offering increased visual absorption capacity. These natural landscape elements, along with the wider visual context of an expansive and sparsely populated environment, serve to reduce the potential for significant visual disruption.

Overall, the visual impact within the Medium Zone is considered low to moderate and can be effectively managed through strategic infrastructure placement and long-term rehabilitation efforts that blend the development into the broader landscape.

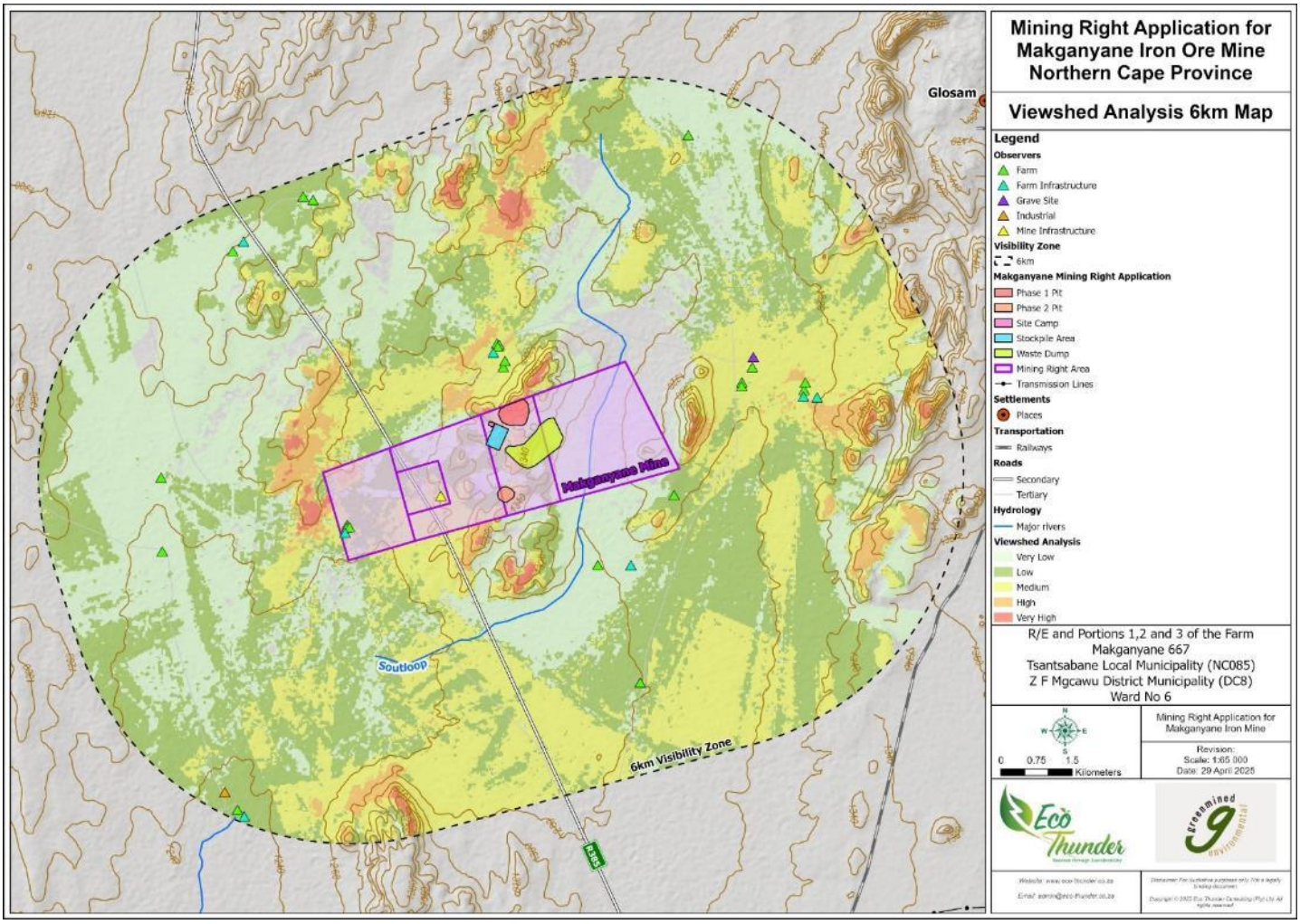


Figure 48: Viewshed analysis – Low-Medium (3-6 km) (Eco Thunder).

2.4 Visual Impact Index (VII)

The Visual Impact Index (VII) for the proposed MIOM provides an integrated analysis of three key variables: Viewer Sensitivity (VS), Project Visibility (PV), and Magnitude of Change (MC). This index is used to evaluate how the project's visibility and its potential to alter the landscape interact with viewer perception and land use context.

Viewer Sensitivity (VS): Viewer sensitivity refers to how different receptor groups are likely to respond to visual changes in their environment. For the MIOM, viewer sensitivity varies across land use types and proximity to the development. The primary receptor groups include:

- Residents and farm workers located within close proximity to the site, including isolated homesteads and farmsteads to the north, west, and southeast of the mining footprint. These receptors are considered to have

high sensitivity, as they are likely to experience persistent and direct views of the mining activities, particularly those within the very high and high visibility zones.

- Road users, particularly those travelling along the R385, traverse all three impact zones. While their sensitivity is moderate, the regular passage along this provincial route—often through scenic rural areas—means that their exposure to visual change will be repetitive, especially where vegetation screening is sparse.

- Agricultural landowners are expected to have medium to high sensitivity, as their operations are closely tied to the visual integrity and perceived value of the land. Long-term occupation and attachment to the rural landscape heighten sensitivity to industrial changes, especially in previously undisturbed areas.

Project Visibility (PV): Project visibility has been assessed through a viewshed analysis extending 6 km from the proposed mining footprint. The results indicate that:

- Within 1 km, visibility is very high due to the open character of the terrain, sparse vegetation, and minimal topographic shielding. Key infrastructure such as the Phase 1 and Phase 2 pits, stockpile areas, and waste dumps will be clearly visible from receptors in this zone.

- In the 1–3 km range, visibility is high but begins to reduce with increased distance and the influence of intermittent ridges, bushveld patches, and variations in slope. Elevated viewpoints retain clear sightlines, while lower-lying areas benefit from partial screening.

- From 3–6 km, visibility is moderate to low, with the terrain, vegetation, and scale of the landscape significantly reducing the prominence of mining features. The Soutloop River and associated riparian vegetation contribute to this screening effect, especially to the southeast and along the river corridor.

Overall, visibility varies spatially but is expected to be highest for receptors closest to the site and along major visual corridors such as the R385 and elevated ridgelines surrounding the site.

Magnitude of Change (MC): The magnitude of visual change associated with the MIOM is informed by the scale and intensity of the proposed infrastructure, as well as the contrast introduced into the existing visual landscape.

- Within the very high impact zone (0–1 km), the magnitude of change is high. The landscape will transition from semi-natural bushveld and agricultural patterns to an active opencast mining operation, with large, exposed earthworks, visible haul roads, and intermittent dust and vehicle movement. This stark shift will be clearly perceived by close-proximity receptors.

- In the high impact zone (1–3 km), the magnitude of change is moderate to high, particularly in elevated areas or those with unobstructed sightlines. The mining infrastructure will be a discernible feature but less dominant due to spatial separation and partial screening.

- In the medium impact zone (3–6 km), the magnitude of change is low to moderate. At this range, infrastructure appears as minor components within a broader visual context. The site becomes more visually assimilated into the landscape, particularly when viewed from behind ridges or through vegetated areas.

The presence of natural landscape elements such as the Soutloop River, local ridgelines, and existing agricultural infrastructure plays a significant role in modulating the visual impact across all zones.

The VII indicates a moderate to high visual impact in the immediate vicinity of the MIOM, decreasing with distance and visual obstruction. The greatest impacts are anticipated for high-sensitivity receptors within 1–3 km of the site, where the transformation of the landscape will be most apparent.

To minimise visual disruption, mitigation measures should prioritise:

- The strategic placement of infrastructure along existing contours;
- Vegetation preservation and the creation of visual buffers using indigenous plantings;
- Progressive rehabilitation of disturbed areas using topsoil stockpiling and reseeding;

- δ Ongoing engagement with landowners to address visual concerns and promote transparency.

With the application of context-sensitive design and mitigation strategies, the visual footprint of the mine can be effectively reduced, particularly for distant receptors and transient viewers.

2.5 Conclusion

The MIOM site is situated in an area already influenced by agricultural activities and mining infrastructure, which has altered the natural landscape to a moderate degree. While the proposed mine will introduce additional elements such as open pits, a substantial waste rock dump, stockpiles, haul roads, and support infrastructure, these features will largely consolidate within an environment already characterised by human modification.

The assessment identified that visual impacts will be most pronounced within the immediate vicinity of the mining area. Receptors along the R385 provincial road, as well as nearby farmsteads and agricultural holdings, are likely to experience the highest degree of visual change, particularly within a radius of up to 1 kilometre from the active mining areas. Beyond this distance, the visibility and significance of the project diminish considerably due to intervening vegetation, subtle topographic variations, and the general distance decay effect. While cumulative visual impacts, in combination with other mining and agricultural activities in the region, were considered, the additional contribution from the proposed MIOM is not expected to fundamentally alter the broader landscape character.

The VIA concludes that, with the full implementation of the recommended mitigation measures and responsible visual management throughout the life of the project, no fatal flaws exist that would prevent the authorisation of the proposed MIOM from a visual perspective. The project is therefore supported on the basis that visual impacts will be effectively managed to remain within acceptable levels.

3. SITE SPECIFIC AIR QUALITY AND NOISE AMBIANCE

(Information extracted from the Atmospheric Impact Report, 2025 attached as Appendix O)

3.1 Air Quality

Although the proposed project does not trigger any listed activities in terms of the Listed Activities and Minimum Emission Standards (GNR. 893 of 2013) under NEM:AQA, 2004 (as amended), Yellow Tree Environmental (Pty) Ltd was appointed to conduct an Atmospheric Impact Report (AIR) for the proposed MIOM. The purpose of the AIR was to evaluate the potential impact of the proposed mining and materials handling activities on ambient air quality in the project area. It specifically considered fugitive emissions of particulate matter (PM_{10} and $PM_{2.5}$) from sources such as blasting, vehicle entrainment, crushing, material handling, and wind erosion from stockpiles.

The following table presents the Unit Processes used in the AIR:

Table 22: Unit processes used in AIR (Yellow Tree, 2025)

Unit Process	Unit Process Function	Batch/Continuous Process
Topsoil Stripping and Stockpiling	Removal and separate storage of topsoil for future rehabilitation	Batch
Waste Rock Excavation and Hauling	Excavation of waste rock to access ore and hauling to waste stockpile	Continuous
Open Pit Mining (Drilling and Blasting)	Fragmentation of rock to allow ore extraction	Batch
Truck and Shovel Operations	Transport of fragmented ore and waste within the site using trucks and excavators	Continuous
ROM Ore Screening	Separation of oversized and undersized material prior to crushing	Continuous
Primary Crushing	Size reduction of ROM ore to prepare for transport	Continuous
Crushed Ore Stockpiling	Temporary storage of crushed ore before off-site transport	Continuous
Crushed Ore Transport to Beeshoek	Road haulage of crushed ore to Beeshoek Mine for further processing	Continuous

The following table indicates the potential sources and characteristics used in the AIR, associated with fugitive emissions from area and/or line sources.

Table 23: Fugitive emissions (area and/or line sources) (Yellow Tree, 2025)

Area and/or Line Source Code	Area and/or Line Source Description	Latitude (UTM) of SW corner	Longitude (UTM) of SW corner	Height of Release above ground (m)	Area (m²)	Emissions Hours	Type of emission (continuous/ batch)
AS1	Waste Dump	690444.26	6885174.91	0	606 000	24	Batch
AS2	Ore Stockpile	689838.09	6885324.12	0	89 400	24	Batch
AS3	Open Pit Development 1	691049.98	6886441.79	0	267 000	24	Batch
AS4	Open Pit Development 2	690127.11	6884108.58	0	85 800	24	Batch
AS5	Crushing Facility	690277.53	6885588.66	0	100	24	Batch
LS1	Trucking Route 1	690803.47	6886105.86	3.4	5 194.08	24	Batch
LS2	Trucking Route 2	690815.26	6886090.85	3.4	5 636.88	24	Batch
LS3	Trucking Route 3	690074.27	6885411.35	3.4	16 495.20	24	Batch

3.2 Emissions Characterisation

The emissions inventory was developed based on anticipated fugitive dust emissions from open pit mining activities, stockpiles, screening and primary crushing operations, and designated haul roads. These emission sources were characterised as area (e.g., for mining, crushing and stockpiles) or line sources (e.g., for haul roads) in the AERMOD dispersion model.

3.2.1 Emissions from Stockpile Area Sources

At the MIOM site, fugitive PM_{10} and $PM_{2.5}$ emissions from stockpiles were estimated based on two primary mechanisms: wind erosion and material loading/drop operations.

Waste Rock Surface Stockpile Area Source

Wind erosion emission rates were calculated using emission factors (kg/ha/hr) and the surface area of the stockpile. The following table presents the estimated emissions for PM_{10} and $PM_{2.5}$.

Table 24: Emission rate calculation for waste rock stockpile wind erosion (Yellow Tree, 2025)

Pollutant	Emission Factor (kg/ha/hr)	Area (ha)	Emission Rate (g/s)
PM_{10}	0.2	60.6	3.367
$PM_{2.5}$	0.1		1.683

Emissions from material loading were estimated based on the total quantity of waste rock handled each month. Additionally, a moisture content of 3% was

assumed for the waste rock material, which is consistent with known dry bulk handling conditions in arid mining regions of South Africa. The following emissions were calculated.

Table 25: Emission rate calculation for material loading onto the waste rock stockpile (Yellow Tree, 2025)

Pollutant	Wind Speed (m/s)	Moisture (%)	Material Handled (tonnes/month)	Emission Rate (g/s)
PM_{10}	4.27	3.0	1 415 964.1	0.411
$PM_{2.5}$				0.0622

Table 26: Emission rate calculation for total fugitive PM emissions from the waste rock stockpile (Yellow Tree, 2025)

Pollutant	Emission Rate from Wind Erosion (g/s)	Emission Rate from Loading (g/s)	Total Fugitive Emissions (g/s)
PM_{10}	3.367	0.411	3.778
$PM_{2.5}$	1.683	0.062	1.746

Ore Stockpile

Fugitive particulate emission rates from wind erosion were calculated using standard emission factors and are summarized in the following table.

Table 27: Emission rate calculation for ore stockpile wind erosion (Yellow Tree, 2025)

Pollutant	Emission Factor (kg/ha/h)	Area (ha)	Emission Rate (g/s)
PM_{10}	0.2	8.94	0.497
$PM_{2.5}$	0.1		0.248

3.2.2 Emissions from the Crushing and Screening Facility

For dispersion modelling purposes, the crushing and screening circuit, the jaw crusher and its supporting equipment (conveyers, grizzly feeders, screens, structures, etc.) was represented as an area source in AERMOD.

It was assumed that all ore that is sent to the ore stockpile passes through the crushing and screening circuit. As such, emissions rates were based off the total predicted tonnes of ore to be mined at the proposed site throughout the reporting period, in accordance with the anticipated production schedule. The following emissions were calculated.

Table 28: Emission rate calculation for primary crushing and screening (Yellow Tree, 2025)

Pollutant	Moisture (%)	Material Handled (tonnes/hr)	Emission Factor (g PM/tonne ore)	Emissions Rate (g/s)
PM_{10}	3.0	258.64	25	1.80
$PM_{2.5}$			3.79	0.27

3.2.3 Emissions from Open Pit Mining Activities

Open Pits 1 and 2 were modelled as area sources at their respective maximum allocated surface areas. The emissions inventory accounts for fugitive dust emissions from blasting, truck-based material handling, and wind erosion over the exposed pit areas.

The total fugitive PM_{10} and $PM_{2.5}$ emissions from Pit 1 were calculated by summing the emission rates from blasting and drilling, wind erosion and material handling.

Table 29: Emission rate calculation for total fugitive PM emissions from Pit 1 (Yellow Tree, 2025).

Pollutant	Emission Rate from Blasting and Drilling (g/s)	Emission Rate from Wind Erosion (g/s)	Emission Rate from Loading (g/s)	Total Fugitive Emissions (g/s)
PM_{10}	0.0431	1.48	0.233	1.76
$PM_{2.5}$	0.0216	0.742	0.0352	0.798

The same methodology that was used to determine the emissions at Pit 1 was applied to Pit 2, and the following total fugitive PM_{10} and $PM_{2.5}$ emissions were calculated.

Table 30: Emission rate calculation for total fugitive PM emissions from Pit 2 (Yellow Tree, 2025)

Pollutant	Emission Rate from Blasting and Drilling (g/s)	Emission Rate from Wind Erosion (g/s)	Emission Rate from Loading (g/s)	Total Fugitive Emissions (g/s)
PM_{10}	0.0431	0.477	0.233	0.752
$PM_{2.5}$	0.0216	0.238	0.0352	0.295

3.2.4 Fugitive Dust from Trucks

Trucks travelling on-site, including the transport of ore, waste rock, and crushed material, have the potential to generate fugitive dust through re-entrainment of particles on unpaved roads. To estimate these emissions, key transport routes were identified and modelled as line sources in AERMOD.

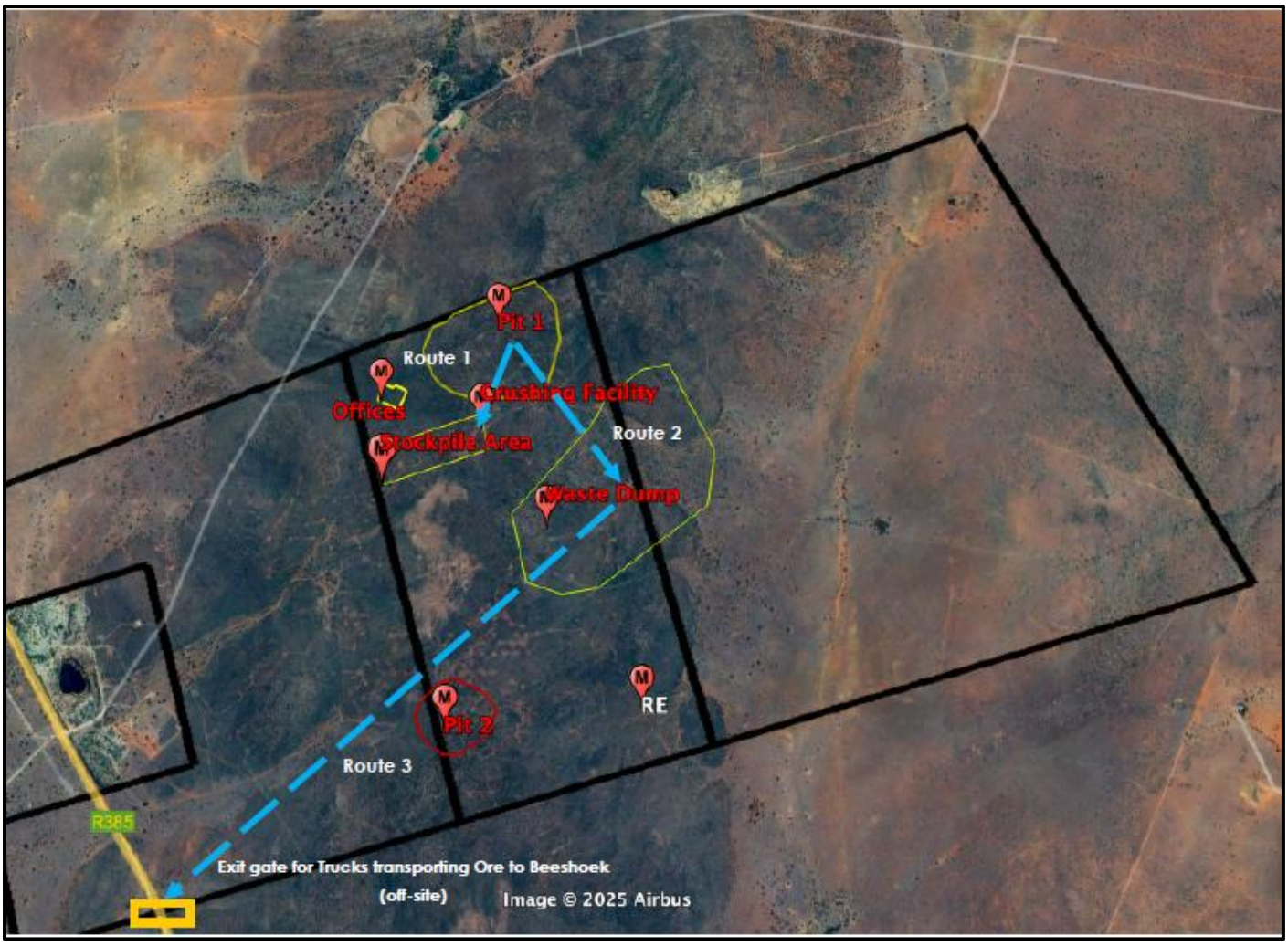


Figure 49: Predicted truck transport routes at MIOM (Yellow Tree, 2025)

The AIR developed two scenarios:

- **Scenario 1** reflects baseline conditions, incorporating the use of water as the only dust suppressant.

- **Scenario 2** evaluates the potential benefits of additional dust mitigation measures, including windbreaks around stockpiles and open pits, and the use of chemical dust suppressants on high traffic haul roads.

The calculated fugitive emissions for Scenario 1 and 2 is summarised below.

Table 31: Estimated fugitive PM emissions from on-site trucking – Scenario 1 (Yellow Tree, 2025).

Line Source Modelled	One Way Distance (km)	Control Efficiency (%)	Pollutant	Haulage (tonne per year)	Distance Travelled (km/day)	Emissions (g/s)
Line Source 1	0.72	55	PM_{10} $PM_{2.5}$	186 220.47	248.88	0.679 0.0679
Line Source 2	0.78	55	PM_{10} $PM_{2.5}$	1 415 974.11	2 052.92	5.599 0.560
Line Source 3	2.29	80	PM_{10} $PM_{2.5}$	186 220.47	790.40	0.958 0.0958

Table 32: Estimated fugitive PM emissions from on-site trucking – Scenario 2 (Yellow Tree, 2025).

Line Source Modelled	One Way Distance (km)	Control Efficiency (%)	Pollutant	Haulage (tonne per year)	Distance Travelled (km/day)	Emissions (g/s)
Line Source 1	0.72	55	PM_{10} $PM_{2.5}$	186 220.47	248.88	0.679 0.0679
Line Source 2	0.78	80	PM_{10} $PM_{2.5}$	1 415 974.11	2 052.92	2.488 0.2488
Line Source 3	2.29	80	PM_{10} $PM_{2.5}$	186 220.47	790.40	0.958 0.0958

3.2.5 Dust Mitigation Control Efficiencies for Area Sources

The AIR assessed the effect of implementing dust control measures at the proposed MIOM as summarized in the following table.

Table 33: Control measures associated PM_{10} emission reductions (Yellow Tree, 2025).

Control Measure	PM_{10} Emissions Control Efficiency (%)
Watering of stockpiles and covering during wind events	90
Three-sided enclosures built around stockpiles with 50 % porosity	75
Application of chemical suppressants to exposed surfaces	84
Gravel cover over exposed areas	84

In Scenario 2, a 75% control efficiency was applied to the area sources, including the waste rock stockpile, ore stockpile and the open pits (Pits 1 and

2), to simulate the effect of installing three-sided enclosures for wind protection. The emissions rates calculated after applying the relevant control efficiencies in Scenario 2 are summarised in Section 3.2.1.

3.3 Modelled Emissions

As mentioned earlier, the AIR developed two dispersion modelling scenarios to assess the potential impact of particulate matter (PM_{10} and $PM_{2.5}$) emissions on ambient air quality.

1. **Scenario 1 – Baseline Emissions with Initially Proposed Dust Mitigation Measures**

This scenario represents a conservative baseline case in which only the following dust control measures were modelled:

- δ Spraying water on all haul roads twice per day, and
- δ Application of a chemical dust suppressant on Route 3 (the haul road to the main gate).

This scenario provides a worst-case estimate of potential air quality impacts based on the initial dust mitigation measures proposed for the site.

2. **Scenario 2 – Enhanced Dust Mitigation Measures**

This scenario evaluates the potential reduction in emissions that could be achieved through the implementation of additional dust control measures beyond those included in Scenario 1.

These enhancements include:

- δ Installation of windbreaks or three-sided enclosures around the ore stockpile, waste rock dump and open pits to reduce wind-blown dust, with associated control efficiencies.
- δ Application of a chemical dust suppressant in addition to water spraying on Route 2 (Figure 49), in response to the high PM emissions predicted in Scenario 1 for this route.

The purpose of modelling both scenarios was to compare the expected air quality impacts under unmitigated and mitigated conditions and to support informed decision-making regarding dust control strategies at the site.

The following emission rates were modelled for the identified area and line sources in terms of Scenario 1.

Table 34: Scenario 1: Unmitigated stockpile emissions (Yellow Tree, 2025).

Source ID	Source Description	Source Type	Source Location	Source Parameters	Pollutant	Emission Rate (g/s)
AS1	Waste Dump	Area POLY	X: 690444.26 Y: 6885174.91	Base Elevation: 1 350.91 m Release Height: 0 m Area: 606 000 m²	PM_{10} $PM_{2.5}$	3.778 1.746
AS2	Ore Stockpile	Area POLY	X: 689838.09 Y: 6885324.12	Base Elevation: 1 329.34 m Release Height: 0 m Area: 89 400 m²	PM_{10} $PM_{2.5}$	0.497 0.248
AS3	Open Pit 1	Area POLY	X: 691049.98 Y: 6886441.79	Base Elevation: 1 363.06 m Release Height: 0 m Area: 267 000 m²	PM_{10} $PM_{2.5}$	1.759 0.798
AS4	Open Pit 2	Area POLY	X: 690127.11 Y: 6884108.58	Base Elevation: 1 335.11 m Release Height: 0 m Area: 85 800 m²	PM_{10} $PM_{2.5}$	0.752 0.295
AS5	Crushing Facility	Area	X: 690277.53 Y: 6885588.66	Base Elevation: 1347.84 m Release Height: 0 m Area: 100 m²	PM_{10} $PM_{2.5}$	1.796 0.272
LS1	Route 1	Line	X: 690803.47 Y: 6886105.86	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 721.4 m Width: 7.2 m	PM_{10} $PM_{2.5}$	0.679 0.0679
LS2	Route 2	Line	X: 690815.26 Y: 6886090.85	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 782.9 m Width: 7.2 m	PM_{10} $PM_{2.5}$	5.599 0.560
LS3	Route 3	Line	X: 690074.27 Y: 6885411.35	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 2 291 m Width: 7.2 m	PM_{10} $PM_{2.5}$	0.958 0.0958

Table 35: Scenario 2: Proposed dust mitigation for stockpiles (Yellow Tree, 2025).

Source ID	Source Description	Source Type	Source Location	Source Parameters	Pollutant	Emission Rate (g/s)
AS1	Waste Dump	Area POLY	X: 690444.26 Y: 6885174.91	Base Elevation: 1 350.91 m Release Height: 0 m Area: 606 000 m²	PM_{10} $PM_{2.5}$	0.944 0.436
AS2	Ore Stockpile	Area POLY	X: 689838.09 Y: 6885324.12	Base Elevation: 1 329.34 m Release Height: 0 m Area: 89 400 m²	PM_{10} $PM_{2.5}$	0.124 0.0621
AS3	Open Pit 1	Area POLY	X: 691049.98 Y: 6886441.79	Base Elevation: 1 363.06 m Release Height: 0 m Area: 267 000 m²	PM_{10} $PM_{2.5}$	0.440 0.200
AS4	Open Pit 2	Area POLY	X: 690127.11 Y: 6884108.58	Base Elevation: 1 335.11 m Release Height: 0 m Area: 85 800 m²	PM_{10} $PM_{2.5}$	0.188 0.0738
AS5	Crushing Facility	Area	X: 690277.53 Y: 6885588.66	Base Elevation: 1347.84 m Release Height: 0 m Area: 100 m²	PM_{10} $PM_{2.5}$	1.796 0.272
LS1	Route 1	Line	X: 690803.47 Y: 6886105.86	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 721.4 m Width: 7.2 m	PM_{10} $PM_{2.5}$	0.679 0.0679
LS2	Route 2	Line	X: 690815.26 Y: 6886090.85	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 782.9 m Width: 7.2 m	PM_{10} $PM_{2.5}$	2.488 0.249
LS3	Route 3	Line	X: 690074.27 Y: 6885411.35	Base Elevation: 1 350.03 m Release Height: 3.4 m Length: 2 291 m Width: 7.2 m	PM_{10} $PM_{2.5}$	0.958 0.0958

3.4 Receptors

The AIR used two sets of receptors in the model:

1. A cartesian plant boundary where intermediate receptors were placed at 50-metre intervals along the boundary of the site (refer to Figure 16 of the AIR). The plant boundary essentially acts as a set of receptors for the surrounding land users and members of the public. The maximum concentrations at and close to the plant boundary were assessed.

2. A uniform cartesian grid with 50-metre spacing up to 10 km from the site and 100-metre spacing beyond this.

Sensitive receptors are usually placed in areas where the occupants are more susceptible to the adverse effects of exposure to air pollutants. Sensitive receptors often include, but are not limited to, hospitals, schools, daycare facilities, and elderly housing. In this study, no sensitive receptors were placed, as the surrounding land use is limited to agricultural and mining activities, and there are no known sensitive land uses within the vicinity of the site.

3.5 Results

3.5.1 Scenario 1 - PM10

Table 36: Non-cumulative PM_{10} Results – Scenario 1 (Yellow Tree, 2025).

Ave. Period	Parameter	Max. Fence Line and Surrounds	NAAQS (µg/m³)
Daily	**Concentration (µg/m³)**	413.6	75
	Elevation	1 349.13 m	
	Location (UTM)	X: 690503.75 m Y: 6886405.76 m	
	Date	2023/11/09	
Annual	**Concentration (µg/m³)**	69.69	40
	Elevation	1 366.84 m	
	Location (UTM)	X: 690868.35 m Y: 6886405.05 m	
	Date/Hour	-	

The dispersion model predicts that, under Scenario 1, ambient PM_{10} concentrations at the site fence line as a result of the MIOM facility alone will exceed both the daily National Ambient Air Quality Standards (NAAQS) of 75 µg/m^3 and the annual NAAQS of 40 µg/m^3. These exceedances highlight the need to consider additional dust mitigation strategies at the proposed site.

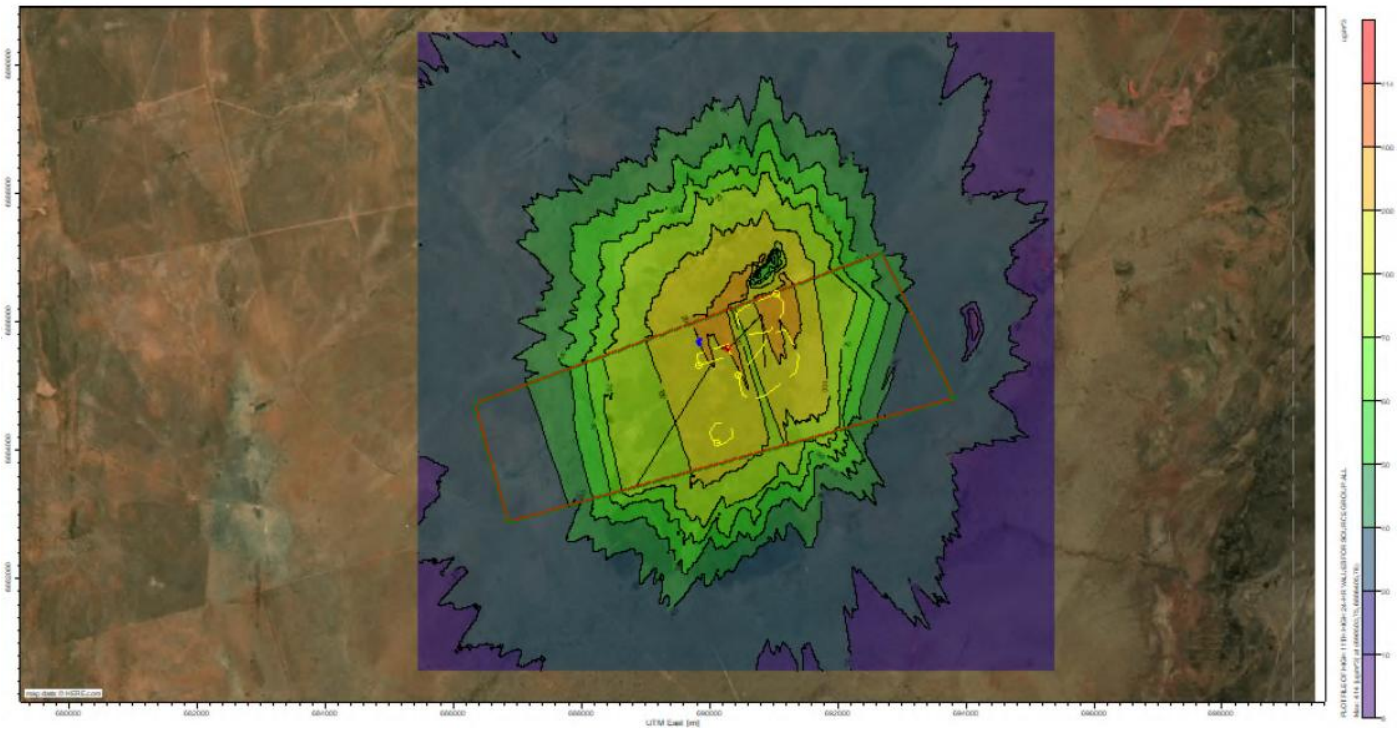


Figure 50: Isopleths of daily PM_{10} Concentrations (Yellow Tree, 2025)

The above figure shows that the highest daily ambient PM_{10} concentration (413.6 µg/m^3) occurs along the northern border of the proposed site, as indicated by the red isopleth. Exceedances of the daily PM_{10} NAAQS are primarily concentrated around the waste rock stockpile. The red, orange, yellow, and light green isopleths denote areas in which exceedances of the daily PM_{10} NAAQS are predicted, while the dark green and blue isopleths indicate concentrations that are below the NAAQS

The following figure shows that the highest predicted annual ambient PM_{10} concentration (69.69 µg/m^3) occurs along the northern border of the proposed site, near the waste rock stockpile, as indicated by the red isopleth.

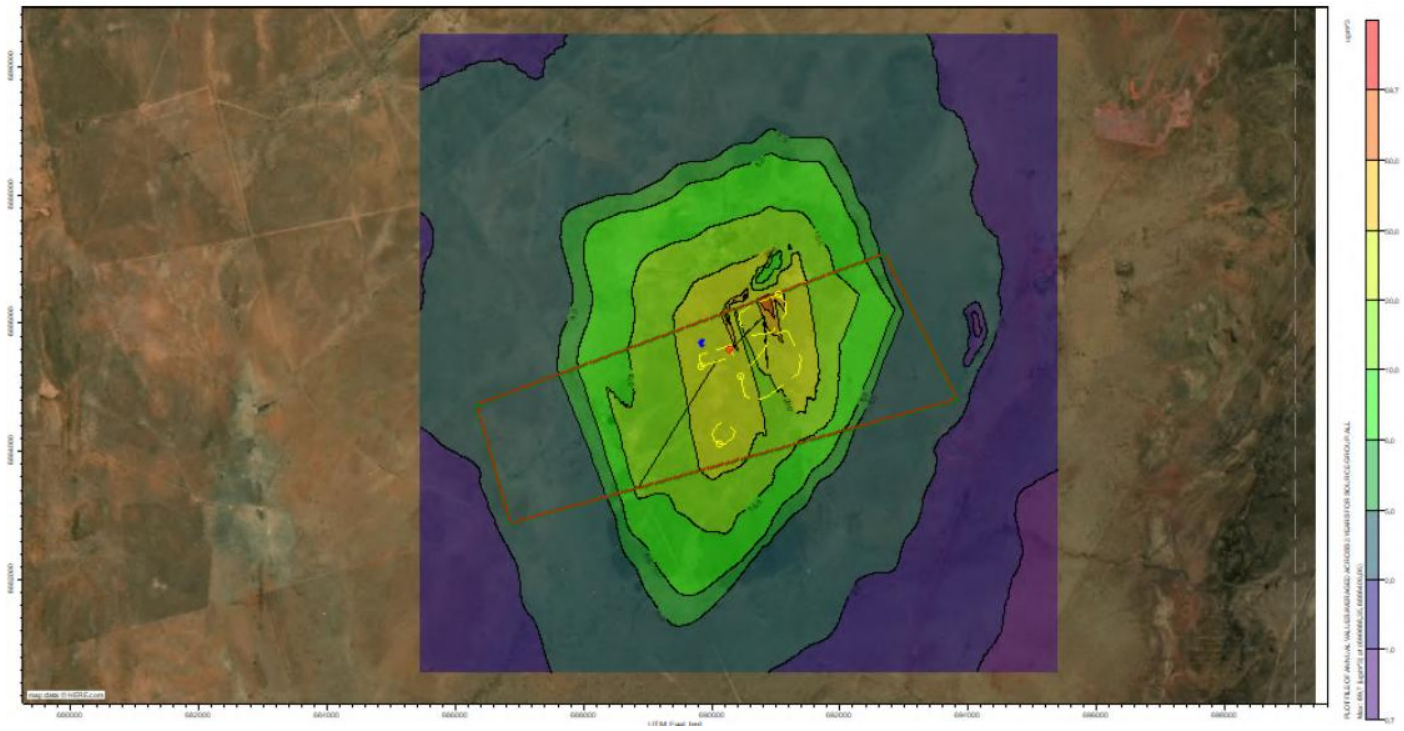


Figure 51: Isopleths of annual PM_{10} Concentrations (Yellow Tree, 2025)

3.5.2 Scenario 1 – PM2.5

Table 37: Non-cumulative $PM_{2.5}$ Results – Scenario 1 (Yellow Tree, 2025).

Ave. Period	Parameter	Max Fence Line and Surrounds	NAAQS (µg/m³)
Daily	Concentration (µg/m³)	101.83	40
	Location (UTM)	X: 690868.35 m Y: 6886405.05 m	
	Elevation	1 366.84 m	
	Date/Hour	2024/10/29, 24	
Annual	Concentration (µg/m³)	24.97	20
	Location (UTM)	X: 690868.35 m Y: 6886405.05 m	
	Elevation	1 366.84 m	
	Date/Hour	-	

The model predicts that, under Scenario 1, ambient $PM_{2.5}$ concentrations at the site fence line as a result of the MIOM facility alone will exceed both the daily NAAQS of 40 µg/m^3 and the annual NAAQS of 20 µg/m^3. These exceedances highlight the need to consider additional dust mitigation strategies at the proposed site.

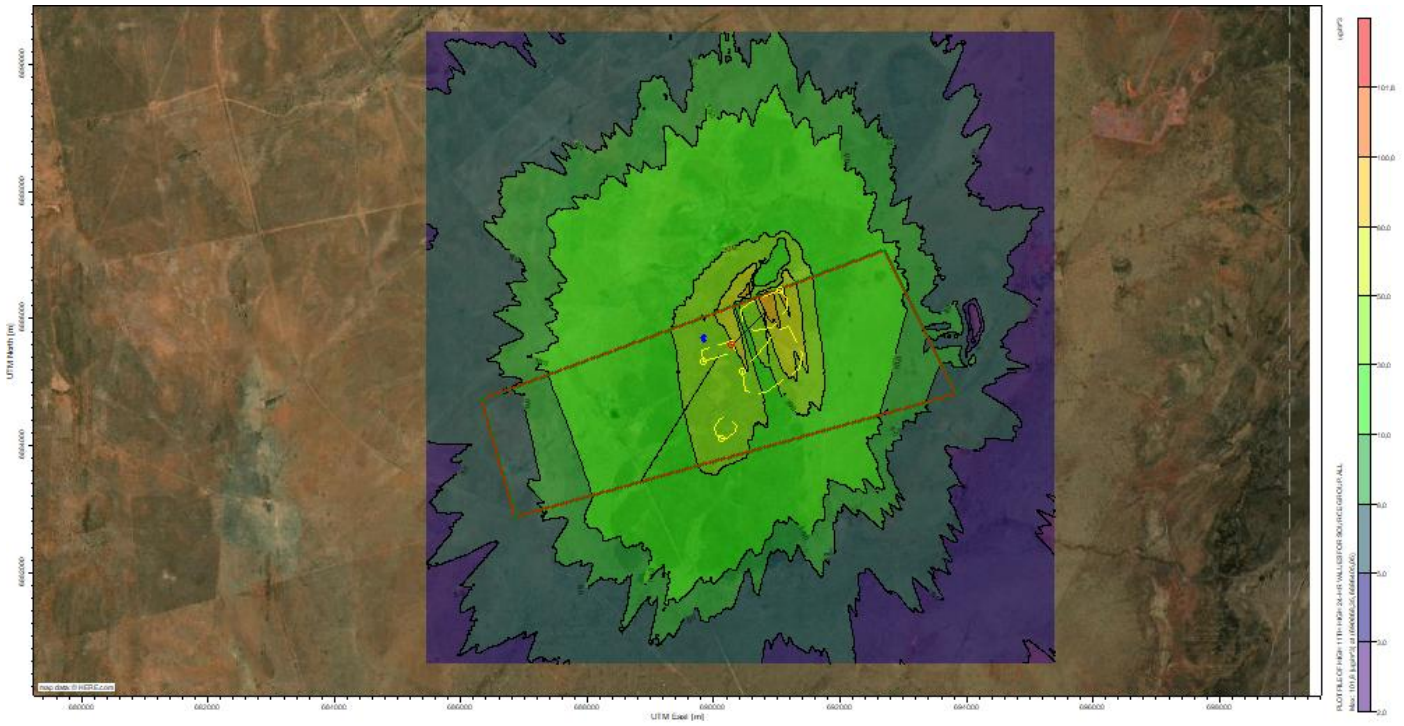


Figure 52: Isopleths of daily $PM_{2.5}$ Concentrations (Yellow Tree, 2025)

The above figure shows that the highest daily ambient $PM_{2.5}$ concentration (101.83 µg/m^3) occurs along the northern border of the proposed site, as indicated by the orange isopleth. The areas in which exceedances are predicted are located around the waste dump of the proposed facility.

Similarly the highest annual ambient $PM_{2.5}$ concentration (24.97 µg/m^3) occurs along the northern border of the proposed site, near the waste rock stockpile, as indicated by the red isopleth in the following figure.

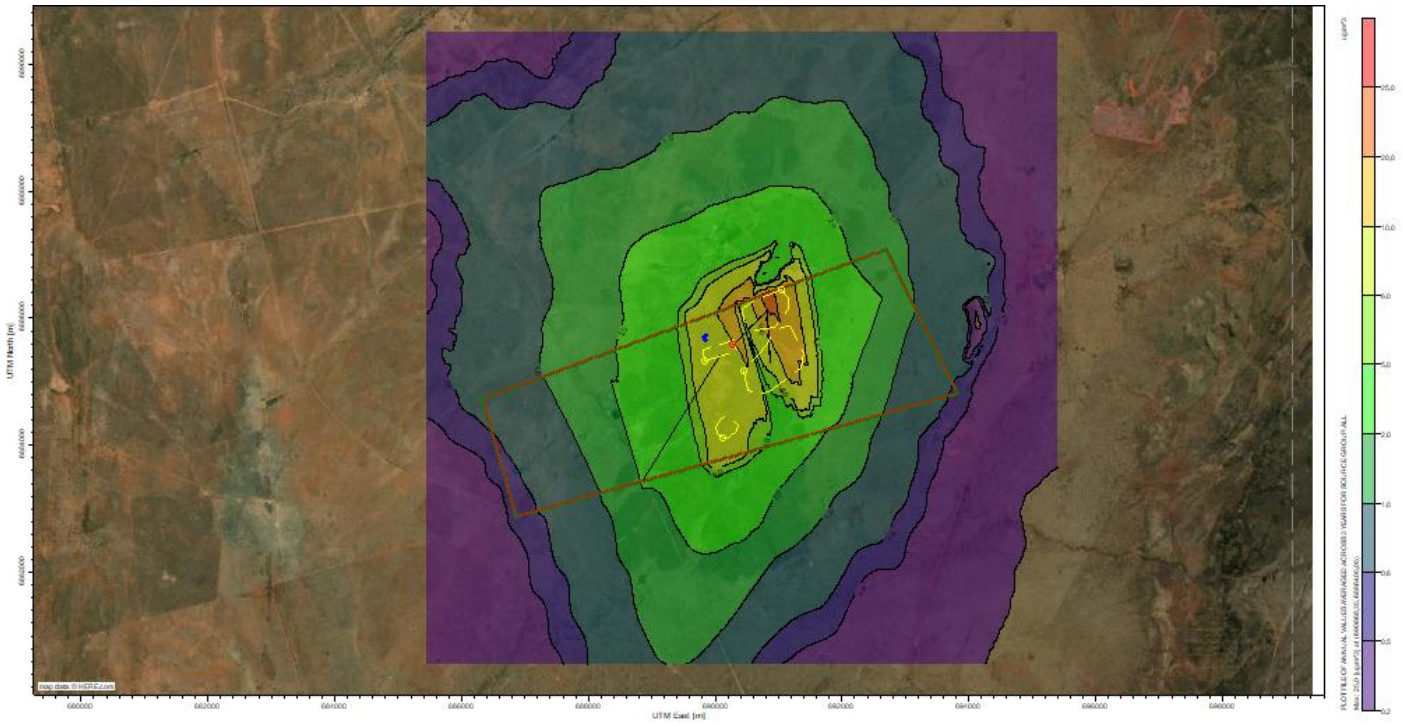


Figure 53: Isopleths of annual $PM_{2.5}$ Concentrations (Yellow Tree, 2025)

3.5.3 Scenario 2 – PM10

Table 38: Non-cumulative PM_{10} Results – Scenario 2 (Yellow Tree, 2025).

Ave. Period	Parameter	Max. Fence Line and Surrounds	NAAQS (µg/m³)
Daily	**Concentration (µg/m³)**	191.48	75
	Elevation	1 350.80 m	
	Location (UTM)	X: 690212.86 m Y: 6886162.50 m	
	Date	2023/04/04, 24	
Annual	**Concentration (µg/m³)**	34.58	40
	Elevation	1 350.80 m	
	Location (UTM)	X: 690212.86 m Y: 6886162.50 m	
	Date/Hour	-	

In Scenario 2, which includes additional dust mitigation measures, namely the windbreaks around the stockpiles and open pits, as well as chemical dust suppressants on the haul route between the pits and waste stockpile, the model predicts exceedances of the daily PM_{10} NAAQS of 75 $\mu g/m^3$ at the site fence line. However, no exceedances of the annual PM_{10} NAAQS of 40 $\mu g/m^3$ are predicted in this scenario, indicating that the implementation of the proposed dust mitigation strategies offers a meaningful reduction in long-term ambient PM_{10} concentrations.

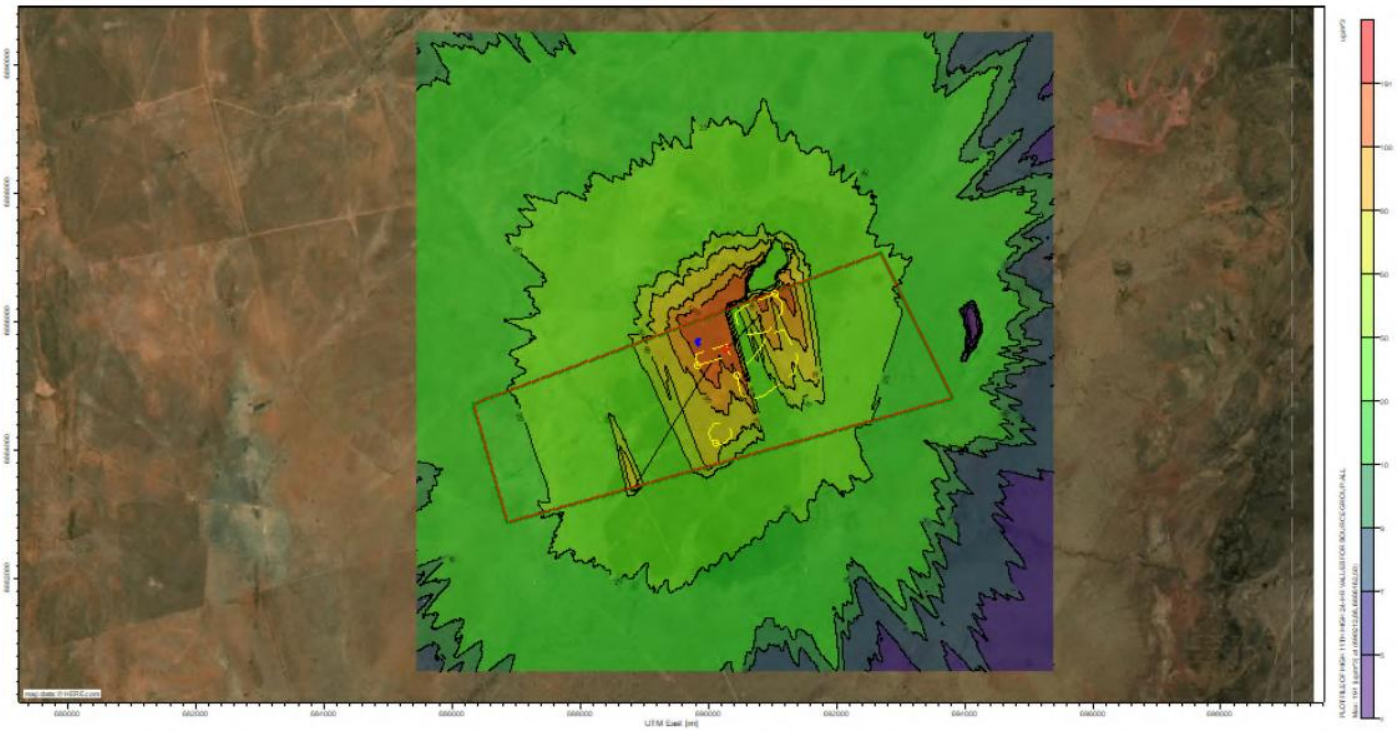


Figure 54: Isopleths of daily PM_{10} Concentrations (Yellow Tree, 2025)

The above figure shows that the highest daily ambient PM_{10} concentration (191.48 $\mu g/m^3$) occurs along the northern border of the proposed site, as indicated by the red isopleth. The areas in which exceedances are predicted are located around the waste dump and the ore stockpile of the proposed facility.

The following figure shows that the highest annual ambient PM_{10} concentration (34.58 $\mu g/m^3$) occurs along the northern border of the proposed site, as indicated by the orange isopleth. The highest predicted concentrations occur in and around the waste dump. No exceedances in the annual NAAQS are predicted by the model, and all isopleths shown indicate annual ambient PM_{10} concentrations that are below the NAAQS.

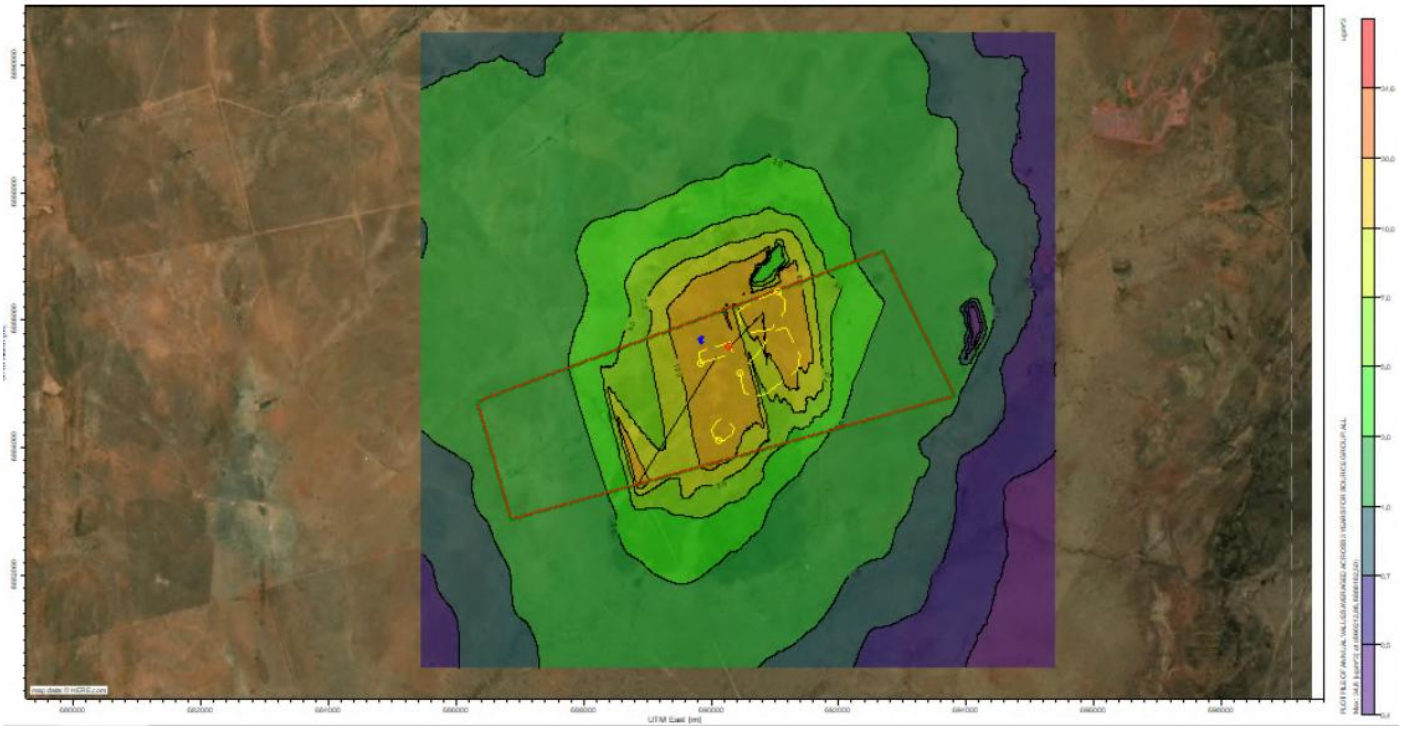


Figure 55: Isopleths of annual PM_{10} Concentrations (Yellow Tree, 2025)

3.5.4 Scenario 2 – PM2.5

Table 39: Non-cumulative $PM_{2.5}$ Results – Scenario 2 (Yellow Tree, 2025).

Ave. Period	Parameter	Max Fence Line and Surrounds	NAAQS (µg/m³)
Daily	Concentration (µg/m³)	32.22	40
	Location (UTM)	X: 690503.75 m Y: 6886405.76 m	
	Elevation	1349.13 m	
	Date/Hour	2022/04/26, 24	
Annual	Concentration (µg/m³)	6.92	20
	Location (UTM)	X: 690868.35 m Y: 6886405.05 m	
	Elevation	1 366.84 m	
	Date/Hour	-	

The Scenario 2 model predicts no exceedances of the $PM_{2.5}$ daily and annual NAAQS of 40 µg/m^3 and 20 µg/m^3, respectively, at the fence line, indicating that the proposed dust mitigation strategies are effective in reducing ambient $PM_{2.5}$ concentrations around the proposed site.

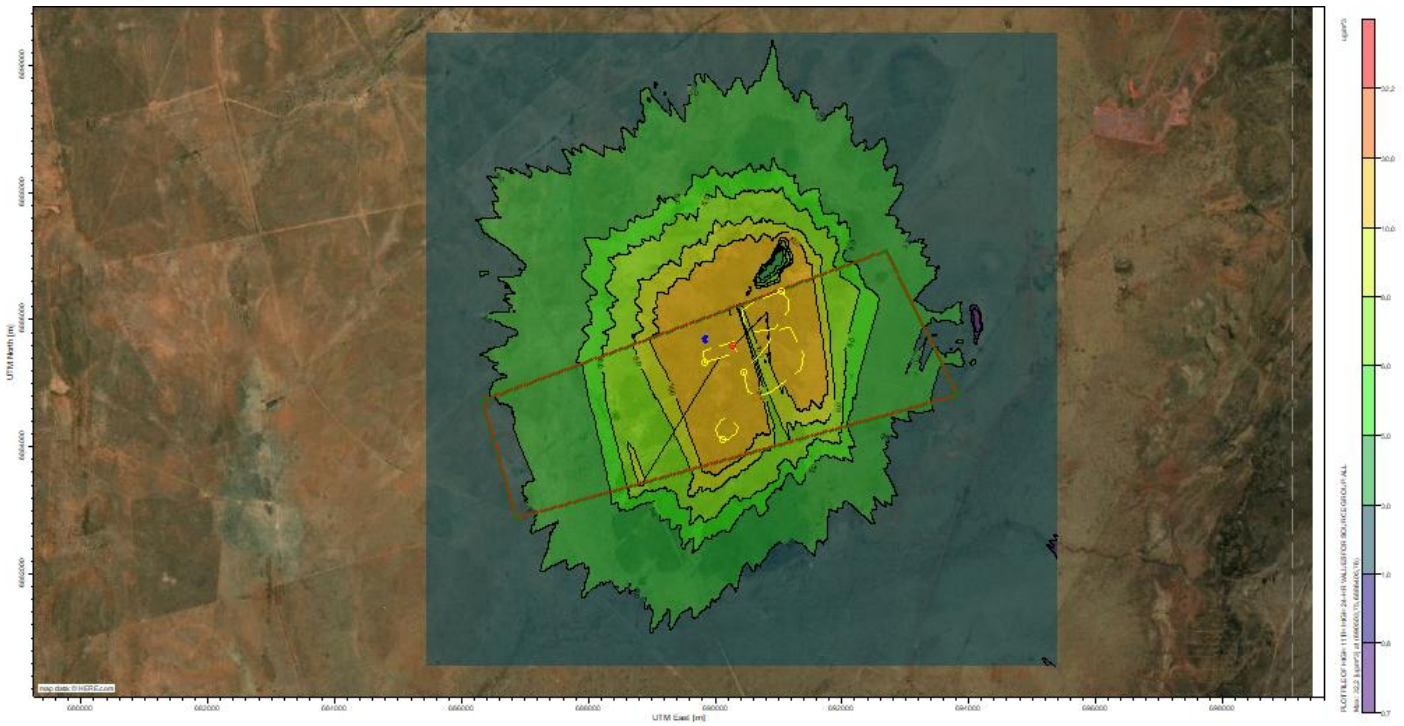


Figure 56: Isopleths of daily $PM_{2.5}$ Concentrations (Yellow Tree, 2025)

The above figure shows that the highest daily ambient $PM_{2.5}$ concentration (32.22 µg/m^3) occurs along the northern border of the proposed site, as indicated by the orange isopleth. The highest predicted concentrations occur around the vicinity of the waste stockpile. However, no exceedances of the daily NAAQS of 40 µg/m^3 are predicted by the model, and all isopleths shown remain within compliance levels.

The following figure shows that the highest annual ambient $PM_{2.5}$ concentration (6.92 µg/m^3) occurs along the northern border of the proposed site, as indicated by the red and orange isopleths. The highest predicted concentrations occur around the vicinity of the waste stockpile. However, no exceedances of the annual NAAQS of 20 µg/m^3 are predicted, and all isopleths shown remain within compliant levels.

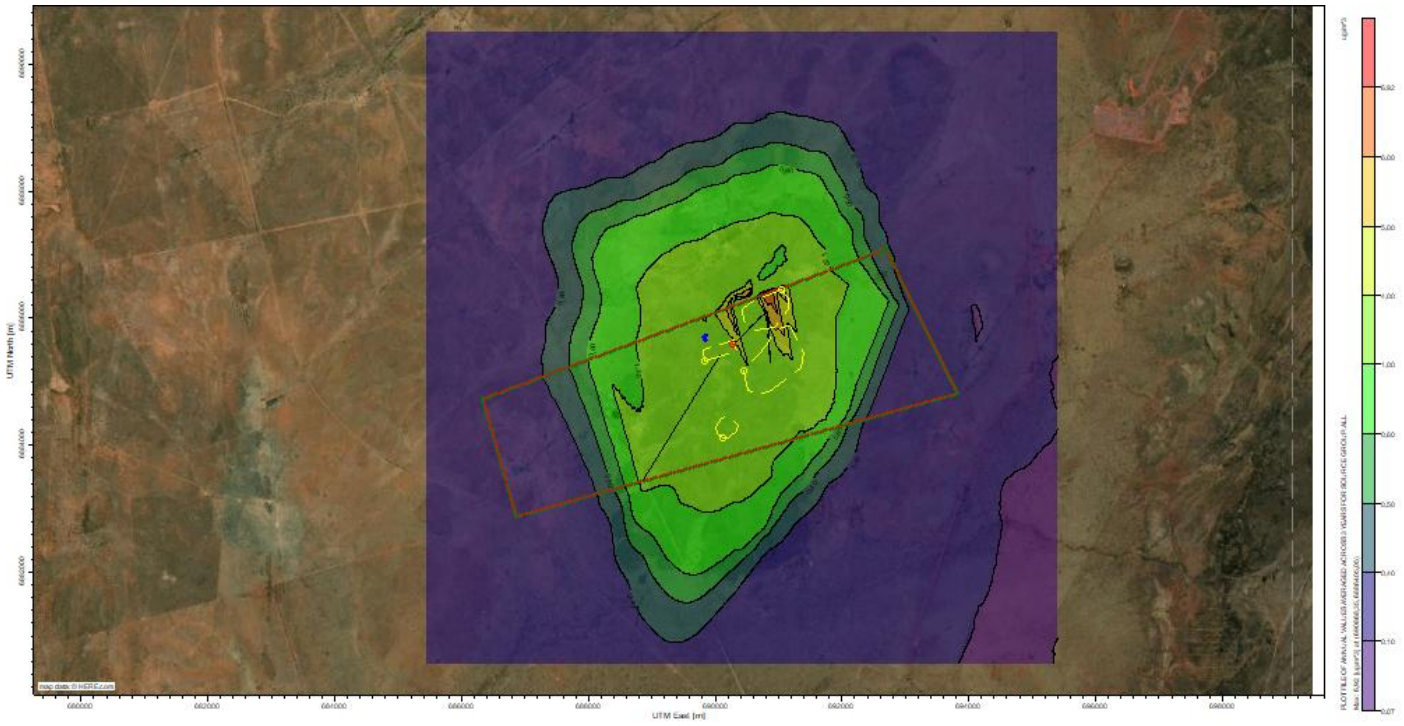


Figure 57: Isopleths of annual $PM_{2.5}$ Concentrations (Yellow Tree, 2025)

3.5.5 Air Dispersion Modelling Conclusions

The modelling results from Scenario 1 indicate that both the daily and annual NAAQS for PM_{10} and $PM_{2.5}$ would be exceeded at locations along the northern fence line of the site, particularly in the vicinity of the waste stockpile and ore stockpile. These exceedances highlight the need for additional dust control measures to ensure compliance during the operational phase of the mine.

In Scenario 2, the implementation of additional dust mitigation measures results in notable improvement in predicted ambient PM concentrations. All $PM_{2.5}$ concentrations remain below both the daily and annual NAAQS, and the predicted annual PM_{10} concentrations also comply with the applicable standard. While the daily PM_{10} NAAQS is still exceeded, the extent and magnitude of the daily exceedance is significantly reduced compared to Scenario 1.

Based on the results of the dispersion modelling, the implementation of additional dust control measures, such as windbreaks and chemical suppressants, would significantly reduce the predicted ambient concentration of PM at the proposed site to acceptable levels.

3.6 Noise, Ground Vibrations and Airblast

The proposed mining footprint encompasses an uninhabited farmhouse (landowner of Makganyene No 667/1,2,RE) in the west, while the following figure shows the position of the nearest surrounding residences/infrastructure to the MR footprint.

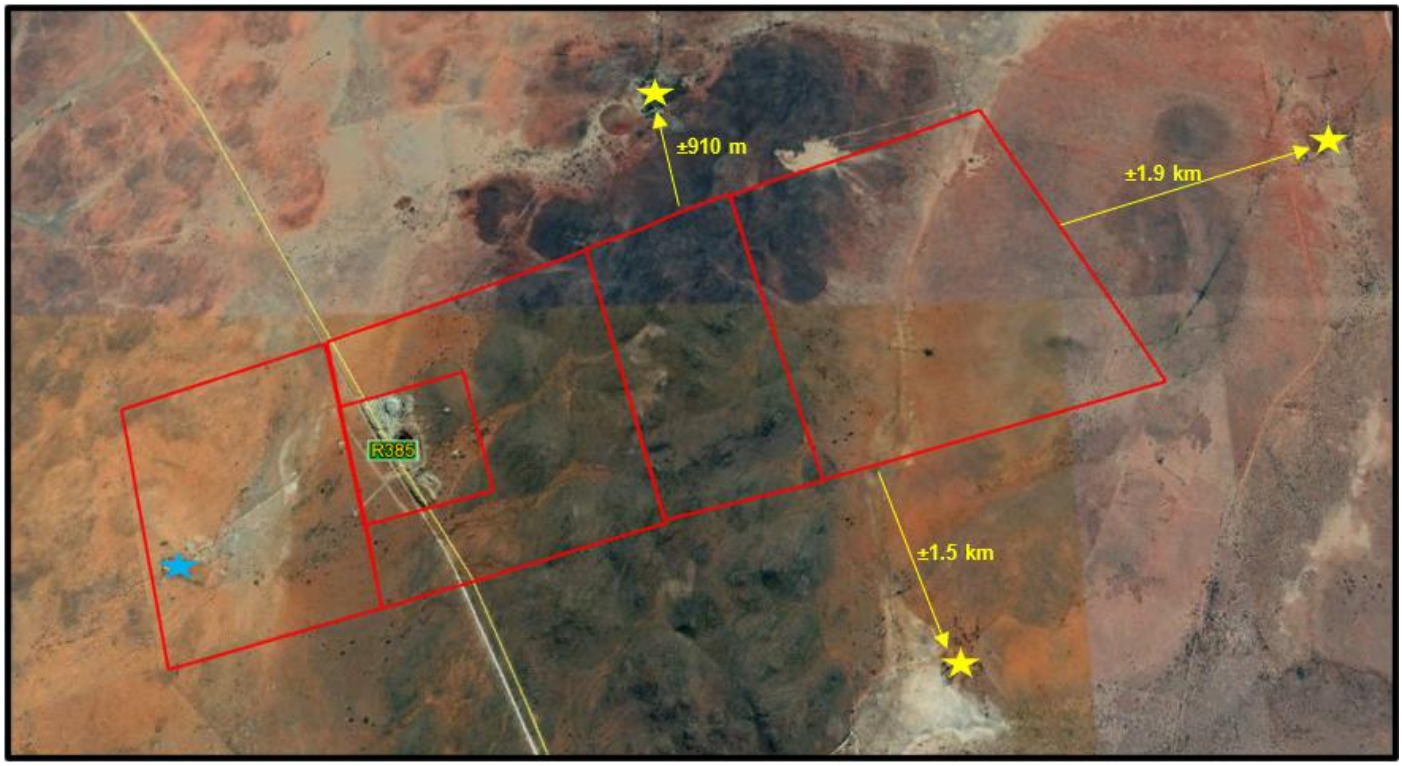


Figure 58: Satellite view showing the distance between the mining footprint and surrounding residences. The blue star indicates the farm house on Makganyene No 667 (image obtained from Google Earth).

Noise will be generated by blasting, crushing, screening, material handling, stockpiling and haulage activities associated with the MIOM. The nearest occupied residence is located ±910 m to the north of the mining area, with additional residences situated 1.9 km to the east and 1.5 km to the south. Blasting will be limited to one event per day during normal working hours (Monday – Friday, 08:00 – 17:00)., while other activities such as crushing, screening and haulage will occur continuously in support of the 24-hour operations. Blasting produces short-duration, high-intensity impulsive noise, while crushing and haulage contribute to continuous background noise. Noise levels are expected to attenuate with distance, with the dwelling at 910 m likely to be most affected relative to receptors further away.

3.6.1 Ground Vibrations

Although there are no formalized limits to vibration, the United States Bureau of Mines (USBM) limits are commonly applied in South Africa. The limiting curve (developed from empirical studies (Siskind et.al. 1980)) is shown in the following figure.

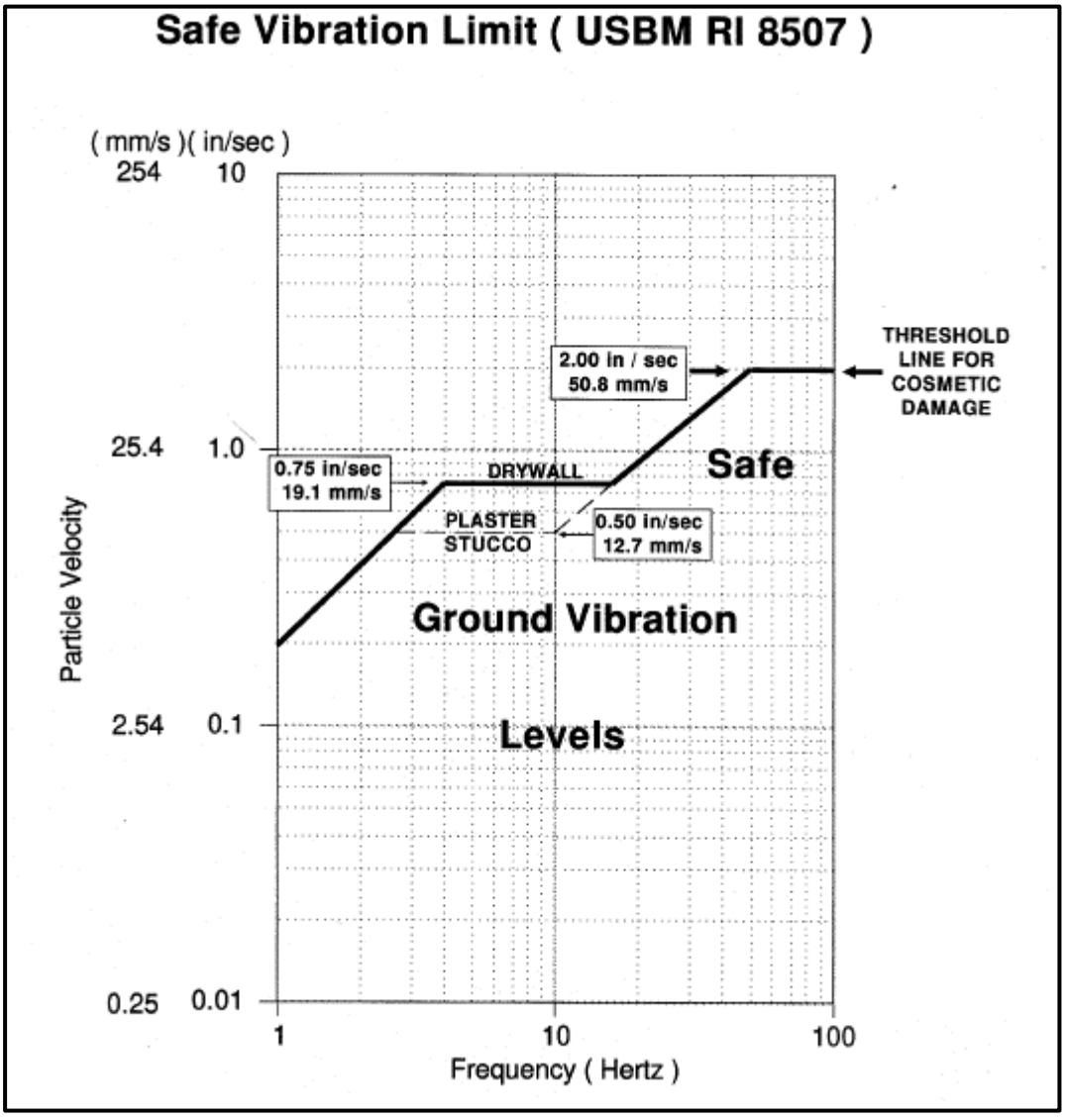


Figure 59: USBM curve that is generally used in South Africa (Cambrian CC).

The limiting curve in Figure 59 represents the limit for cosmetic damage to a house. The maximum ground vibration amplitudes are frequency dependent with higher frequencies allowing higher peak amplitudes. In general, at lower frequencies (less than 10 Hz), the ground vibration should not exceed 12.7 mm/s, but at higher frequencies, the limit can increase to 50 mm/s.

Although buildings can withstand ground vibration amplitudes of 12.7 mm/s or more, depending on the frequency, human beings are easily disturbed at lower

levels. The typical human response to ground vibration is illustrated in the table below. Ground vibration levels of 0.76 to 2.54 mm/s received at a structure are perceptible, but the probability of damage is almost non-existent. Levels in the 2.54 to 7.6 mm/s range can be disturbing, and levels above 7.6 mm/s can be very unpleasant, although permanent damage is unlikely.

Table 40: Table showing the general human response to ground vibrations (Cambrian CC).

Effect on Humans	Ground Vibration Level in mm/sec
Imperceptible	0.025 – 0.076
Barely perceptible	0.076 – 0.254
Distinctly perceptible	0.254 – 0.762
Strongly perceptible	0.762 – 2.540
Disturbing	2.540 – 7.620
Very disturbing	7.620 – 25.400

Human perception is also affected by frequency. The approximate human response curves are combined with the USBM limiting curve for damage the following figure. These curves slope in the opposite direction, in other words, humans are more tolerant to low frequency vibrations.

To avoid damaging buildings, the USBM limiting curve should be applied. However, to avoid constant complaints and possible litigation from neighbours, the vibration should preferably be kept beneath the unpleasant curve and definitely be kept beneath the intolerable curve.

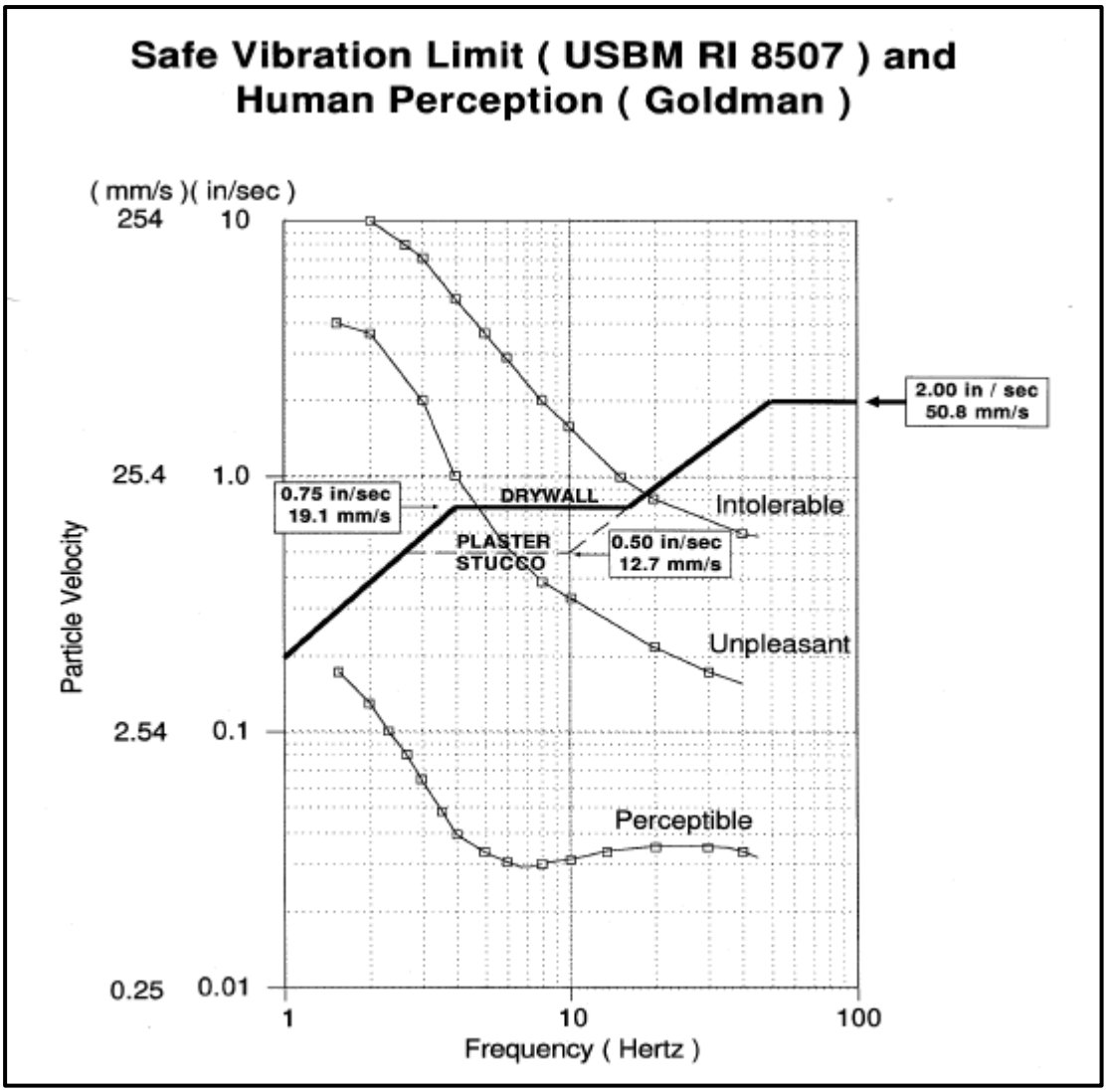


Figure 60: Human response curves compared with potential damaging limits. (Cambrian CC).

3.6.2 Effect of Air Blasts

Based on work carried out by Siskind et.al. (1980), air blast amplitudes up to 135 dB are safe, provided the monitoring instrument is sensitive to low frequencies (down to 1 Hz). Persson et.al. (1994) have published the following estimates of damage thresholds based on empirical data. The regulatory limit defined by USBM is 133 dB-L.

Table 41: Tables showing the accepted damage threshold for air blast (first table) as well as the human response to air blast (second table) (Cambrian CC).

Damage thresholds for air blast.

120 dB	Threshold of pain for continuous sound
>130 dB	Resonant response of large surfaces (roofs, ceilings). Complaints start.
150 dB	Some windows break
170 dB	Most windows break
180 dB	Structural Damage

Human response to airblast.

Average human response	Airblast (dB)
Barely to distinctly perceptible	50 to 70
Distinctly to strongly perceptible	70 to 90
Strongly perceptible to mildly unpleasant	90 to 120
Mildly to distinctly unpleasant	120 to 140
Distinctly unpleasant to intolerable	140 to 170

AEL Mining Services (AEL) in one of their 'Blasting News' publications make the points that there are no legislated limits for air blast in South Africa and that human response to blasting is difficult to quantify as airblast can be felt at levels well below those required to produce damage to structures. They published guides for airblast criteria and human response as presented in the following table.

Table 42: Guidelines for airblast criteria and human response as published by AEL Mining Services (Cambrian CC).

AEL guide for airblast criteria (Based on USBM RI 8485)	
Level	**Description**
100 dB (2.0 Pa)	Barely noticeable.
110 dB (6.3 Pa)	Readily acceptable.
128 dB (50.2 Pa)	Currently accepted by South African authorities as being a reasonable level for public concern. (No more than 10% of measurements should exceed this value).
134 dB (100.2 Pa)	Currently accepted by South African authorities that damage will not occur below this level. (No measurements should exceed this value outside the mining boundaries).

3.6.3 MIOM Scenario

Ground vibrations and airblast are also expected at the proposed MIOM as a result of blasting. Data from a comparable nearby mine indicate average ground vibrations of 2.075 mm/s Peak Particle Velocity (PPV) and average air blast levels of 131.9 dB. According to the USBM criteria commonly applied in South Africa, vibration levels below 12.7 mm/s (at low frequencies) are unlikely to cause structural damage, although levels above approximately 2.54 mm/s can be perceptible and may be disturbing to humans (Figure 59; Table 40). Similarly, airblast amplitudes up to 133–135 dB is generally considered below the structural damage threshold (Table 41), although human sensitivity may be triggered at lower levels (Table 42).

Blasting operations at the MIOM will therefore have to be monitored and managed to ensure compliance with the applicable ground vibration and airblast criteria, while mitigation measures for noise and operational activities must be implemented as outlined in the Environmental Management Programme.

4. SITE SPECIFIC GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY

(Information obtained from the MWP, 2024, the Geohydrological Investigation, 2025 attached as Appendix E, and the Soil, Land Use and Land Capability Assessment Report, 2025 attached as Appendix Q)

Most of the surface outcrop features towards the east of the earmarked properties comprise diamictites of the Makganyene Formation. Some quartzite splays cover the diamictite in places. The flat laying topography to the west comprises mostly of sand and sporadic outcrops of the Ongeluk lava. Two almost parallel linear features with a south-south-west to north-north-east trend are present on the geological sheet, possibly representing the continuation of thrust faults (following figure). The western feature seems to connect with a thrust fault. The MWP notes that the properties warrant in depth investigation due to the close location to recent iron ore deposits intersected on the farm Heuningkrantz and mining activities on Aucampsrust, where similar rock formations are present. Both the Gamagara Formation and the Rooinekke Iron Formation are hosts rocks to iron and manganese mineralization. Clastic ore deposits present on Kameelhoek, Aucampsrust and Makganyene were documented by Nel, Tin 1929.

The Geohydrological Investigation provided a simplified stratigraphic column (following figure) to indicate the layers as they appear in the Makganyane area. A

clear picture of the regional geological layout is formed if the abovementioned column is viewed in conjunction with Figure 62 in vertical cross-section format.

Supergroup	Group	Subgroup	Formation	Member	Major lithology	Thickness (m)
Traansvaal	Posmasburg		Ongeluk		Andesite lava	> 180
			Makganyene		Diamictite, cherty carbonate	< 10
		Major Unconformity				
	Ghaap	Koegas	Nelani		Silicate lutite, grainstone	< 40
			Rooinekke		Iron-formation, 'upper dolomite'	0 - 130
		Major thrust				
Keis	Elim		Gamagara	Paling	Shale	20-80
				Marthaspoort	Quartzite with intermittent conglomerates	
				Sishen	Shale	
				Doornfontein	Basal iron rich conglomerate	
		Major Unconformity				
			Manganore	Blinkklip	Iron/chert breccia	0 - 100
					Iron-fomation and iron ore	
			Wolhaarkop		Siliceous chert breccia	0 - 30
	Ghaap	Campbellrand			Dolomite	

Figure 61: Postulated Simplified Makganyene stratigraphic column (Groundwater Complete).

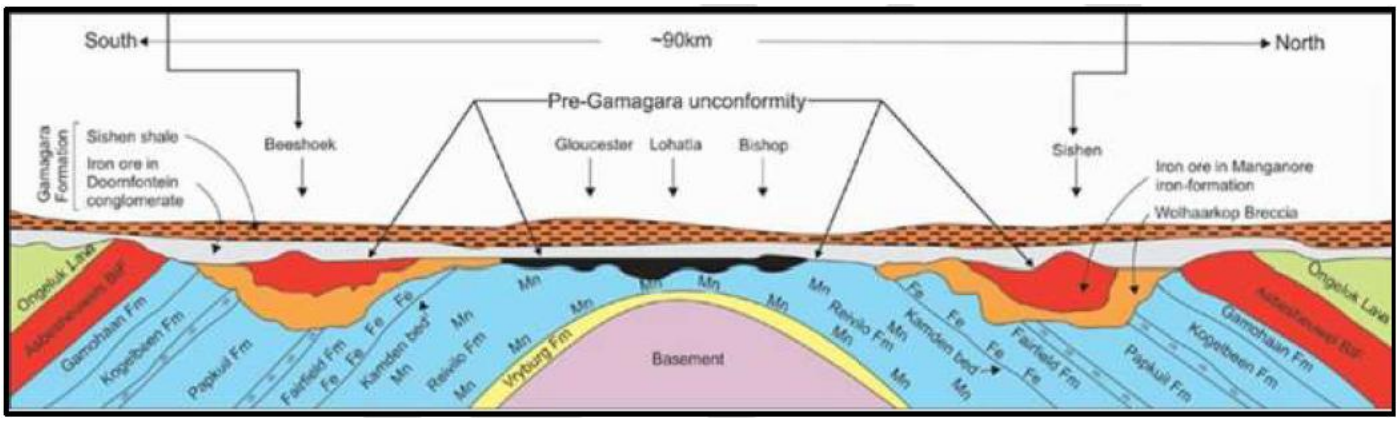


Figure 62: Schematic north-south sections across the Maremane Dome (Groundwater Complete).

The Maremane dome is the main geological feature in the area between Postmasburg in the south and Sishen in the north. It forms a large anticline structure stretching over tens of kilometres consisting mainly of dolomite. The top of the dome ends in an unconformity, in which the banded iron formation (BIF) and Wolhaarkop formations were formed. The chert units (Wolhaarkop Formation), comprising angular to sub-rounded chert fragments in a grey-brown chert matrix, unconformably overlies the carbonates. The breccia is thought to be the result of solution collapse and cavity formation within the underlying dolomites. With the collapse of the underlying dolomite, the overlying chert broke-up and accumulated in the cavity. These zones of brecciated cherts are most likely the source

(transmissive fracture zones) of water in the boreholes where the highest yields were recorded.

The BIF within the area belongs to the Kuruman Iron Formation and have locally been named the Manganore Iron Formation (Beukes, 1983). The Makganyane iron-ore deposits were formed by the reformation of BIF's during the end of the formation of the Pretoria/Postmasburg groups.

A clastic succession of sedimentary rocks (conglomerates, shales, flagstones and quartzites) of the Gamagara Formation were deposited above an unconformity surface formed on the upper parts of the Asbestos Hills Subgroup. The Gamagara sequence is well developed in the Sishen area. The Koegas Group rocks fill synclinal basins around the Wolhaarkop Dome, having been thrust onto the Gamagara Formation.

The Koegas Subgroup is, in turn, conformably overlain by diamictite of the Makganyene Formation, upon which lavas of the Ongeluk Formation have been subaqueously extruded. The Makganyane area is mainly covered by a dome of Koegas Group Nelani and Rooinekke formations with some outcrops of diamictite of the Makganyene Formation. Surrounding the dome is a region of Ongeluk Formation andesitic lavas, almost entirely blanketed by sand, dolocrete and calcrete of the Kalahari Group.

4.1 Surface Outcrop Mapping

Manganese bearing jasperoied and mudstone, typical to the Rooinekke and Naragas formations of the Koegas Subgroup, as well as banded iron formations are present in outcrop. It was suggested that slivers of the Makganyene diamictite are overlaying the Rooinekke Iron Formation of the Koegas Sub-Group in outcrop.

Weathered lava fragments and poor outcrops are present towards the west. Marthaspoort quartzite, defining the top of the Gamagara Formation, is present on different localities towards the east. Iron ore and flagstone remnants are present up-dip of the Marthaspoort quartzite.

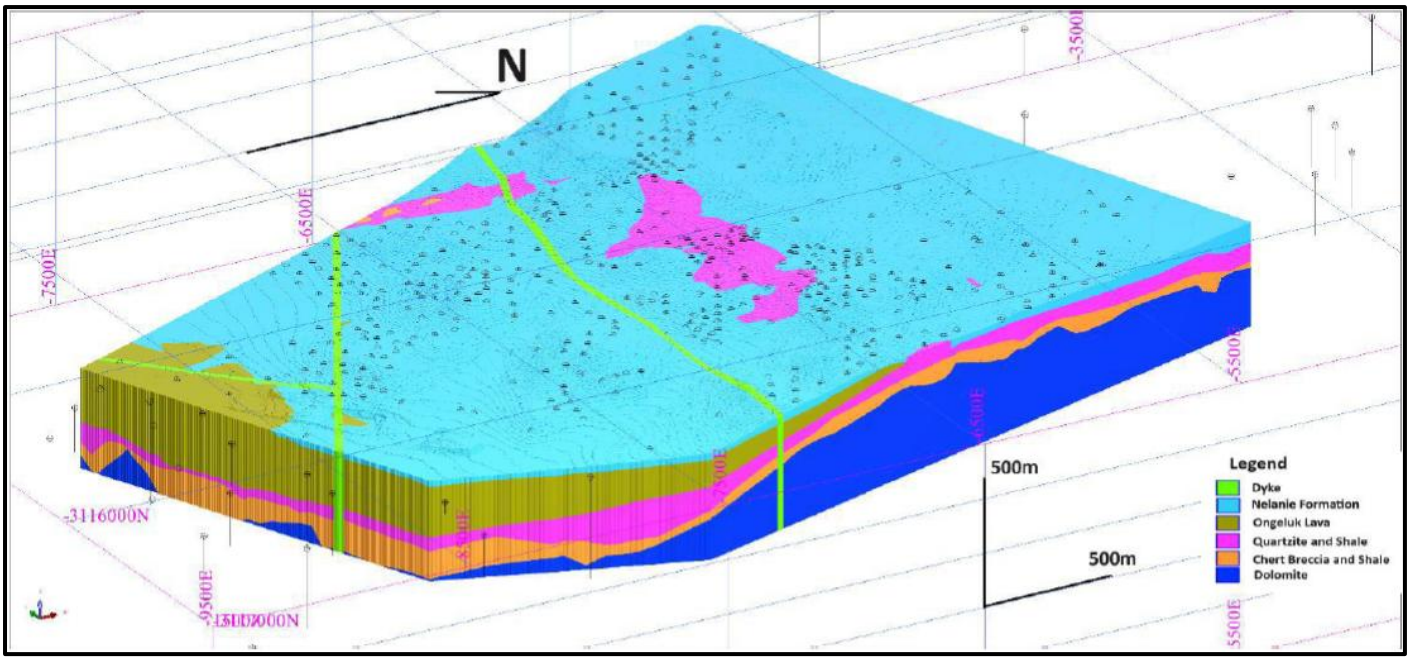


Figure 63: General Stratigraphic Zones with their Main Material Types (image obtained from the MWP).

Also refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 5. Site Specific Geohydrology.*

4.2 Dominant Soil Forms

(Information obtained from the Soil, Land Use and Land Capability Assessment Report, 2025 attached as Appendix Q)

The identified soil forms occurring within the focus area include Mispah/Glenrosa, Mispah (outcrops), Glenrosa, Clovelly, Witbank (Infrastructure), and Cullinan (Excavation with Water). Of these identified soils, the Mispah/Glenrosa and Mispah soil forms were the most dominant within the focus area, occupying 69.62% and 18.24% of the total enclosed area respectively.

The Mispah/Glenrosa and Mispah soil formations are typically shallow in nature and in some instances no bedrock outcrops on surface. These soils are characterised by spatial heterogeneity associated with weathering of the rock material, illuviation, and biotic disturbance (plants and animals) especially along the joints or bedding planes which results in the mixing of soil and rock material in some instances. These types of soils are usually avoided for any agricultural cultivation activities and thus left for grazing and wildlife land uses in this arid region since they do not present adequate soil depth for most cultivated crops.

The Witbank (Transported Technosols) soil forms are soils which have been subjected to physical disturbance due to infrastructural developments. In this context, Witbank soils include areas with transported soil material which has been significantly transformed and heavily modified such that the diagnostic horizons could not be identified. As a result, these soils are not ideal for agricultural cultivation.

The soils of Hutton formations are characterised by development in well-drained oxidising environmental conditions (warm and moist) which allow for iron oxide coating on soil particles thus resulting in the dominating red colours of the soils. In some instances, the red colour can be because of the iron-rich parent material (hematite). These soils have a good depth (approximately 120 cm), which is considered sufficient to allow plants' roots to extract moisture and nutrients to sustain growth and development. In the absence of climatic constraints, the soils are suitable for arable cultivation.

The following table presents the identified soil forms within the focus area, their respective diagnostic horizon and soil depth (cm).

Table 43: Identified soil forms associated with the focus area (ZRC).

Soil Forms	Soil Depth (cm)	Diagnostic Horizons	Area Extent (ha
Hutton	120	Orthic A/ Yellow Brown Apedal/ Lithic	5.50
Cullinan	n/a	(Excavation with Water)	1.24
Glenrosa	<30	Orthic A/ Lithic	37.04
Mispah/Glenrosa	<15	Orthic A/ Lithic and/or Hard Rock	253.46
Mispah	0	Orthic A/ Hard Rock	66.39
Witbank	n/a	Transported Technosols	0.41
Total Enclosed Area			**364.04**

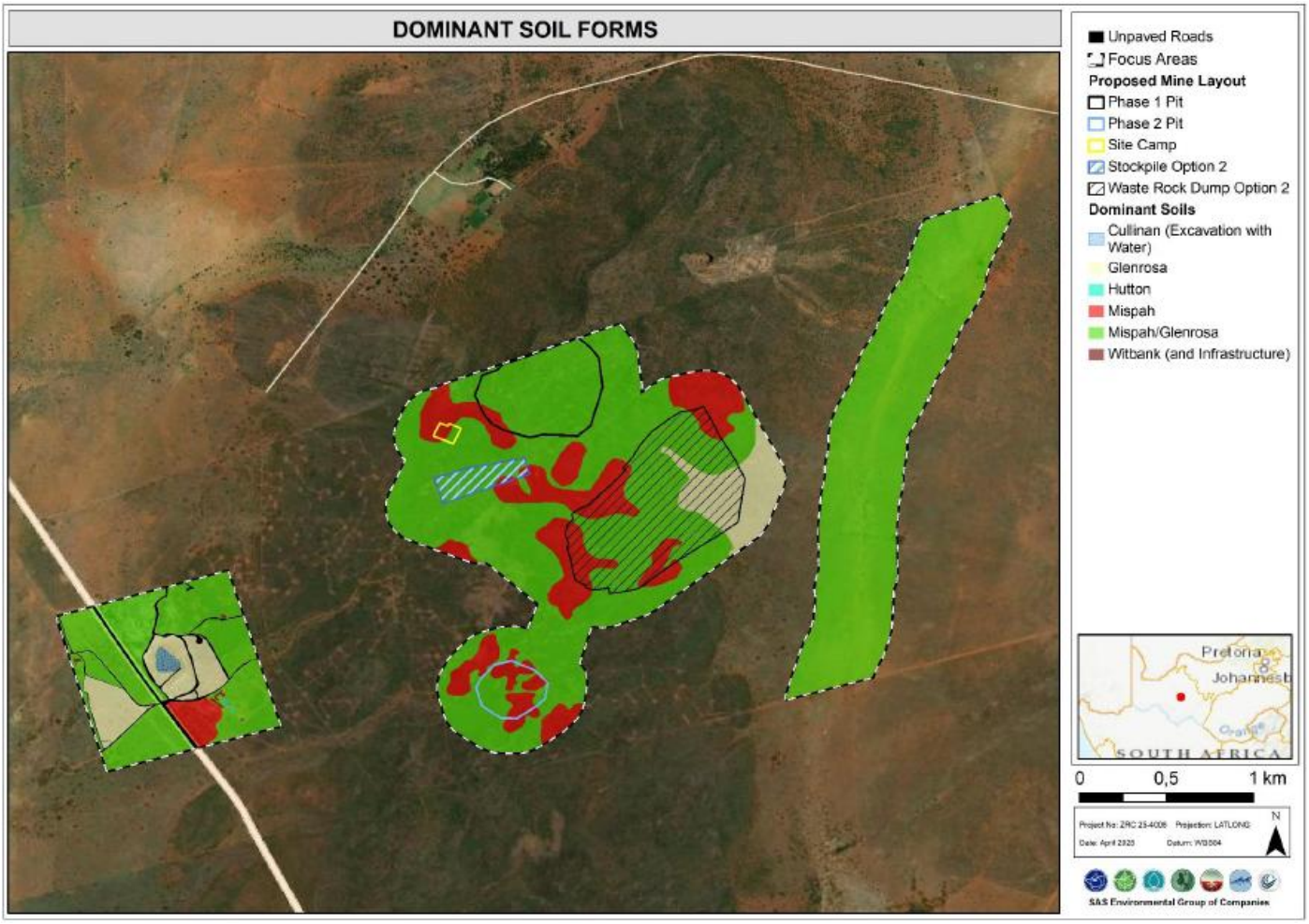


Figure 64: Dominant soil forms associated with the focus area (ZRC).

4.3 Land Capability Classification

The focus area falls under Climate Capability Class 5 which is characterised by moderate to severe limitation rating. This is due to moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops may be grown at risk of some yield loss under this climatic capability class (C5).

The identified land capability limitations for the identified soils are discussed in comprehensive “dashboard style” summary tables presented from Tables 45 – 48 below.

Table 44: Land capability and land potential associated with the soils occurring within the focus area (ZRC)

Soil Forms	Soil Depth (cm)	DALRRD (2018) Classification	Field Verified Agricultural Sensitivity	Land Potential	Area Extent (ha)	Percentage (%)
Hutton	120	14. Very High	Medium	Good – L3	5.50	1.51
Glenrosa	<30	6. Low - Moderate		Restricted – L5	37.04	10.17
Mispah/ Glenrosa	<15	4. Low - Very Low	Low	Very Restricted – L6	253.46	69.62
Mispah	0	2. Very Low		Very Low – L8	66.39	18.24
Cullinan	n/a				1.24	0.34
Witbank	n/a				0.41	0.11
Total Enclosed Area					**364.04**	**100**

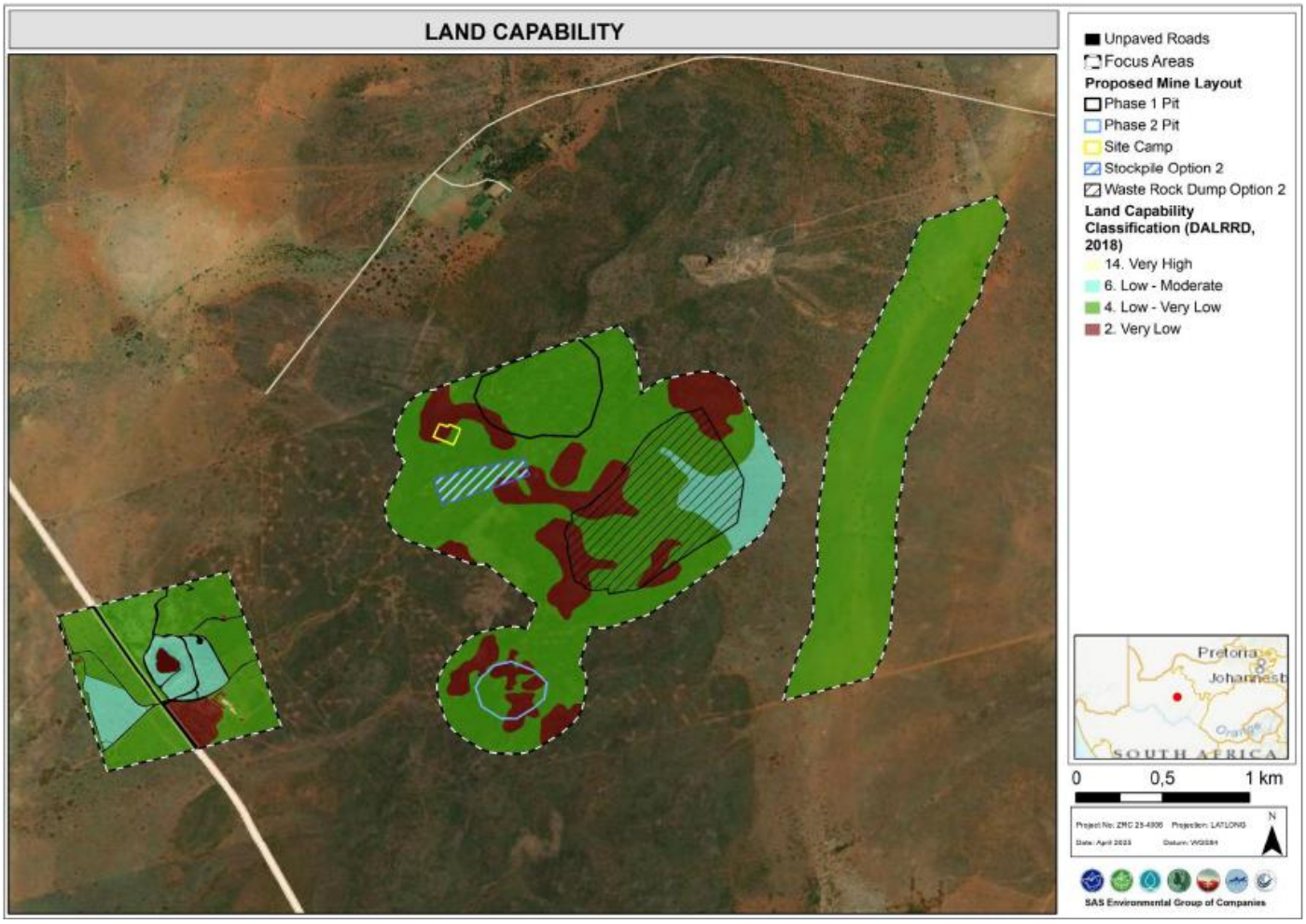


Figure 65: Land capability of the soil forms associated with the focus area (ZRC).

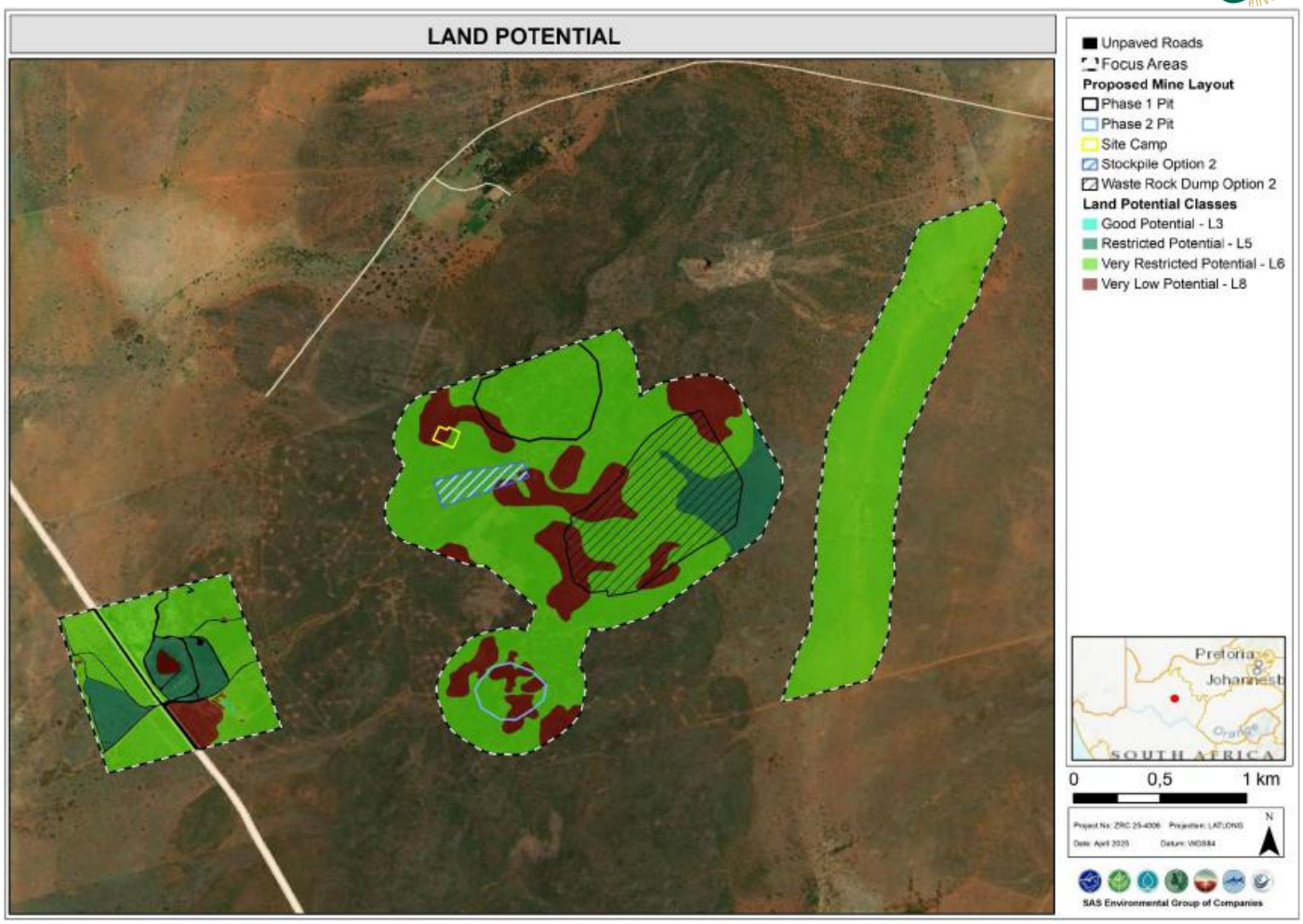


Figure 66: Land potential of the soil forms associated with the focus area (ZRC).

Table 45: Summary discussion of the [14. Very High: (Arable – Class II)] land capability class associated with the Hutton soil form (ZRC).

<table>
<tr><th colspan="5">Land Capability: 14. Very High: (Arable - Class II)</th></tr>
<tr><td colspan="5">View of the identified Hutton soil form within the focus area.
 </td></tr>
<tr><td>Terrain Morphological Unit (TMU)</td><td colspan="2">Flat terrain with less than 0.5% slope</td><td>Photograph notes</td><td>View of the identified red apedal horizons associated with the Hutton soil forms.</td></tr>
<tr><td>Soil Form(s)</td><td colspan="2">Hutton</td><td>Area Extent (ha)</td><td>5.50 (1.51%)</td></tr>
<tr><td>Diagnostic Horizon Sequence</td><td colspan="2">Orthic A/ Red Apedal B</td><td rowspan="3" colspan="2">Land Capability
Land capability (Class II) is suitable for arable agricultural land use with restrictions. The identified soil forms are of good potential (L3) particularly when they occur under Climate Capability Class (C5) which is characterised by a moderate to severely restricted growing season due to low temperatures, frost and/or moisture stress. Therefore, these soils are considered to make a considerable contribution to agricultural productivity on a regional and national scale.</td></tr>
<tr><td>Land Potential</td><td colspan="2">Good Potential – L3: Infrequent and/or moderate limitations due to soil, slope, temperatures, or rainfall. Appropriate contour protection must be implemented and inspected.</td></tr>
<tr><td>Physical Limitations</td><td colspan="2">None. These soils have a good depth (approximately >120 cm) which is considered sufficient to allow plants' roots to extract moisture to sustain growth and development.</td></tr>
<tr><td>Overall impact significance prior to mitigation</td><td>M</td><td rowspan="2">The overall impact on land capability is anticipated to be Medium (M) without mitigation. Although this soil have inherently good land capability, no placement of mining infrastructure will occur on this soil according to the layout provided by the proponent. Therefore, if better managed, anticipated impacts can be further reduced to a low level (L) with effective application of soil conservation mitigation measures.</td><td rowspan="2" colspan="2">Consideration of Integrated Environmental Management and Sustainable Development principles:
Although the areal extent of this soil is limited, the identified soils are considered good agricultural soils and suitable for arable crops. These soils can yield profit returns under prudent crop selection and conservation soil management practices. However, the prevailing local climatic conditions (low rainfall and high evaporation) severely restricts the choice of crop cultivation under rainfed agriculture. Therefore, lack of irrigation options disqualifies this area for commercial cultivated agriculture although ideal soils occur. Thus, the soils are restricted to grazing land use.</td></tr>
<tr><td>Overall impact significance post mitigation</td><td>L</td></tr>
</table>

Table 46: Summary discussion of the [6. Low - Moderate: (Grazing Land – Class VI)] land capability class associated with the Glenrosa soil form (ZRC).

<table>
<tr><th colspan="5">Land Capability: [6. Low – Moderate: (Grazing Land - Class VI)]</th></tr>
<tr><td colspan="5">Occurrence of Glenrosa as identified within the focus area.
 </td></tr>
<tr><td>Terrain Morphological Unit (TMU)</td><td colspan="2">Gently sloping landscape, >1.5% slope</td><td>Photograph notes</td><td>View of the morphology of the identified Glenrosa soil form.</td></tr>
<tr><td>Soil Form(s)</td><td colspan="2">Glenrosa</td><td>Area Extent (ha)</td><td>37.04 ha (10.17%)</td></tr>
<tr><td>Diagnostic Horizon Sequence</td><td colspan="2">Orthic A /Lithic</td><td colspan="2" rowspan="3">Land Capability
The identified Glenrosa soil form is of poor (Class VI) land capability and is not suitable for arable agricultural use. Theses soils is, at best, suitable for natural pastures and for light grazing. Therefore, these soils are not considered to make a substantial contribution to extensive subsistence farming on a local scale.</td></tr>
<tr><td>Land Potential</td><td colspan="2">Restricted Potential – L5: Regular and/or moderate to severe limitations due to soil, slope, temperature, or rainfall.</td></tr>
<tr><td>Physical Limitations</td><td colspan="2">Primarily effective rooting depth due to the occurrence of lithic material at a relatively shallow depth (<30 cm).</td></tr>
<tr><td>Overall impact significance prior to mitigation</td><td>M</td><td rowspan="2">The overall impact on land capability is anticipated to be medium (M) without mitigation due to the inherently marginal land capability of the identified soil forms. If better managed, these anticipated impacts can be reduced to low level (L).</td><td colspan="2" rowspan="2">Consideration of Integrated Environmental Management and Sustainable Development principles:
These soils are generally not considered to be of significant agricultural productivity as a result of their shallow nature which effectively reduce the rooting depth. Therefore, these soils are at best suited for light grazing with intensive management practices. The proposed development is viable on these soils due to their low agricultural potential. However, mitigatory measures should still be put in place to minimise disruption of other adjacent soils which can potentially be used for grazing.</td></tr>
<tr><td>Overall impact significance post mitigation</td><td>L</td></tr>
</table>

Table 47: Summary discussion of the [5. Low: (Grazing Land – Class VII)] land capability class associated with the Mispah/Glenrosa soil form (ZRC).

<table>
<tr><th colspan="4">Land Capability: 5. Low: (Grazing Land - Class VII)]</th></tr>
<tr><td colspan="4">Occurrence of Glenrosa and Mispah/Glenrosa as identified within the focus area.
 </td></tr>
<tr><td>Terrain Morphological Unit (TMU)</td><td colspan="2">Sharply steep landscape, >1.5% slope</td><td>Photograph notes View of the morphology of the identified Mispah/Glenrosa soil forms.</td></tr>
<tr><td>Soil Form(s)</td><td colspan="2">Mispah/Glenrosa</td><td>Area Extent (ha) 253.46 ha (69.62%)</td></tr>
<tr><td>Diagnostic Horizon Sequence</td><td colspan="2">Orthic A /Lithic or Hard Rock</td><td rowspan="3">Land Capability
The identified Mispah/Glenrosa soil forms are of poor (Class VII) land capability and are not suitable for arable agricultural use. Theses soils are, at best, suitable for natural pastures and for light grazing. Therefore, these soils are not considered to make a substantial contribution to extensive subsistence farming on a local scale.</td></tr>
<tr><td>Land Potential</td><td colspan="2">Very Restricted Potential – L6: Regular and/or severe limitations due to soil, slope, temperature, or rainfall. Non-arable.</td></tr>
<tr><td>Physical Limitations</td><td colspan="2">Primarily effective rooting depth and/or the absence of growth medium (soil) due to the occurrence of lithic and hard rock material just below the topsoil horizon.</td></tr>
<tr><td>Overall impact significance prior and post mitigation</td><td>L</td><td>The overall impact on land capability is anticipated to be low (L) without mitigation due to the inherently poor land capability of the identified soil forms. If better managed, these anticipated impacts can further be reduced to very low level (VL).</td><td>Consideration of Integrated Environmental Management and Sustainable Development principles:
These soils are generally not considered to be of significant agricultural productivity as a result of their poor effective rooting depth and in some instances, the total absence of growth medium (soil). Therefore, these soils are at best suited for light grazing with intensive management practices. The proposed mining project is viable on these soils due to their low agricultural potential.</td></tr>
</table>

Table 48: Summary discussion of the [2. Very Low: (Wilderness – Class VIII)] land capability class associated with the Mispah, Cullinan, and Witbank soil formations (ZRC).

Land Capability: 2. Very Low: (Wilderness - Class VIII)]			
Terrain Morphological Unit (TMU)	Mispah - Sharply steep landscape, >1.5% slope Witbank/Cullinan - Not applicable; highly disturbed areas	**Photograph notes**	View of the morphology of the anthropogenically excavated soils, exposed hard rock (outcrops) and the disturbed soils.
Soil Form(s)	Mispah - Orthic A/Hard Rock Witbank - (Transported Technosols) Cullinan - (Excavation with Water)	**Area Extent**	68.04 ha (18.69%)
Physical Limitations	Comprises of significantly disturbed areas due to anthropogenic activities (*i.e.* infrastructural developments, and historic mining and related activities) to an extent that no recognisable diagnostic soil horizon properties could be identified. These soils are characterised by various limitations, primarily the absence of soil horizon as a growth medium.	**Land Capability** These identified soils have very poor (Class VIII) land capability due to the significant disturbance that has occurred because of infrastructural developments and historic mining and related activities. This has led to the long-term alteration of the soil physical properties such that these soils are no longer viable for agriculture while the Mispah is characterised by outcrops which cannot be cultivated for agricultural activities. This land capability class also includes areas where the original soil has been excavated and/or extensively modified by anthropogenic activities. These soils are not considered to make any contribution towards agricultural productivity even on a local scale.	
Land Potential	**Very Low Potential (L8):** Very severe limitations due to soil, slope, temperature, or rainfall. Non-arable.		

Overall impact significance prior and post mitigation	**L**	The overall impact of the proposed development on the land capability of these soils is anticipated to be low (L) due to their already existing poor land capability because of historic mining and related activities as well as characterization of rocky outcrops.	**Consideration of Integrated Environmental Management and Sustainable Development Principles:** The current state of these soils requires significant rehabilitation already. The proposed development is not anticipated to cause any loss of agricultural resources since these soils have been disturbed and therefore are not ideal for cultivation.

4.4 Agricultural Sensitivity

The field assessment and verification indicate that while the DFFE national web-based screening tool (Figure 40) initially flagged the focus area as having medium sensitivity to impact, the field verified agricultural sensitivity revealed a low agricultural sensitivity due to factors such as poor soil quality (lack of soil medium and effective rooting depth) and climatic constraints that limit the potential for commercial agricultural production. Therefore, the screening tool is disputed and thus, the proposed mine development can be supported.

Upon verification, the agricultural sensitivity classes with varying degrees of impact depending on the type of land use or soil classification were determined as follows:

- δ Arable soil [14. Very High (Class II)] – Rated as medium sensitivity due to climatic constraints although the soil inherently has a good potential for crop growth.
- δ Grazing land [6. Low - Moderate (Class VI)] – Rated as Medium Low sensitivity due to the soil's prevailing physical limitations.
- δ Grazing land [5. Low (Class VII)] – Rated as Low sensitivity due to the dominance of rocky outcrops (exposed hard rock).
- δ Disturbed footprint areas [2. Very Low (Class VIII)] – Rated as Very Low sensitivity due to significant alterations (infrastructure and mining related activities) to the land which makes it less suitable for agricultural activities.

The following table summarizes the identified soils, and their respective fields verified agricultural sensitivity while the following figure depicts field verified agricultural sensitivity associated with the proposed development.

Table 49: Identified soils within the focus area and their respective field verified agricultural sensitivity (ZRC).

Soil Forms	DALRRD (2018) Land Capability Classification	Field Verified Agricultural Sensitivity	Area Extent (ha)	Percentage (%)
Hutton	14. Very High	Medium	5.50	1.51
Glenrosa	6. Low - Moderate		37.04	10.17
Mispah/Glenrosa	4. Low – Very Low	Low	321.50	88.31
Mispah	2. Very Low			
Cullinan				
Witbank				
Total Enclosed Area			**364.04**	**100**

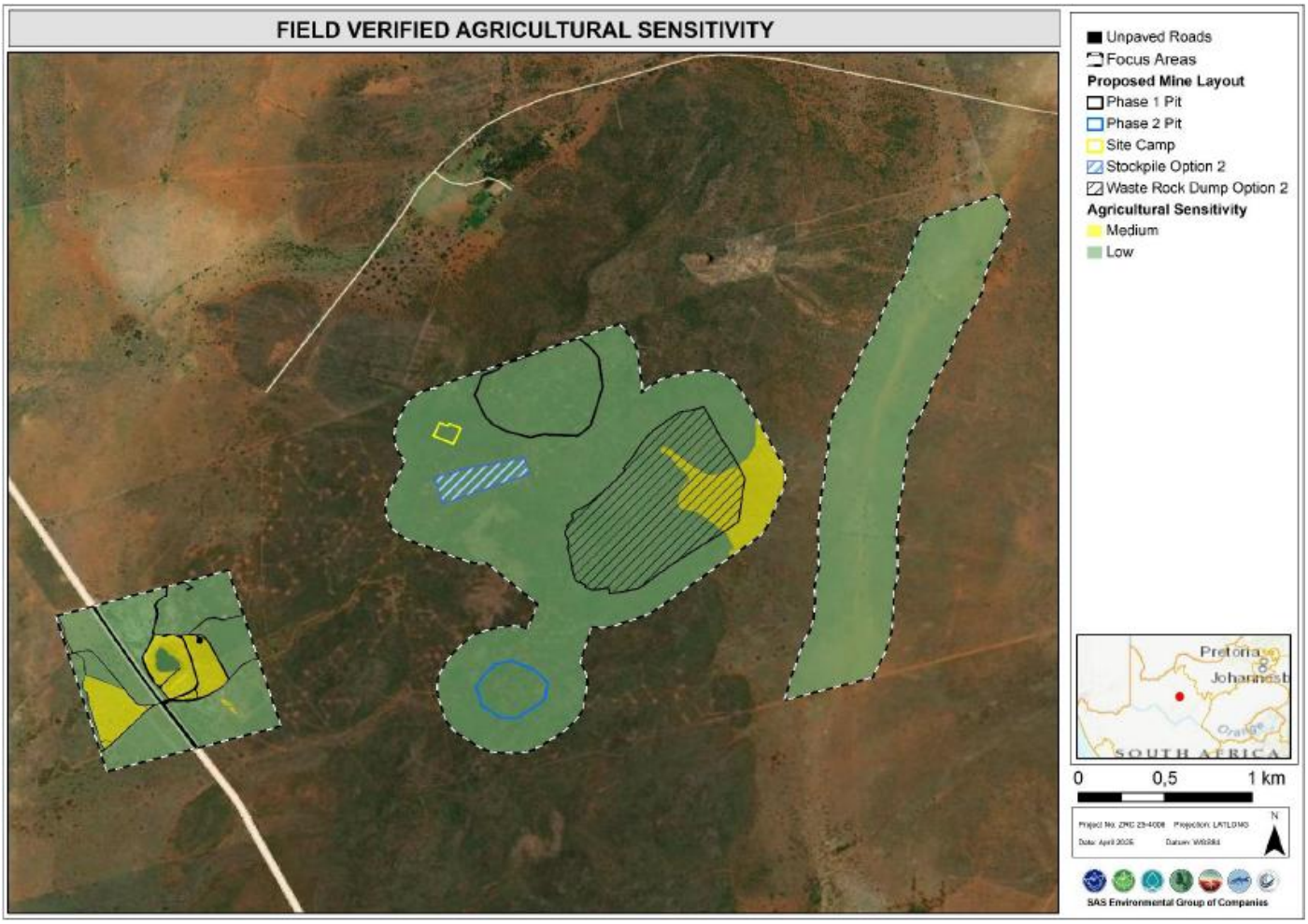


Figure 67: Field verified agricultural sensitivity associated with the focus area (ZRC)

4.5 Northern Cape Protected Agricultural Areas (PAAs)

The Protected Agricultural Areas (PAA) have been mapped out according to their agricultural potential within the Northern Cape province (Department of Agriculture, Land Reform and Rural Development, 2022). These protected agricultural areas are classified into two categories, the irrigated (IR) areas and the rainfed (RF) production systems.

According to the Department of Agriculture, Land Reform and Rural Development DALRRD, 2022) database, the proposed MIOM is not located within any of the protected agricultural areas (PAAs). Therefore, the proposed development is not likely to have an impact on the protected agricultural areas as well as the regional, provincial, and national food production.

4.6 Soil, Land Use, Land Capability and Land Potential Conclusion

The entire focus area is characterised by ±300 mm of mean annual rainfall per annum. This rainfall is deemed inadequate for a variety of cultivated crops and adjusting planting and/or an irrigation scheme may be necessary for successful cultivation of crops. Additionally, the entire focus areas are characterised by mean annual evaporation of more than (>2400 mm) per annum. Moisture deficit and crop wilting may be a problem for non-irrigated crops.

According to observations made during the site assessment, the footprint areas for the proposed MIOM is dominated by bushveld with shrubby and thorny vegetation, wilderness/wildlife, open grassland that is currently utilised for livestock grazing (cattle). No small scale and/or commercial agricultural cultivation activities were observed within the immediate surroundings (5 km radius) of the focus area.

According to the DALRRD 2022 database on the proposed MIOM area is not located within any PAA. Therefore, the proposed mining project is not likely to have an impact on the protected agricultural areas and consequent food security.

The identified soil forms occurring within the focus area include Mispah/Glenrosa, Mispah (outcrops), Glenrosa, Clovelly, Witbank (Infrastructure), and Cullinan (Excavation with Water). The Mispah/Glenrosa and Mispah soil formations are usually avoided for intensive agricultural use and thus left for grazing and wildlife land uses in this arid region since they do not present adequate soil depth for most cultivated crops.

The Witbank (Transported Technosols) soil forms include areas with transported soil material which has been significantly transformed and heavily modified such that the diagnostic horizons could not be identified. As a result, these soils are not ideal for agricultural cultivation.

The soils of Hutton formations have a good depth (±120 cm), which is considered sufficient to allow plants' roots to extract moisture and nutrients to sustain growth and development. In the absence of climatic constraints, the soils are suitable for arable cultivation.

The cumulative loss from a soil and land capability point of view is anticipated to be low for the proposed MIOM. This can be attributed to the dominance of Glenrosa and Mispah soil forms within the focus area which account for approximately 85% of the focus area. The dominant soils have little bearing on agricultural productivity and their contribution towards local, regional, and national food security is highly minimal. Additionally, the existence of other currently operating mines and the proposed Makganyane Mine may have incremental effects on the environment over time; however, the cumulative impacts within the context of local and regional setting are not anticipated to be significant given the low land capability associated with the identified soils as well as the low grazing capacity potential regionally.

The livestock grazing capacity potential is estimated to be ±14 hectares per livestock unit (ha/LSU) for the entire focus area. This grazing capacity potential associated with the focus area is considered insufficient to support both small scale and/or commercialised livestock farming.

The field verified agricultural sensitivity revealed a low agricultural sensitivity due to factors such as poor soil quality (lack of soil medium and effective rooting depth) and climatic constraints that limit the potential for commercial agricultural production.

Given the restrictive soil physical properties and unfavourable climatic conditions associated with the footprint area, the proposed development is not regarded as a significant threat towards regional, provincial, and national food production and security.

It is therefore the opinion of the soil specialist that the proposed MIOM will not result in an unacceptable risk or loss of agricultural resources, and the proposed development is therefore deemed acceptable from a soil, land use, and land capability point of view, provided adequate and appropriate mitigation measures are put in place to minimise disturbances on the soil regime of the focus area.

5. SITE SPECIFIC GEOHYDROLOGY

(Information extracted from the Geohydrological Investigation, 2025 attached as Appendix E)

5.1 Geology

As mentioned earlier, with the collapse of the underlying dolomite, the overlying chert broke-up and accumulated in the cavity. These zones of brecciated cherts are most likely the source (transmissive fracture zones) of water in the boreholes where the highest yields were recorded.

In a hard rock environment, geological structures such as faults and intrusive dykes often play a major role in groundwater flow and mass transport. Several of these geological structures (dykes and faults) have been mapped throughout the Makganyane area as indicated in the following figure.

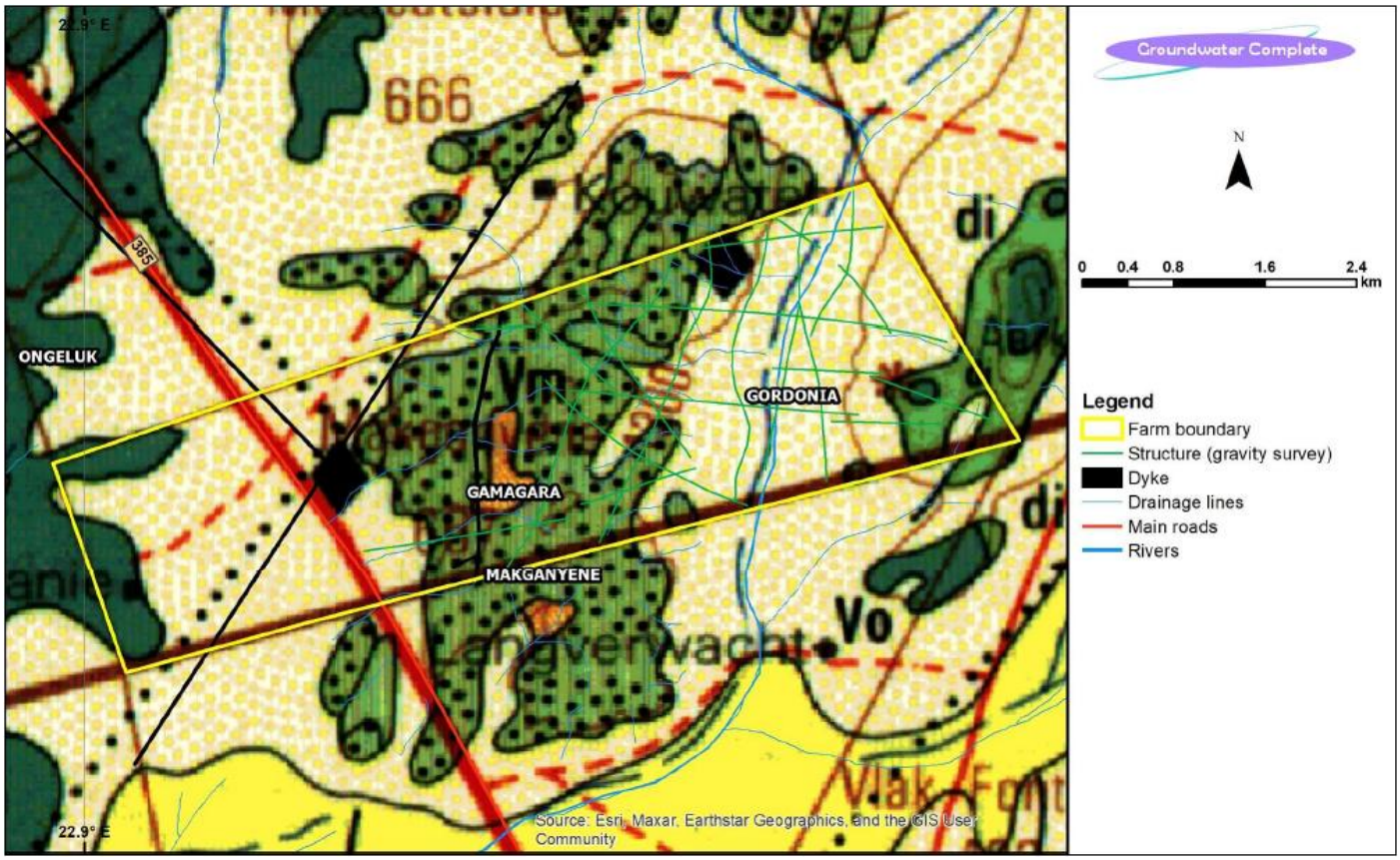


Figure 68: Structural geology of the Makganyane area (Groundwater Complete).

There are two regional dykes occurring in the Makganyane area, which are also indicated in the above figure in black. While aquifer tests with the associated observation boreholes were planned to be near and around several of the indicated structures, very few of these proved to have significant effects on the transmissivity and permeability of the aquifer. In other words,

few of the structures seemed to act as either prominent barriers for horizontal groundwater flow, or as preferred flow paths for extended distances.

5.2 Results of the Hydrocensus Survey

A hydrocensus/user survey was conducted on farms surrounding Makganyane (following figure) by Aquatico Scientific. The information and knowledge gained from the hydrocensus data (Table 3-1 of Appendix E) provides a snapshot of current groundwater conditions or so-called baseline. A total of 98 boreholes were located during the hydrocensus, and agriculture and livestock watering are the main water uses in the area.

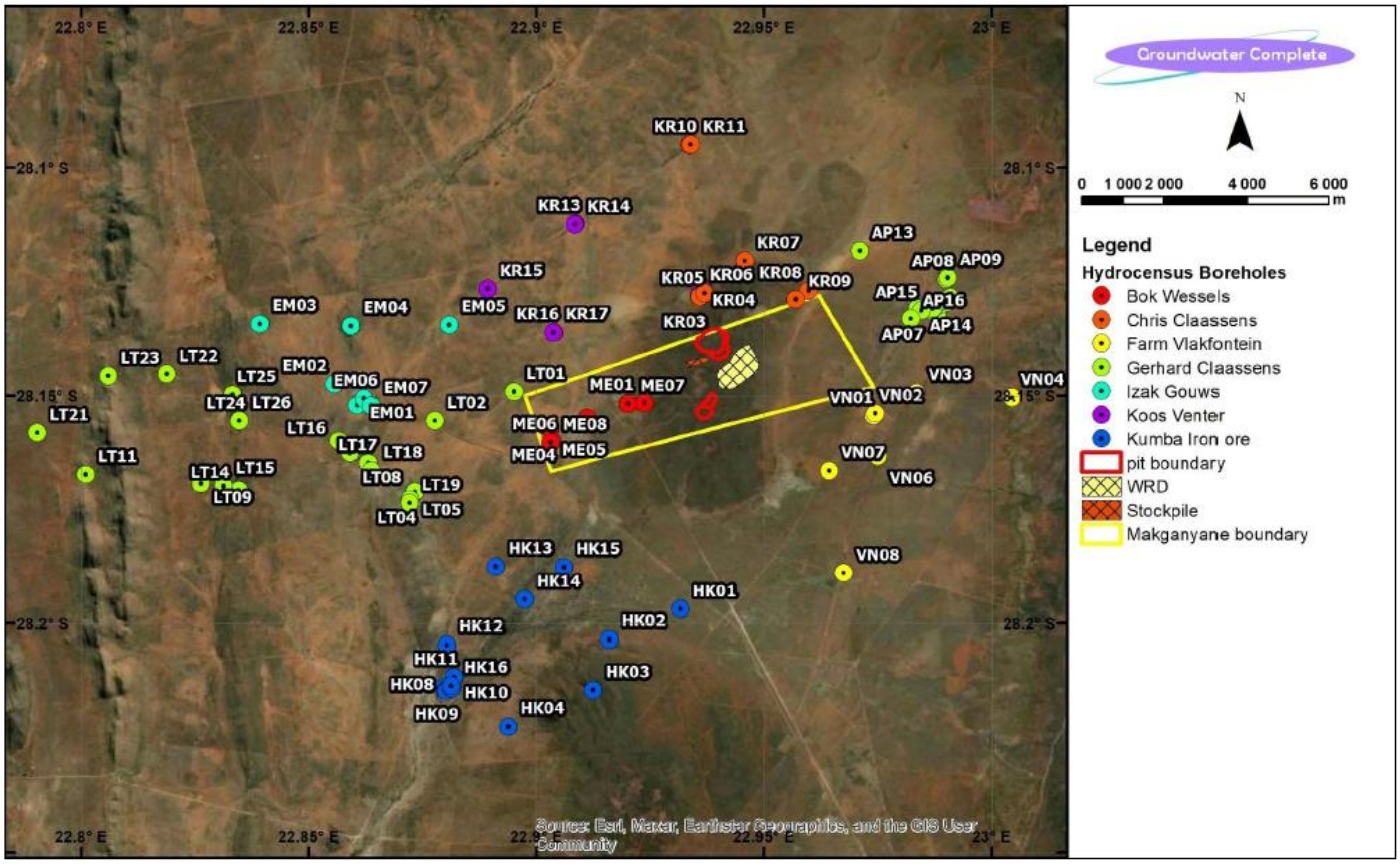


Figure 69: Map of user boreholes found during the hydrocensus (Groundwater Complete).

5.3 Aquifer Delineation and Groundwater Level Depth

The Makganyane area is underlain by two distinct and very different aquifers, though they are of the same type. The first of the aquifers exists below the flatter topography in the eastern and western areas of the Makganyene property. The host rock of the aquifer is the andesitic lavas of the Ongeluk Formation. The un-weathered lavas are largely of a lower permeability. The static groundwater levels in this aquifer are generally shallow. Water levels to

the west of the central hilly topography vary between 7 and 22 meters below surface (mbs), while the water levels to the east of the hills vary between 18 and 28 mbs.

The second aquifer exists mainly in the planned mining area. This aquifer exists mainly in a specific layer, namely the chert-breccia layer of the Wolhaarkop and Blinkklip formation. This aquifer is highly variable in thickness, fracture size, orientation, extent and hydraulic fracture interconnectivity. Water levels were generally deep with often low (but also highly varying) transmissivities. Groundwater levels in the boreholes from this aquifer vary between 30 and 100 mbs.

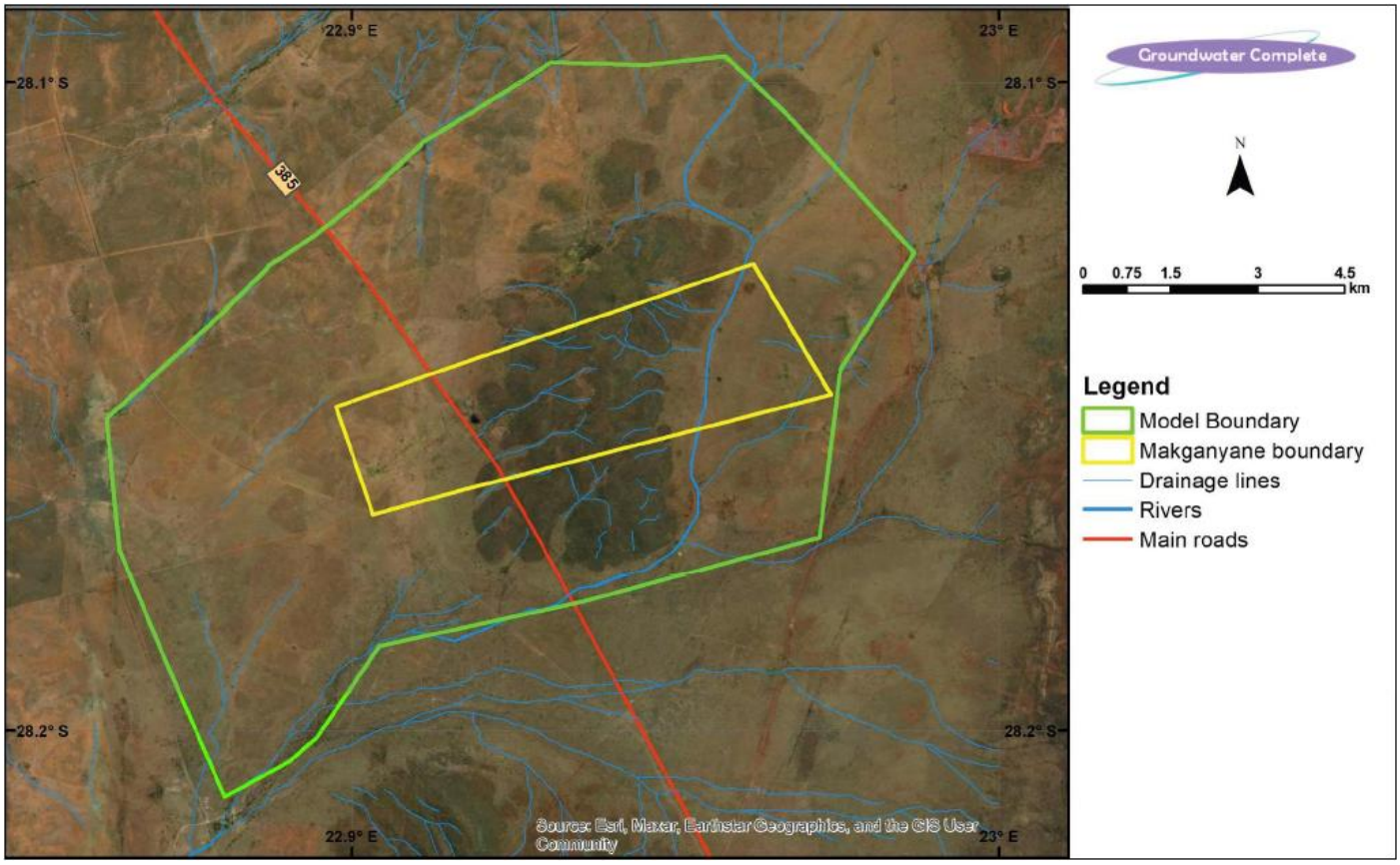


Figure 70: Approximate aquifer delineation for the project area (Groundwater Complete).

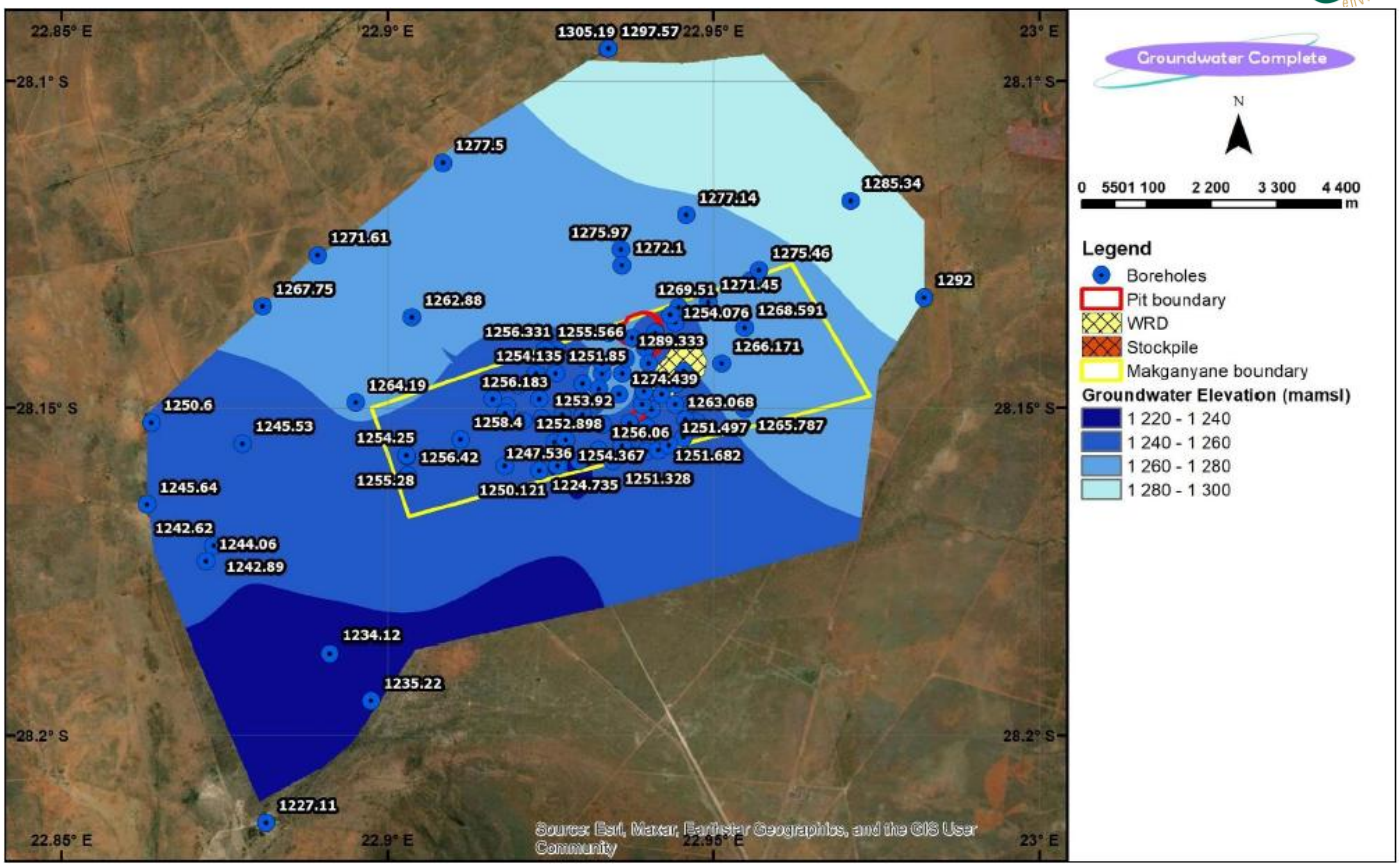


Figure 71: Contour map of the measured groundwater elevations in mamsl (Groundwater Complete).

5.4 Groundwater Flow Elevations

The information presented on the contour map (Figure 71) was used to determine the direction of groundwater flow, which as a result of gravity is from higher to lower hydraulic elevations (i.e. from north to south and north-east to south-west).

The average hydraulic gradient was calculated to be in the order of 0.0042 or 0.42% and was then used to calculate the rate of groundwater movement (the so-called 'Darcy flux') in the project area. By using these values, the average rate of flux in the project area was calculated to be in the order of 4.8 meters per year.

5.5 Aquifer Characterisation

The *Groundwater Vulnerability Classification System* was developed as a first order assessment tool to aid in the determination of an aquifer's vulnerability/susceptibility to groundwater contamination. The project area achieved a score of 7 and the underlying aquifer can therefore be regarded as having a medium vulnerability.

The first aquifer (in the flat areas to the east and west of the Makganyane boundary) is classified as a relatively shallow, semi-confined fractured aquifer. Due to the shallow water level and high permeability of the host rock, the boreholes drilled into this aquifer have high yields of good quality water. Farmers in the region use this aquifer widely for domestic purposes and livestock water supply with limited irrigation of gardens and fodder. The aquifer is usually regarded as a major aquifer system.

The second aquifer (in the hills where proposed mining is to take place) is the deeper, secondary porosity (fractured) aquifer that occurs at depths usually exceeding 30 meters below surface and will be the major aquifer system in the affected groundwater zone. Fracturing in the aquifer usually occurs in the brecciated banded iron formation and to a lesser extent shale and quartzite at depths of between ±88 and 230 m below surface. Fracturing is usually concentrated near the banded iron formation ore bodies where mineralization and preservation of ore bodies occurred through folding, thrusting, fracturing and sinkhole formation/slumping. The aquifer could also be regarded as a major aquifer system.

The combination of Aquifer Vulnerability Classification rating and Aquifer System management Classification provides a protection level referred to as Groundwater Quality Management Classification (GQM). The GQM rating for Makganyane is 8, which indicates a high level of protection. Therefore, the specialist recommended that the monitoring system proposed in the Geohydrological Investigation (Appendix E) be implemented for the proposed development.

5.6 Aquifer Testing

After consideration of all the data collected by conducting the slug tests and constant rate tests, the specialist drew the following conclusions:

- δ Two different aquifers exist in the Makganyane area.
- δ The aquifer where mining activities will be concentrated is a highly heterogeneous aquifer with hydraulic parameters varying significantly over short distances.
- δ The aquifer to the east and west of the hills have shallower water levels and is expected to have a higher groundwater yield.
- δ The two aquifers are poorly connected to each other.

- δ The matrix transmissivities of the aquifer in the hills range from 0.08 to 57 m^2/d.
- δ The aquifer provides little to middling volumes of water.

5.7 Aquifer Recharge Rate

An average recharge of 2% was calculated with the Chloride Method, which is in line with the 1.8 - 2.4% range of Vegter.

Based on all the gathered information and experience from previous studies in similar areas, the mean annual recharge to the aquifer regime in the Makganyane was estimated to be in the order of 2% or 6.5 mm/a.

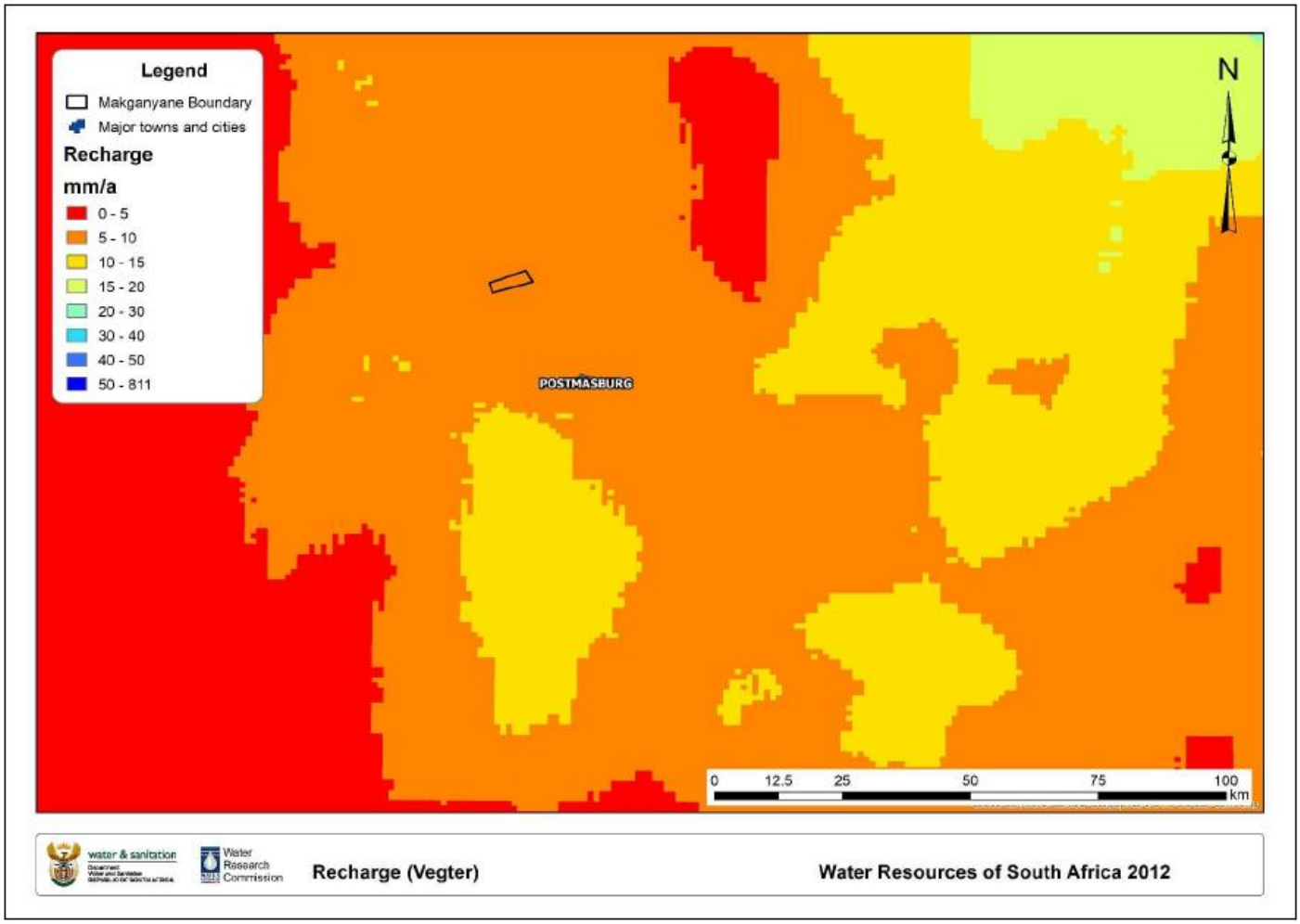


Figure 72: Mean annual aquifer recharge of South Africa (Groundwater Complete).

5.8 Groundwater Quality Conditions

Groundwater quality data of 20 boreholes, 10 pumping test boreholes and 10 boreholes that were sampled during the previous study for the Makganyane

project in 2023 were used in the study. Two additional groundwater samples were taken from the Kimberlite Shaft (old diamond mine shaft) and analysed.

The results showed that the groundwater is considered to be of good quality and also suitable for human consumption according to the South African National Standards for drinking water (SANS 241:2015).

Groundwater total dissolved solids (TDS) concentrations measured in the site specific groundwater user boreholes vary between 330 mg/l and 590 mg/l and is considered a normal range for this arid region.

The highest nitrate concentrations measured during this study are around 7 mg/l which do not exceed the maximum permissible SANS value of 11 mg/l.

Groundwater magnesium concentrations are relatively low and vary between ±27 mg/l and 64 mg/l.

Boreholes display groundwater chloride concentrations of between approximately 8 mg/l and 68 mg/l.

Since no mining occurs within the immediate vicinity of any of the hydrocensus boreholes, the elevated nitrate concentrations are believed to originate from areas where animals congregate in significant numbers (feedlot, kraal, etc.).

Groundwater within the Makganyane area is dominated by calcium and magnesium cations, while bicarbonate alkalinity dominates the anion content.

The concentrations of groundwater parameters measured in the old Kimberlite pit were largely similar to the qualities measured in the other Makganyane boreholes.

None of the parameters' concentrations exceeded the SANS 241:2015 guidelines for drinking water purposes.

The only differences between the concentrations measured in the Kimberlite pit versus the surrounding area are slightly higher concentrations of sodium, magnesium and potassium – likely due to higher evaporation.

5.9 Waste Classification

Potential contamination sources associated with the proposed MIOM, and related activities are the planned stockpile area and WRD. According to the waste classification study (IQS Holdings, 2025), the sources at Makganyane will have a very low potential of producing poor quality leachate to groundwater.

5.10 Potential Pathways for Contamination

In order for contamination to reach and eventually affect a receptor(s), it must travel along a preferred pathway. The effectiveness of a pathway in conducting contamination is determined by three main factors, namely:

- Hydraulic conductivity of pathway;
- Groundwater hydraulic gradient; and
- The cross-sectional area through which flow occurs.

Two potential pathways were identified in the project area and are discussed shortly:

- Structures such as dykes and faults have the potential to serve as sufficient pathways for contamination. Many structures occur in the Makganyane area, any of which may act to some extent as preferred pathways.

- The crystalline nature of an igneous dyke is characteristic of an aquiclude, however, none of the structures mapped by previous studies appeared to act notably as aquicludes during the aquifer testing. Rapid cooling during intrusion usually causes highly transmissive fracture zones to form along the contact between the intrusive and surrounding rock.

- Flow rates may increase by several orders of magnitude if a transmissive geological structure is located in the down gradient groundwater flow direction and when orientated parallel to the local flow direction.

- If any of the source infrastructures induce groundwater mounding through artificial recharge (in the form of seepage), the groundwater

gradient will increase, thereby increasing groundwater flow velocity away from the source.

5.11 Potential Receptors of Contamination

For a negative groundwater quality impact to be registered the following three components should be present:

- δ A source to generate and release the contamination,
- δ A pathway along which the contamination may migrate, and
- δ A receptor to receive the contamination.

All three these components will be present within the project area. However, the source has a low risk of contamination as determined by the waste classification report.

The pathway is relatively poor, resulting in slow transportation of contamination, and possible receptors are relatively far away from the potential sources. The outcome does however stress the importance of a comprehensive early detection groundwater monitoring program.

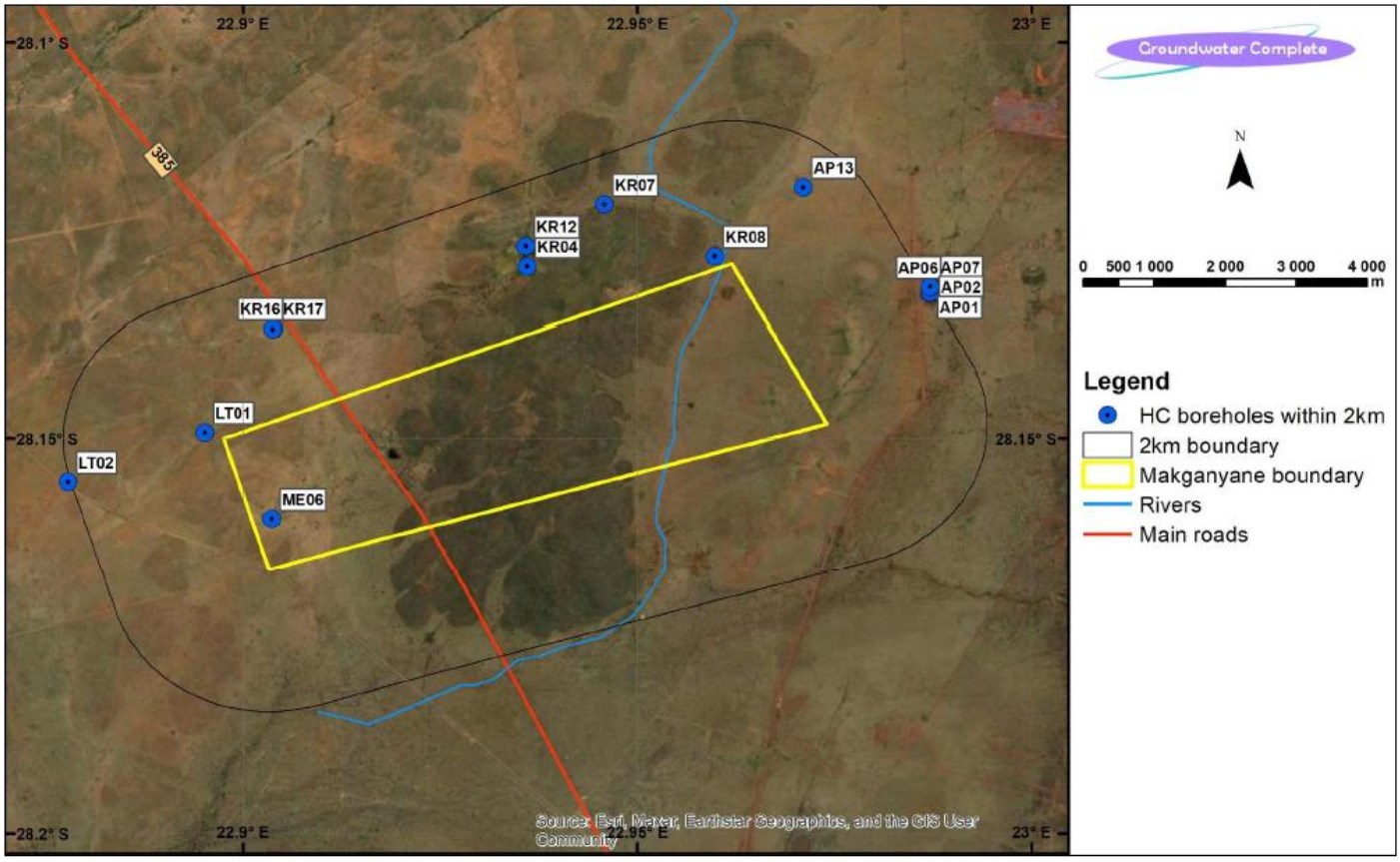


Figure 73: Hydrocensus boreholes that are in use and located within a 2 km radius of the mining area (Groundwater Complete).

5.12 Summary of Conceptual Model

Pit 1, located north of the cross-section plane (following figure), is expected to act as a significant hydraulic sink due to ongoing dewatering activities. This artificial lowering of the groundwater table in the vicinity of the pit is anticipated to draw contaminated groundwater in that direction, resulting in a distortion or elongation of any contamination plumes migrating from the WRD and stockpile. Although the original direction of plume movement would typically follow the regional hydraulic gradient, the influence of the pit may override this in localised areas, pulling the plumes toward the pit over time.

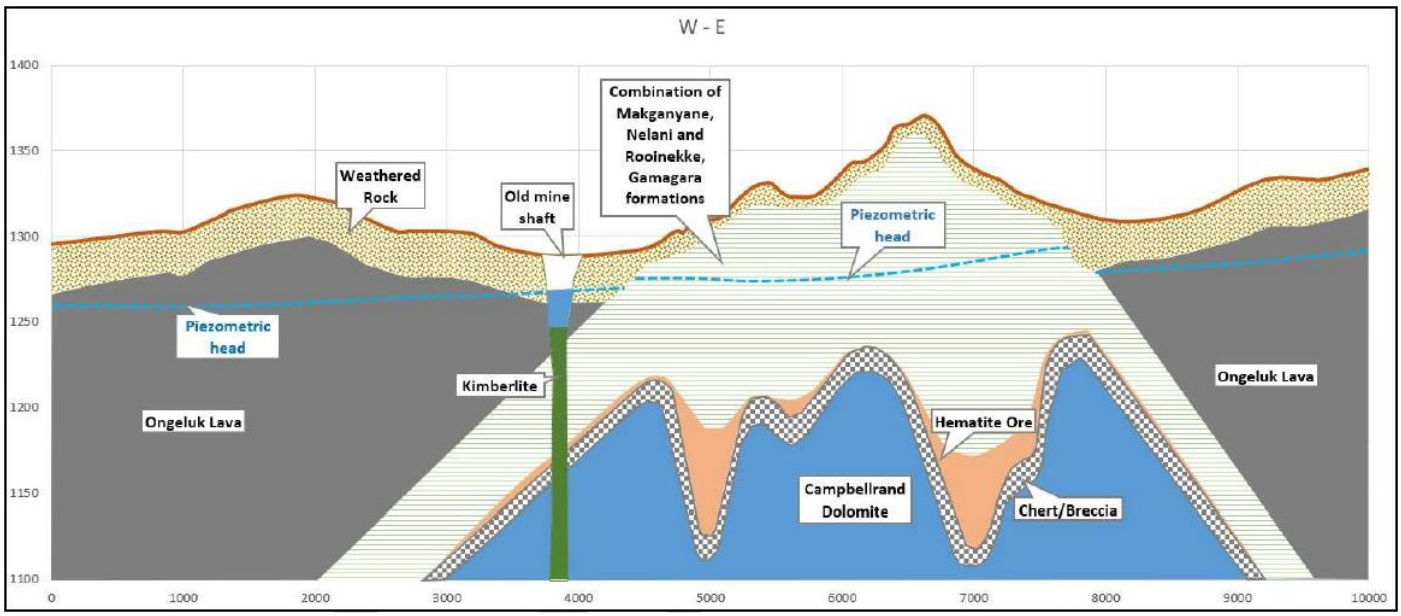


Figure 74: Vertical cross-section from west to east through the project area, showing the layers important to the geohydrology (Groundwater Complete).

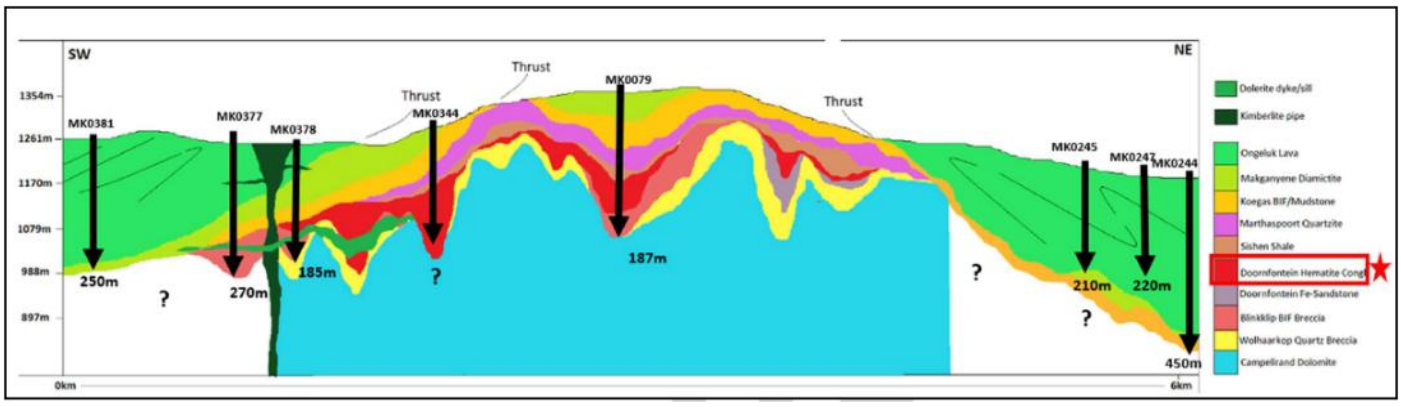


Figure 75: Geological cross-section (Groundwater Complete).

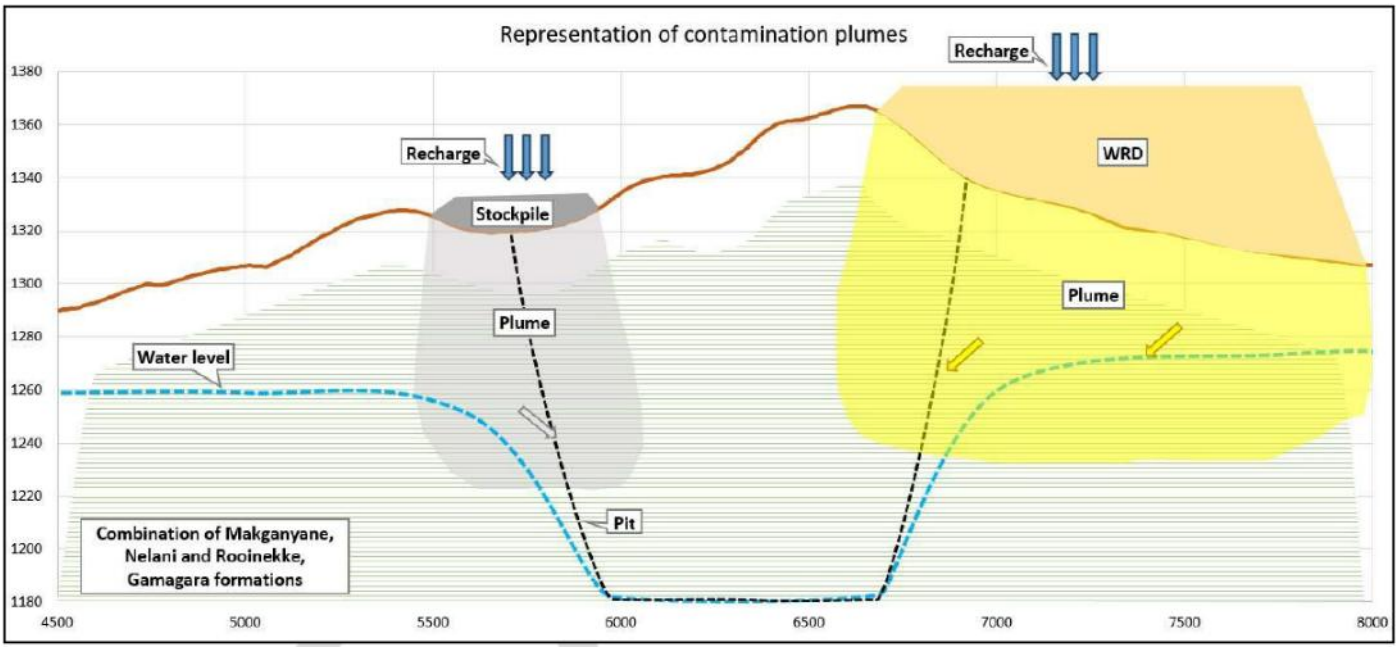


Figure 76: Cross-section to display the expected movement of contamination conceptually (Groundwater Complete).

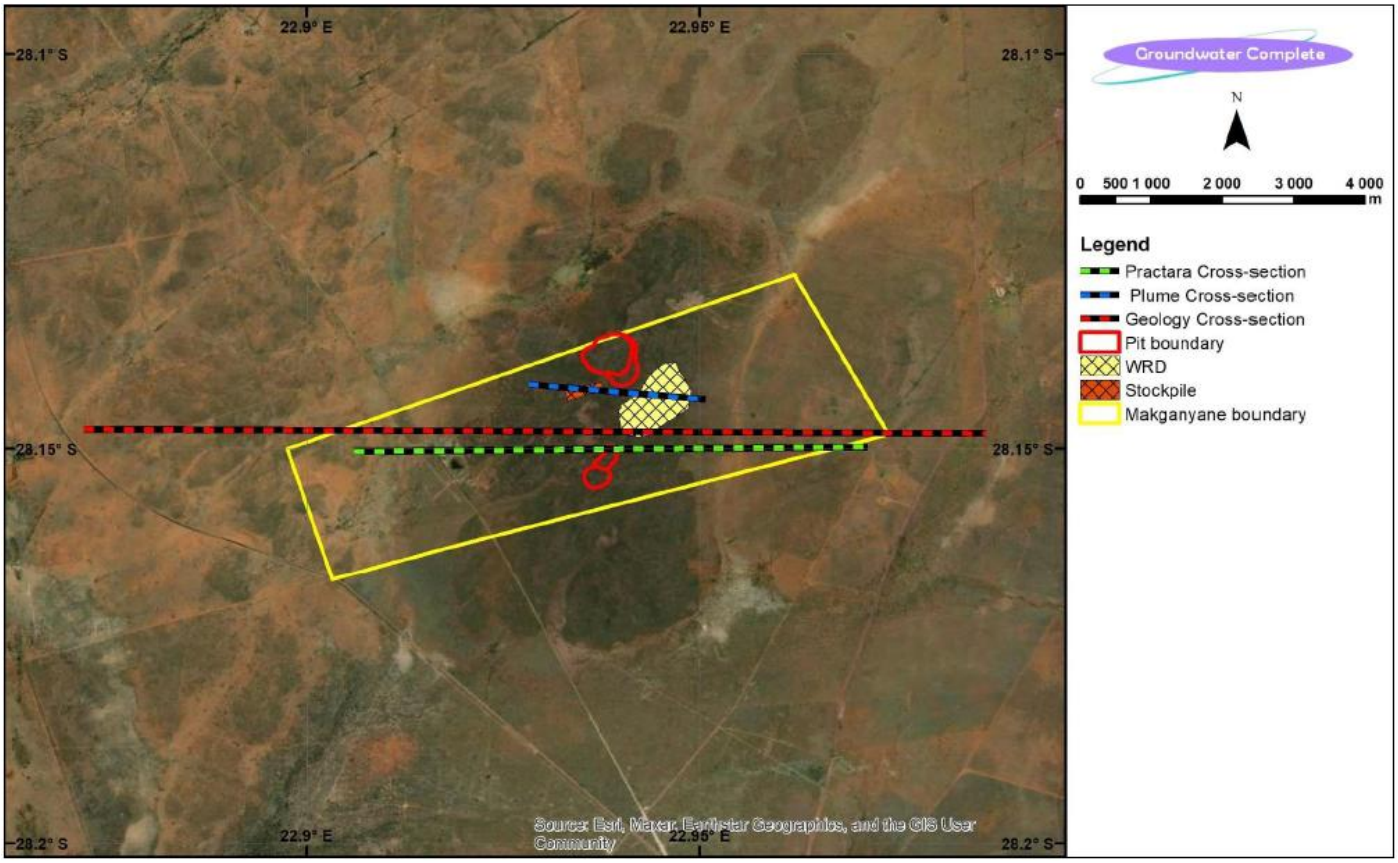


Figure 77: Position of cross-section over the project area (Groundwater Complete).

5.13 Impacts on Groundwater Levels

The specialist summarised the flow model simulation as follows:

- A maximum groundwater level drawdown of ±110 m was simulated for Pit 1.

- An area of ±5.9 km^2 of the water table was simulated to be affected by the opencast mining of the two pits (i.e. area simulated to experience >5 m lowering of water levels).

- The flow model assumed a rapid deepening of the pits in the first few years of mining. This will cause a high volume of inflow during the first years of mining since a significant amount of water needs to be pumped from storage in the saturated mine material.

- Due to the relatively short life of mine, the rate of inflow will not have stabilized to reach an equilibrium by the time mining ends and water levels will have started to recover.

- As the mining progresses, average influx volumes of between 20 and 40 m^3/h may be expected.

- The shape and extent of the depression cone are largely determined by the hydraulic properties of the surrounding aquifer/s and geological structures. Impacts on groundwater levels will be exacerbated along certain transmissive geological structures (i.e. open fractures and discontinuities).

- No hydrocensus boreholes are located within this affected area (Figure 71), however, the “KR”-boreholes to the north will still be affected in terms of groundwater quantity due to the proximity to the cone of depression, for which some form of compensation will have to be planned.

- After mining has ceased, the pits will fill with water, allowing the surrounding groundwater levels to slowly recover.

- The radius of the cone of depression may increase slightly after mining has ceased, but it will start becoming shallower immediately.

δ The water level of the mining area recovers to between 20 and 30 meters below the static or pre-mining level at around 25 years post closure (at Pit 1).

A contour map of the model simulated groundwater depression cones is provided in Figures 78 to 81. The colour scale provided in the figures represents water level drawdown in meters below surface. In other words, the contours represent the vertical depth of decline of the static piezometric water level as a result of development of the open pit voids if assumed that the void is kept dry through pumping out all groundwater ingress down to the deepest pit floor.

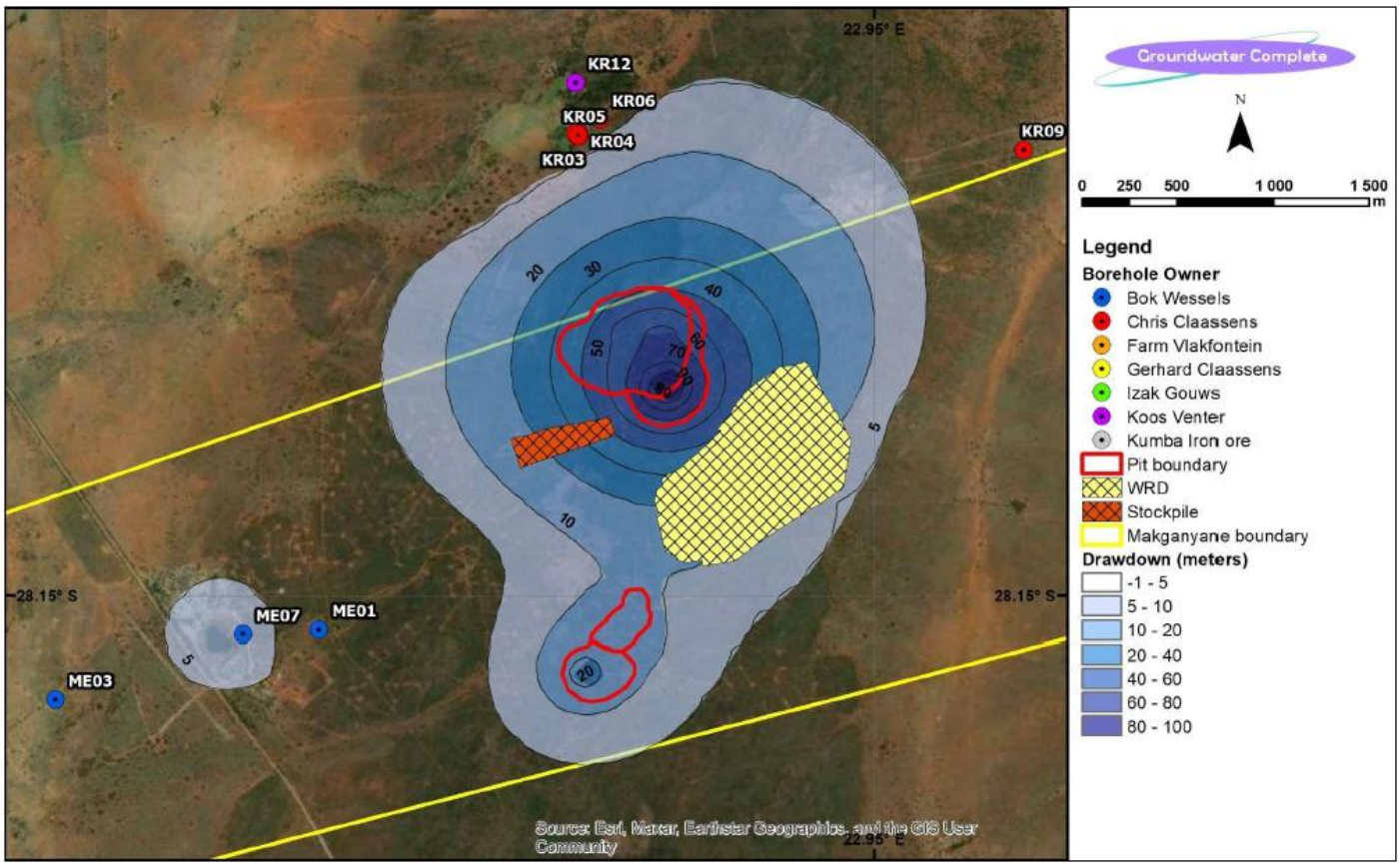


Figure 78: Model simulated groundwater depression cone at mine closure (Groundwater Complete).

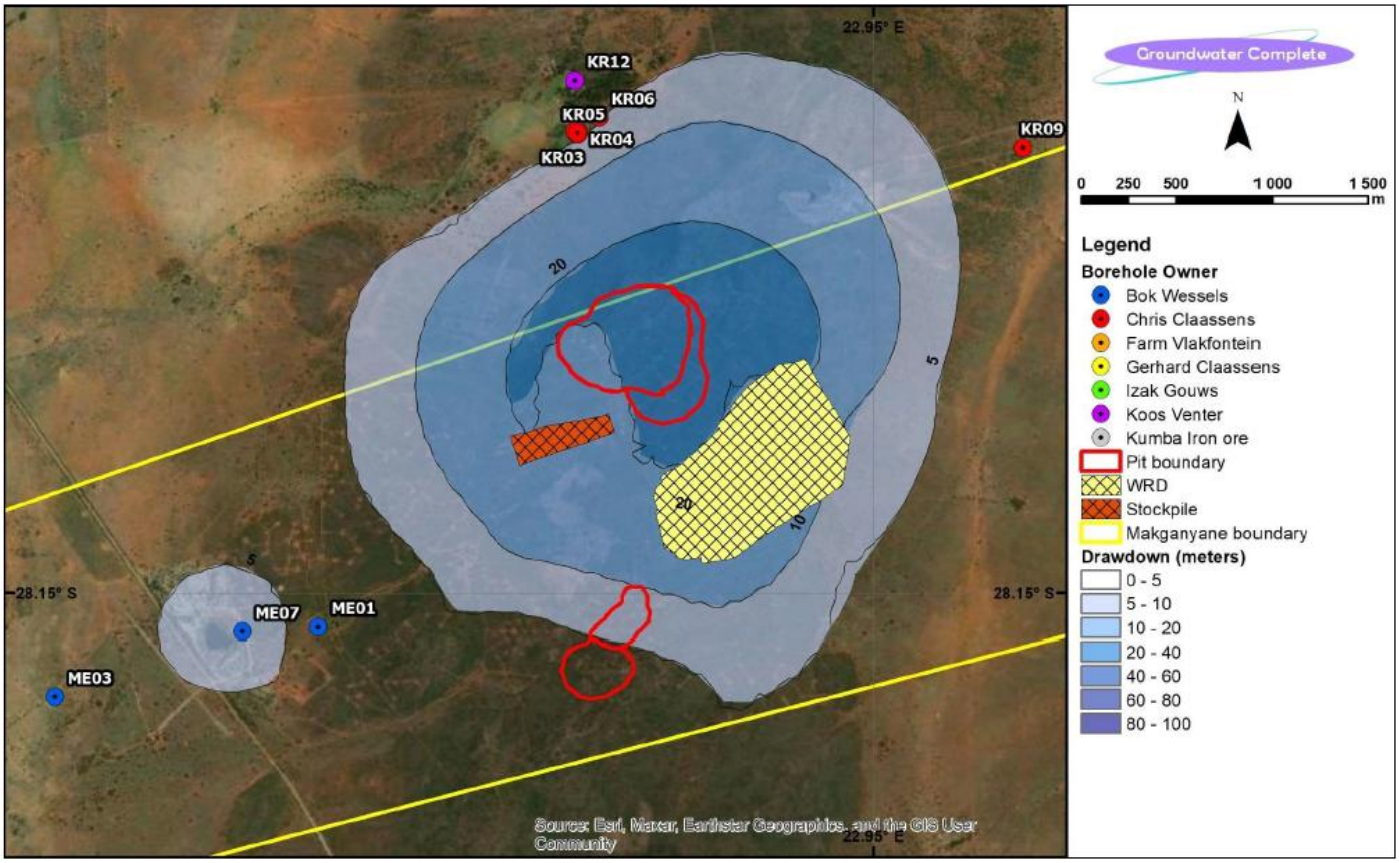


Figure 79: Model simulated groundwater depression cone at 25 years past closure (Groundwater Complete).

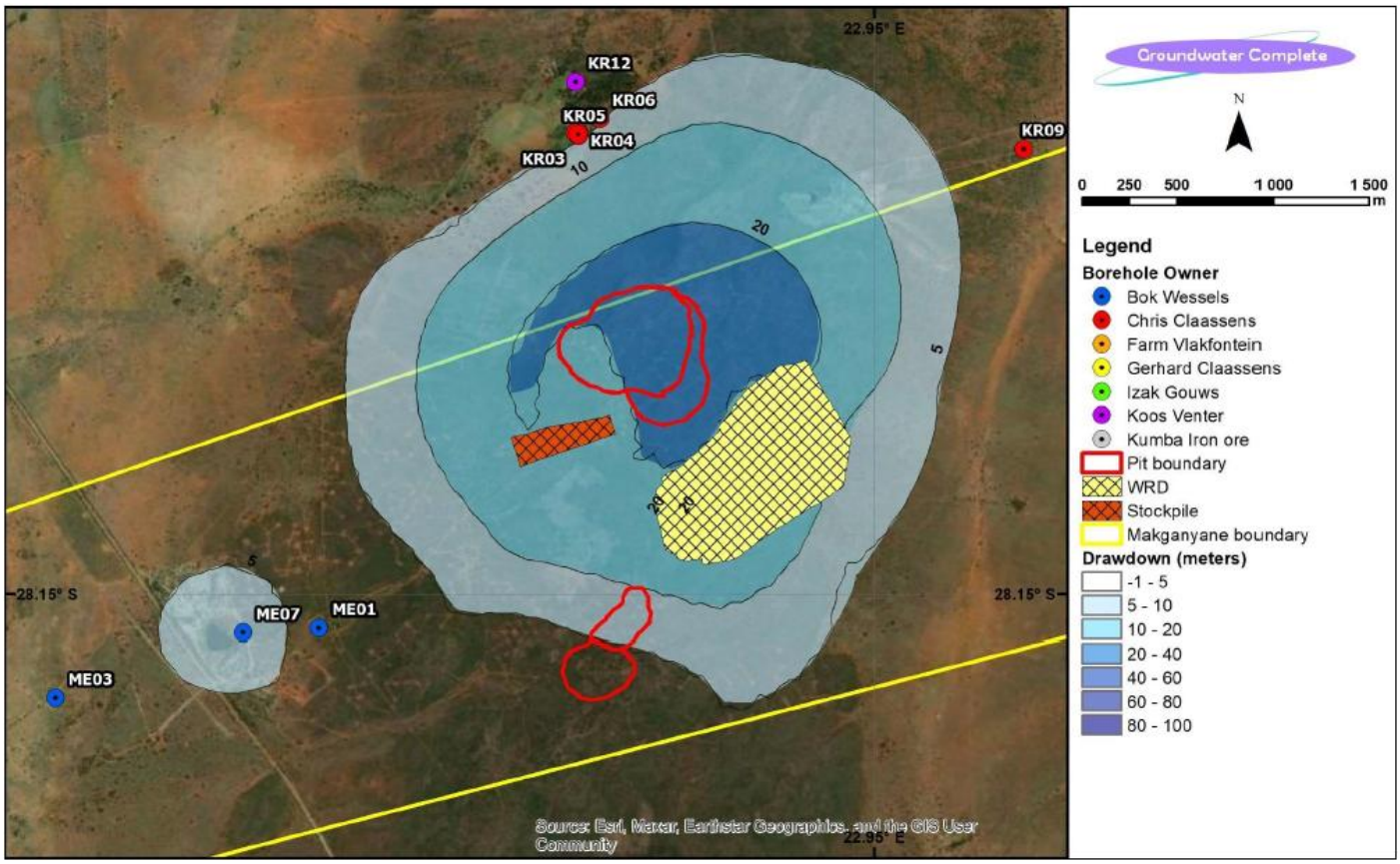


Figure 80: Model simulated groundwater depression cone at 50 years past closure (Groundwater Complete).

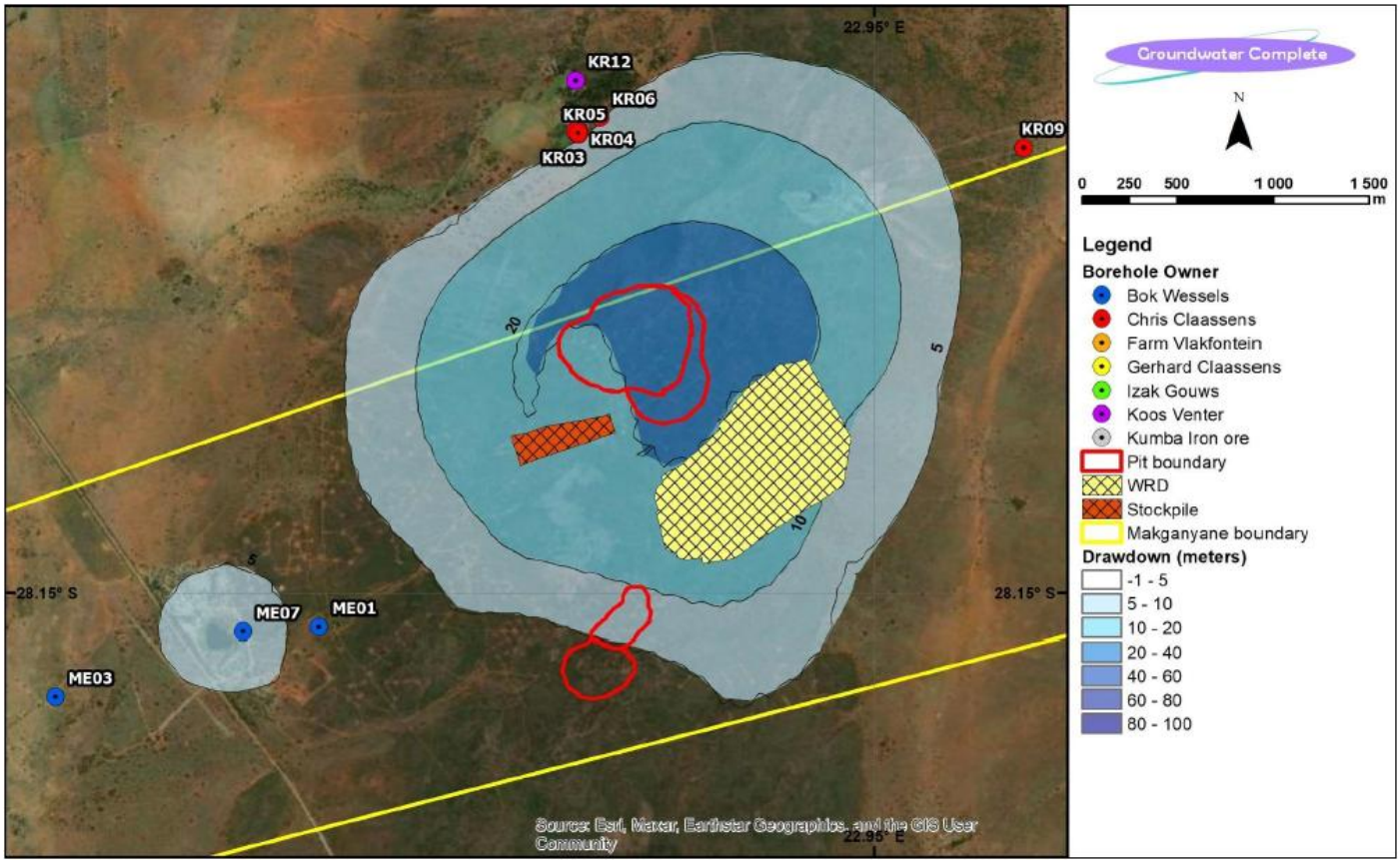


Figure 81: Model simulated groundwater depression cone at 100 years past closure (Groundwater Complete).

5.14 Dewatering Design

As discussed earlier in *Part A(1)(g)(i) Details of the development footprint alternatives considered* two possible dewatering techniques were considered for the MIOM project. Current model results however indicated that the expected groundwater inflow volumes per quarter, as presented in the following tables, are sufficiently low to be managed entirely by strategically placed sump pumps within the pits (Dewatering Technique 1).

Table 50: Dewatering calculations for direct rainfall on pit surfaces (Groundwater Complete)

Parameter	North Pit	South Pit	Unit
Pit area	350 600	125 800	m^2
Rainfall	320	320	mm
Runoff at 100%	112 190	40 250	m^3
Daily pump rate to extract	307	110	m^3/d

Table 51: Dewatering design volumes (Groundwater Complete)

Stress Period	Period Length	South Pit		North Pit	
		Daily Volume	Pump Rate	Daily Volume	Pump Rate
	Year	m^3/d	L/H	m^3/d	L/H
1	10	0	0	0	0
2	0.25	0	0	0	0
3	0.25	0	0	0	0
4	0.25	0	0	0	0
5	0.25	0	0	0	0
6	0.25	0	0	460	19174
7	0.25	0	0	734	30577
8	0.25	0	0	810	33736
9	0.25	28	1155	814	33923
10	0.25	78	3269	875	36449
11	0.25	187	7806	991	41293
12	0.25	156	6500	668	27814
13	100	0	0	0	0

5.15 Impacts on Groundwater Quality

The Geohydrological Investigation noted that any potential contamination that may occur at the stockpile area and/or WRD is expected to slowly migrate down from the surface towards the groundwater level, transported by rainwater during recharge. The concentration of the contamination, 100% at the source, will slowly dilute as it moves away from the source. Should contamination occur at either of the two potential sources it was concluded that by end of mining, no contamination would have reached the groundwater yet.

The main movement of contaminants will be downgradient, towards Pit 1 which forms a groundwater sink. Contamination will therefore largely be contained by the depression cone formed by Pit 1, while the migration rate is restricted by the poor transmissivity of the aquifer host rock. By the end of modelling (100 years past closure), the contamination would have moved between 120 m and 150 m down-gradient. Potential contamination may eventually (>100 years past closure) reach the position of the pit and seep into the pit void. It is important to note that the simulated contamination model assumed that the stockpile area and WRD would remain in place after closure. However, when the stockpile area is rehabilitated (as proposed in the Rehabilitation, Decommissioning and Closure Plan), the associated risk (with the stockpile area) is eliminated.

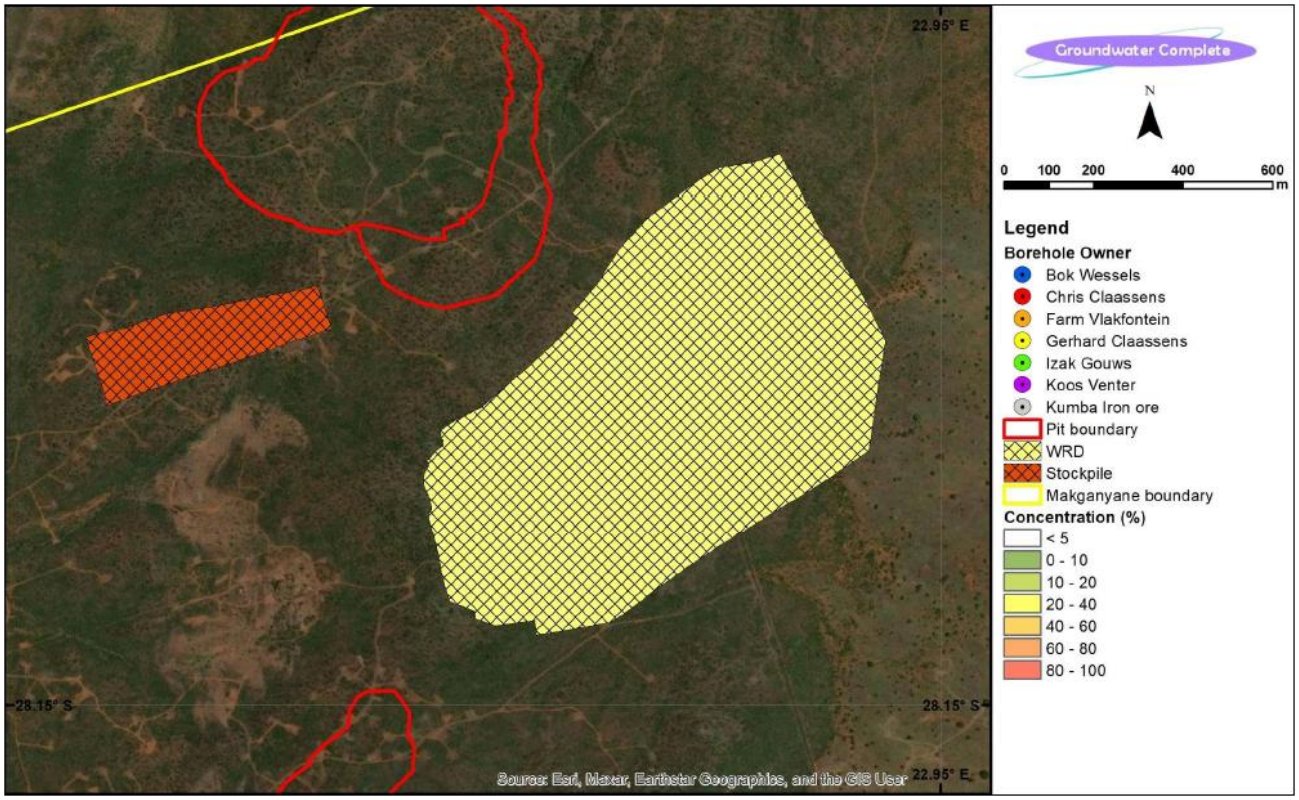


Figure 82: Model simulated contamination plume at mine closure if stockpile area and WRD footprint is not rehabilitated (Groundwater Complete).

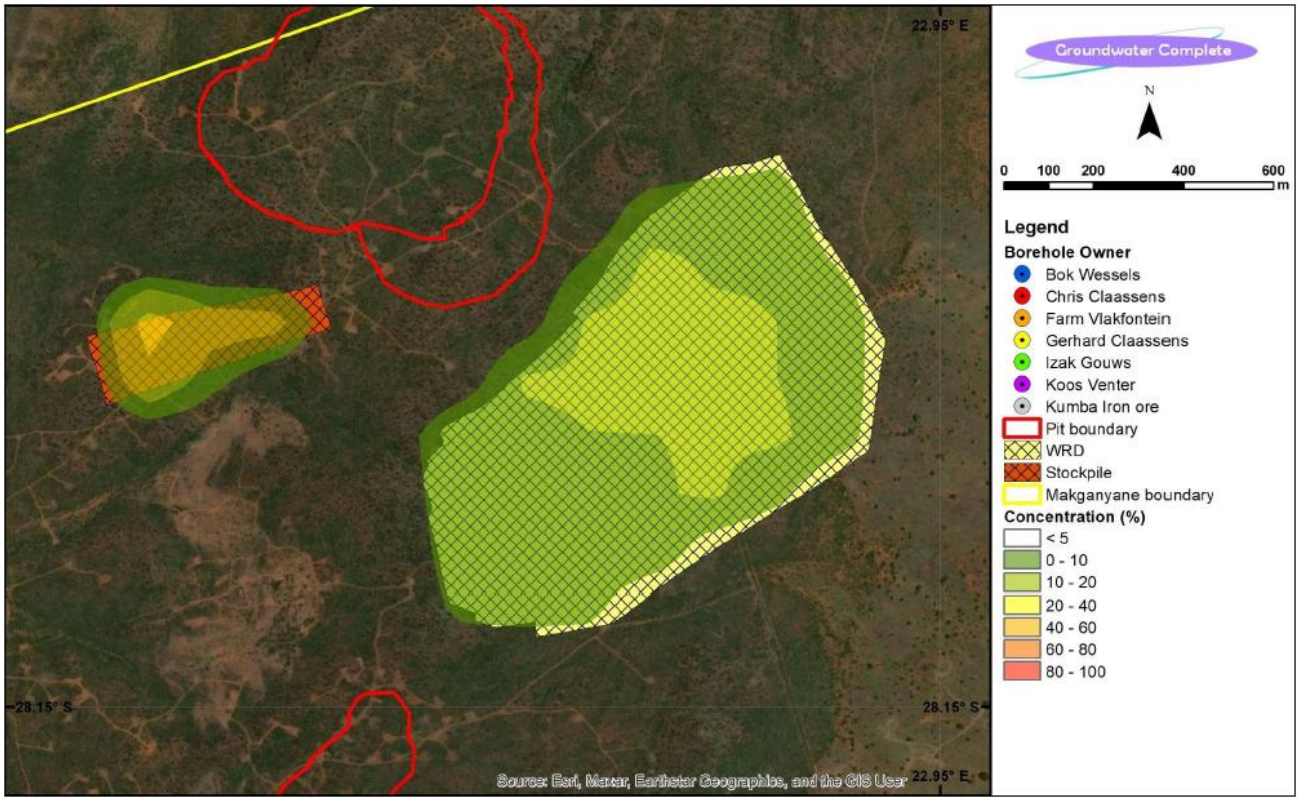


Figure 83: Model simulated contamination plume at 20 years past closure if stockpile area and WRD footprint is not rehabilitated (Groundwater Complete).

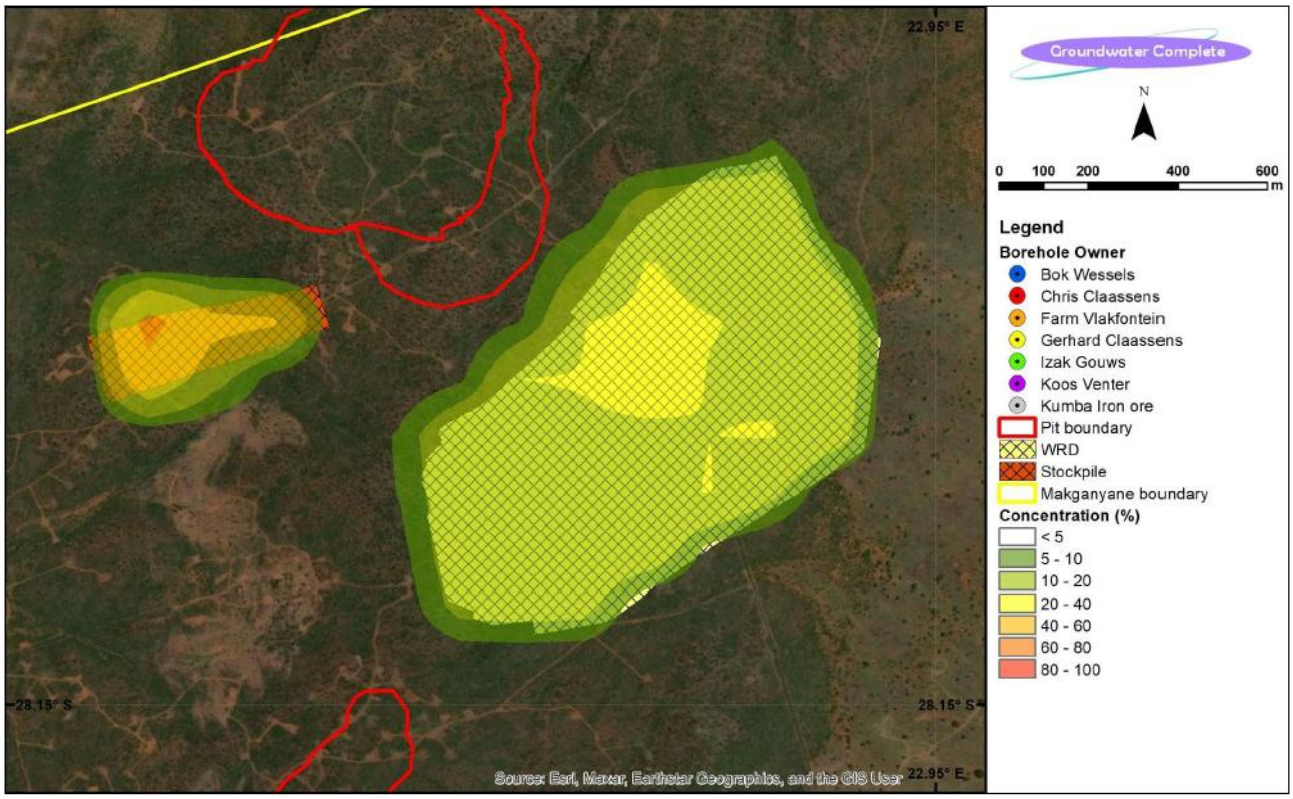


Figure 84: Model simulated contamination plume at 40 years past closure if stockpile area and WRD footprint is not rehabilitated (Groundwater Complete).

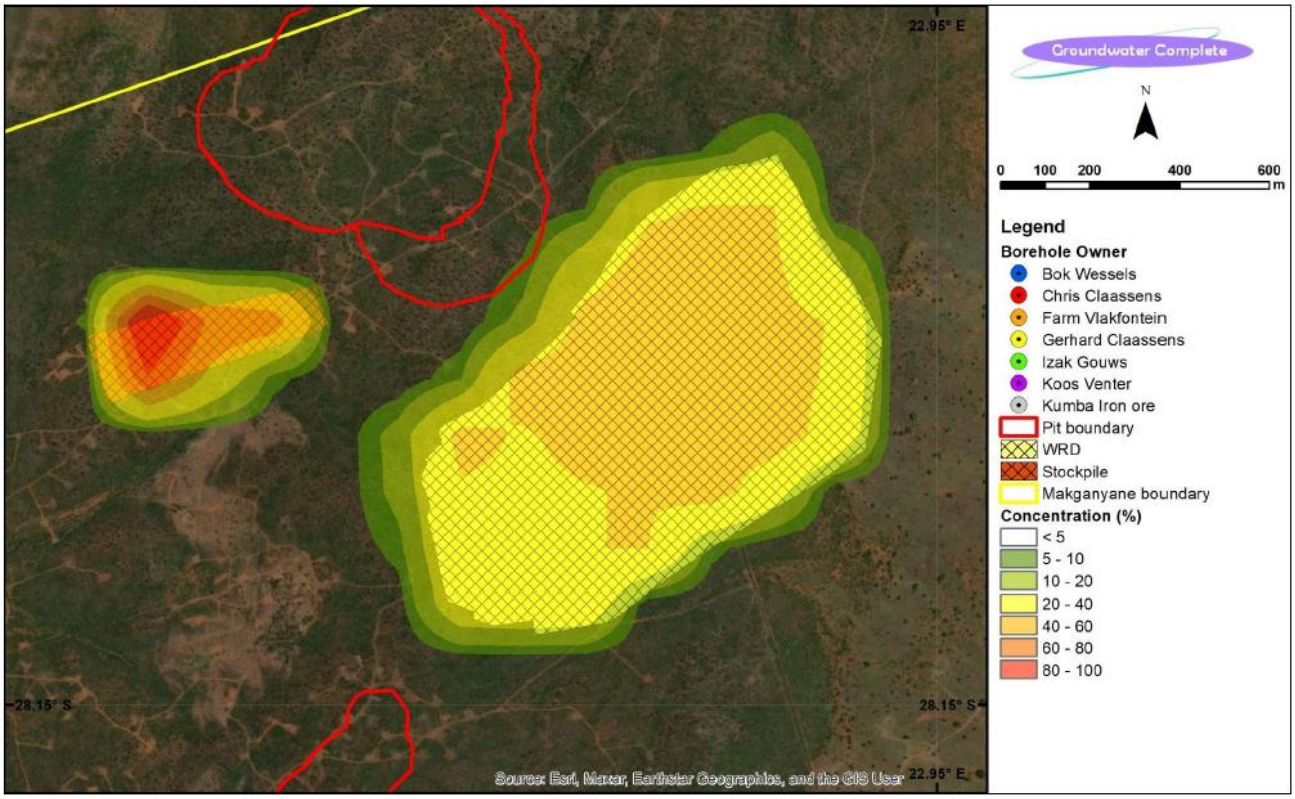


Figure 85: Model simulated contamination plume at 100 years past closure if stockpile area and WRD footprint is not rehabilitated (Groundwater Complete).

5.16 Groundwater Risk Assessment

The specialist assessed the following main activities that may have an effect on groundwater quality or quantity:

- δ Generation of stockpile and WRD;
- δ Excavation of the pits; and
- δ Waste water generation and management.

The following table provides a summary of the risk assessment.

Table 52: Summary of the risk assessment (Groundwater Complete)

	Generation of stockpile and WRD		Excavation of the pits		Waste water generation and management	
	No mitigation	With mitigation	No mitigation	With mitigation	No mitigation	With mitigation
Significance/Risk	6.4	4.8	32	22.4	6.4	3.2
Risk Class	Low risk	Low risk	Medium risk	Low risk	Low risk	Low risk

Refer to the following sections for the full assessment of the potential impacts:

- δ *Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts*
- δ *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity*

5.17 Geohydrology Recommendations

The Geohydrological Investigation proposed that groundwater monitoring should be conducted to assess the impacts of the proposed new mining activities on groundwater quality and quantity. It is proposed that the monitoring (i.e. sampling and water level measurements) should be conducted at quarterly intervals.

The specialist identified five areas (following table) that need to be monitored to focus on different aspects of monitoring. It is proposed that existing

exploration boreholes located in advantageous positions should be used for monitoring purposes.

Table 53: Proposed water monitoring areas (Groundwater Complete)

Monitoring Area	Boreholes	Monitoring Focus
North Pit	MK0102 MK0089 MK0445 KR02	Water level monitoring
South Pit	MK0254 MK0134 MK0090 MK0326 MEX1	Water level monitoring
WRD	MEX27 MK0123 MK0124 MK0046	Inorganic compounds
Stockpile	MK0416 MK0417A MK0171 MK0058/275	Inorganic compounds
Office latrine	Additional borehole necessary	Bacteriological monitoring

The mine should also consider including some active user boreholes located within at least a 1 km radius (but preferably 2 km) of the planned mining activities.

Groundwater samples should be analysed at a SANAS accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities.

5.18 Geohydrology Conclusion

In conclusion, the geohydrological investigation indicates that the MIOM is unlikely to result in significant long-term impacts on groundwater quality, provided that the recommended mitigation, monitoring, and management measures are diligently implemented and sustained throughout the project lifecycle. Considering the groundwater characteristics of the project area and the nature of the proposed activities, the Section 21(g) Water Use Licence application is supportable from a groundwater perspective, as the associated risk to the groundwater environment is considered very low.

6. SITE SPECIFIC HYDROLOGY

(Information extracted from the Hydrological Assessment, 2025 attached as Appendix I)

6.1 Site Specific Design Rainfall

Design rainfall is a probabilistic representation of rainfall intensity (depth of rainfall over a time period) at a certain location for a given duration and average recurrence interval. The 24-hr design rainfall depths for the different return periods are illustrated in the following table and the value used is highlighted in **bold.**

Table 54: Design rainfall depths (TBC, 2025)

Recurrence Interval (years)	1:2-year	1:5-year	1:10-year	1:20-year	1:50-year	1:100-year
Rainfall depth (mm)	55.8	79.0	95.3	111.9	**134.9**	153.2

6.2 Topography and Drainage

The Biodiversity Company (TBC) created a Digital Elevation Model (DEM) to identify lower lying regions as well as potential convex topographical features which could point towards preferential flow paths. The proposed MIOM site ranges from 1 244 masl in the south-western region to 1 376 masl within the vicinity of Pit 1, which can be considered the highest point at the site. The lower lying areas is generally represented in dark blue in the following figure and presented the areas that would have the highest potential to be characterised as watercourses.

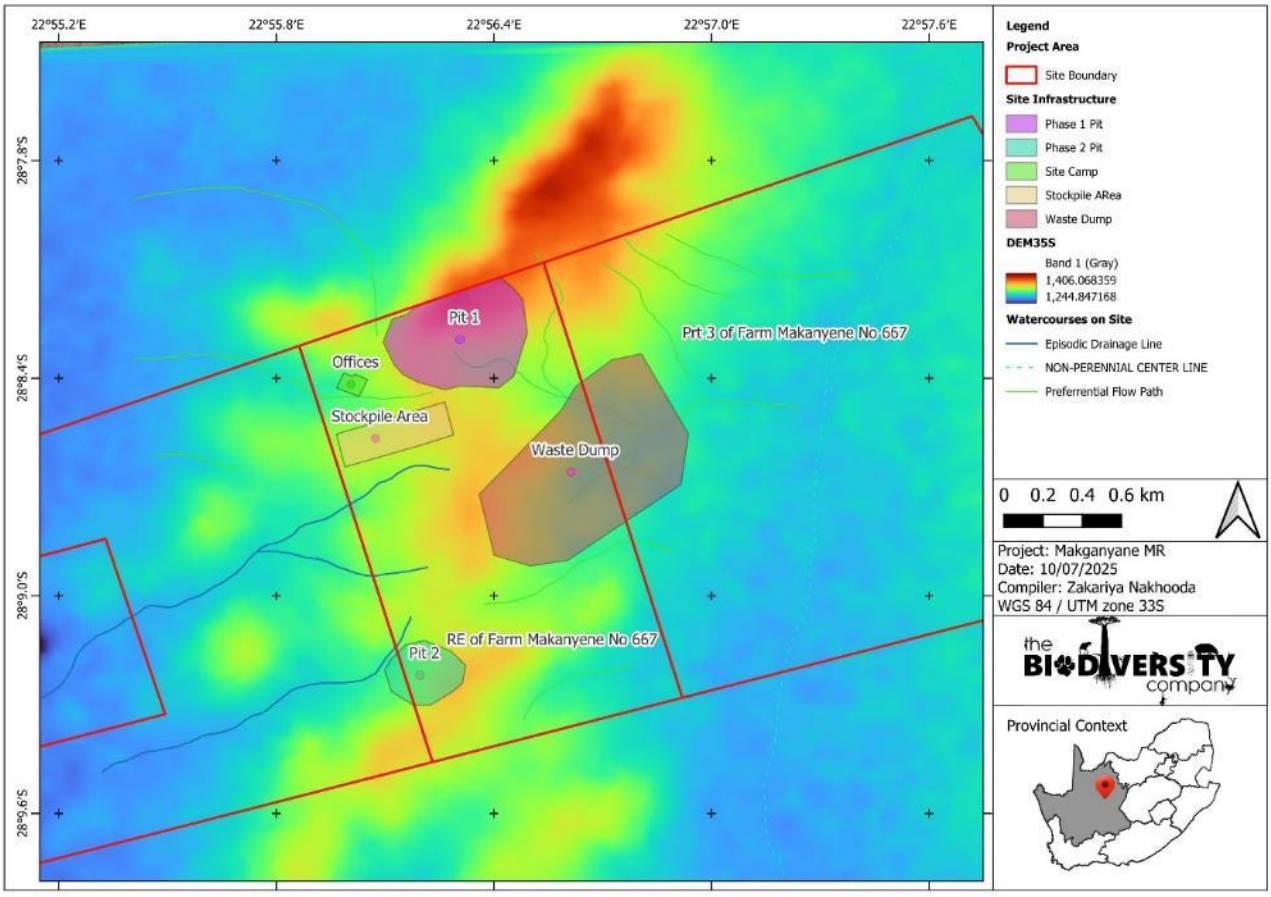


Figure 86: Digital elevation model (TBC, 2025).

The proposed Mine site is drained by a non-perennial tributary located towards the east of the mining area as well as smaller non-perennial drainage lines and preferential flow paths (following figure). The non-perennial tributary passes through the project area (away from proposed mine workings) in a southerly direction before eventually joining the Soutloop River some 57 km downstream. These watercourses are predominantly dry, apart from runoff generated during and immediately after significant rainfall events.

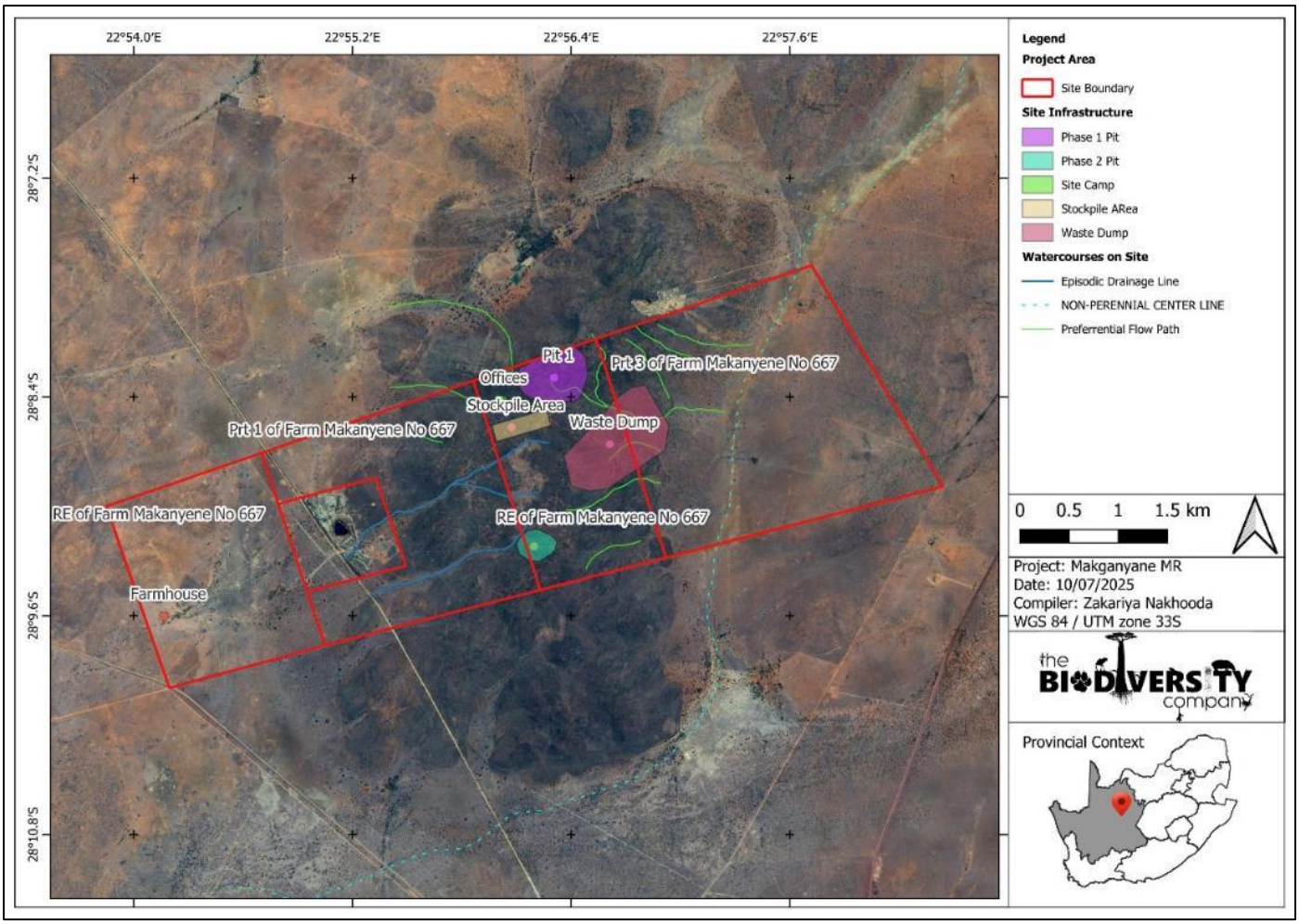


Figure 87: Drainage setting of the proposed mine site (TBC, 2025).

6.3 Water Quality Assessment

Surface water quality samples were collected from the historic Kimberlite shaft as no other surface water resources occur within the project site. The results indicated elevated levels of chlorine and ammonium.

6.4 Design Flood Peak Calculations

The contributing catchments to the non-perennial reach under consideration were delineated by TBC as presented in the following figure.

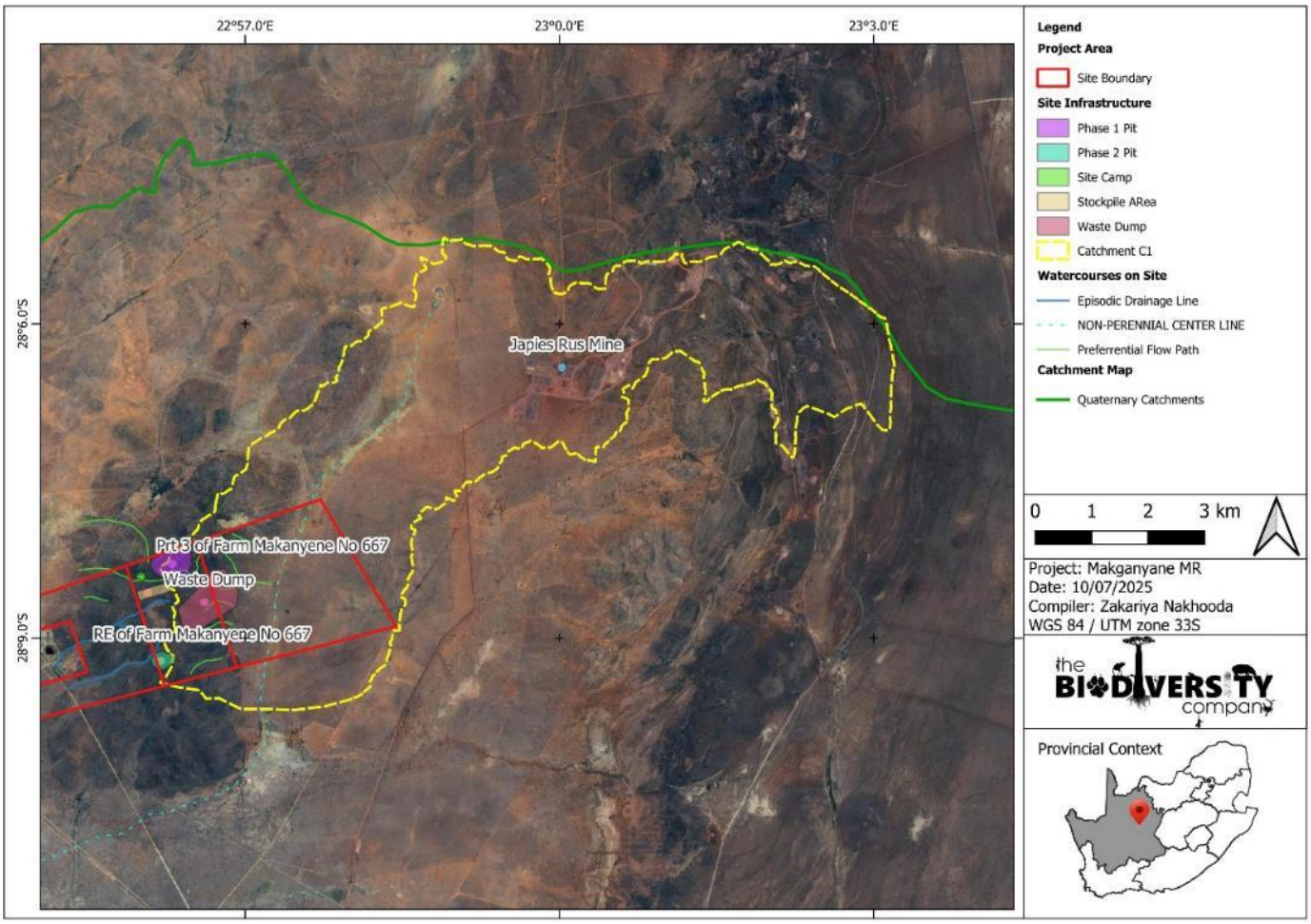


Figure 88: Delineated catchments (TBC, 2025).

The relevant flood peaks for the 1:100-year return interval for the catchment area is shown in the following table. For the purposes of the hydraulic modelling undertaken as part of this assessment, and in keeping with a conservative approach, the highest peaks were utilised.

Table 55: Design flood values (TBC, 2025)

Catchment	Return Interval	HEC-HMS (m^3/s)	SCS-SA (m^3/s)	SDF (m^3/s)
C1	1:100-year	49.64	75.48	**81.87**

6.5 Hydraulic Modelling

The modelled 1:100-year floodline for the tributaries is presented in the following figure.

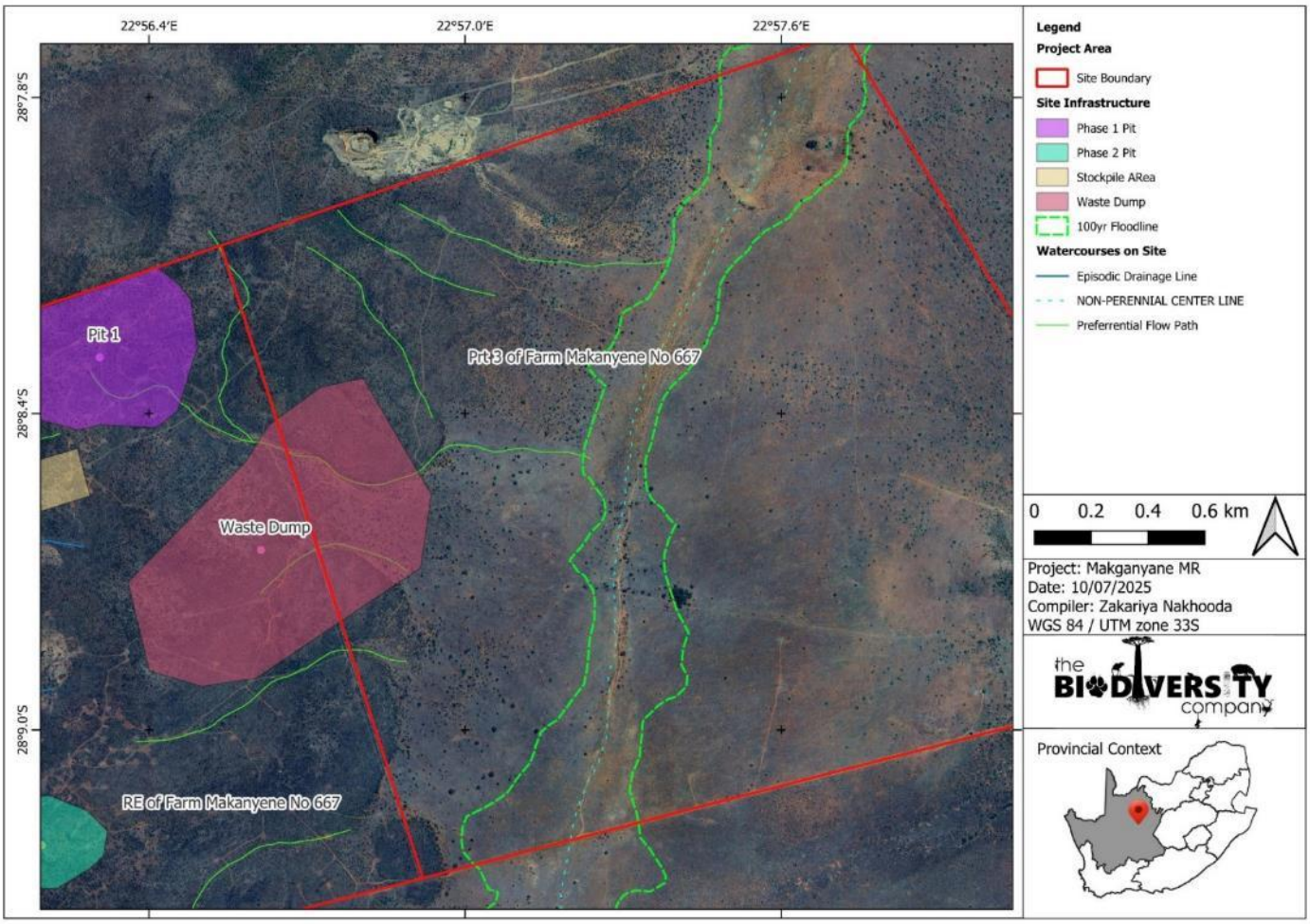


Figure 89: 1:100-year Floodline (TBC, 2025).

6.6 Conclusion and Recommendations

The 1:100-year floodline was delineated for the watercourse identified across the site, utilising topographical data. TBC recommended that no activities be undertaken within the 1:100-year floodline extents and that these be clearly marked. Based on the current site layout, no activities are envisaged within the 1:100-year floodline extent.

The proposed MIOM is expected to pose "Low" to "Medium" post-mitigation risks to the identified watercourses. Achieving "Low" ratings depends on effective mitigation measures addressing stormwater management, erosion and sedimentation prevention, proper chemical use and storage, rehabilitation of disturbed areas, prevention of runoff into water resources and their buffers, and restricting heavy vehicle operations within specified zones.

The following recommendations have been made to ensure the conservation of the aquatic resources:

- δ A competent Environmental Control Officer (ECO) must oversee the construction, operation and rehabilitation phases of the project, with watercourse areas as a priority;

- δ It is recommended that an Erosion Risk Assessment and Management Plan is completed and implemented to derive the areas at highest risk for erosion. These high-risk areas should then be key points for erosion management throughout the entirety of the project lifecycle.

- δ The Proposed Mine should have and implement a Rehabilitation Plan that will be active during the life of mine, as well as post-decommissioning. This is to ensure that ecological integrity and ecosystem services can be restored in the event of degraded wetlands and aquatic habitats.

- δ The Proposed Mine must have and implement a Remediation Plan that encompasses all types of pollution events associated with a Mine.

7. SITE SPECIFIC FRESHWATER ECOSYSTEMS

(Information obtained from the Freshwater Ecosystem Assessment, 2025 attached as Appendix R)

7.1 DFFE Screening Tool Result

The DFFE Screening Report shows the proposed MR footprint within an area of Very High aquatic biodiversity importance as depicted in the following figure. Various triggers are listed for the designation of very high sensitivity:

- δ Located within a FEPA subcatchment; and
- δ The presence of wetlands and rivers, as confirmed by the NFEPA and NBA Databases.

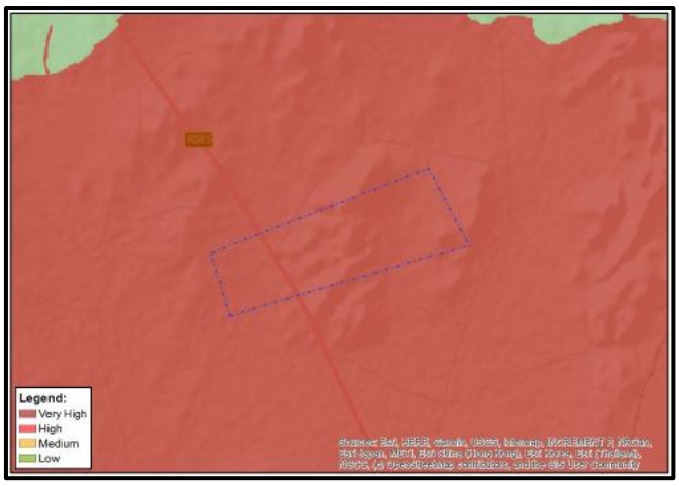


Figure 90: Aquatic biodiversity theme sensitivity according to the DFFE screening report (2024).

According to the protocol for the assessment of freshwater and aquatic biodiversity an applicant intending to undertake an activity on a site identified as being of "very high sensitivity" for an aquatic biodiversity theme must submit an Aquatic Biodiversity Impact Assessment.

Scientific Aquatic Services (SAS) was accordingly appointed to assess and discuss the freshwater ecosystem sensitivity of the study area. Based on the site verification and detailed assessments undertaken by SAS the designation of very high freshwater sensitivity to the entirety of the focus and investigation areas is disputed. As a general principle, all freshwater ecosystems (EDLs) in the focus and investigation areas have been designated as sensitive features in line with the inherent sensitivity associated with freshwater ecosystems. For parts of the focus and investigation areas located outside of the delineated freshwater ecosystem boundaries which are designated by the web-based screening tool as areas of very high sensitivity, a designation of low sensitivity has been assigned.

Under the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity, (GN320 of March 2020), for areas of moderate aquatic biodiversity sensitivity an Aquatic Biodiversity Assessment must be produced. Such a reporting approach has been followed in this instance.

7.2 Results of the Desktop Analysis

The following section contains data accessed by SAS as part of the desktop assessment and are presented as a "dashboard" report below.

Table 56: Desktop data relating to the characteristics of the freshwater ecosystems associated with the focus area and investigation area (SAS).

Aquatic ecoregion and sub-regions in which the focus and investigation areas fall	
Ecoregion	Southern Kalahari
Catchment	Orange
Quaternary Catchment	D73A
WMA	Lower Vaal
SubWMA	Molopo
Dominant characteristics of the Southern Kalahari (29.01) Ecoregion Level 2 (Kleynhans *et al*., 2007).	
Dominant primary terrain morphology	Plains; moderate relief, Closed hills, mountains; moderate and high relief.
Dominant primary vegetation types	Karroid Kalahari Bushveld, Kalahari Mountain Bushveld, Kalahari Plateau Bushveld.
Altitude (m a.m.s.l)	700 to 1500
MAP (mm)	0 to 500
Coefficient of Variation (% of MAP)	30 to 40
Rainfall concentration index	60 to >65
Rainfall seasonality	Late summer
Mean annual temp. (°C)	16 to 22
Winter temperature (July)	0 to 22
Summer temperature (Feb)	16 to >32
Median annual simulated runoff	<5 to 40 mm
Ecological Status of the most proximal sub-quaternary reach (DWS, 2014)	
Sub-quaternary reach	D73A – 02698 (Unnamed river)
Proximity to focus area	Within eastern section (Figure 12)
Assessed by expert?	No (ephemeral feature)
PES Category Median	NA
Mean Ecological Importance (EI) Class	Low
Mean Ecological Sensitivity (ES) Class	NA
Stream Order	1
Default Ecological Class (based on median PES and highest EI or ES mean)	NA

Details of the area in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
FEPACODE	The focus and investigation areas fall within a FEPA Catchment (FEPACODE 1). River FEPAs achieve biodiversity targets for river ecosystems and threatened fish species and were identified in rivers that are currently in a good condition. Although the FEPA status applies to the actual river reach within the sub-quaternary catchment the surrounding land and smaller stream network needs to be managed in a way that maintain the good condition of the river reach.
NFEPA Wetlands (Figure 6)	According to the NFEPA database, there is one artificial channelled valley bottom wetland (CVB) located in the eastern portion of the focus area, associated with the unnamed river. The CVB is considered heavily to critically modified ecological condition (Class Z).
Wetland Vegetation Type (Figure 7)	Most of the focus and investigation areas fall within the Eastern Kalahari Bushveld Group 3, while the remaining central portions fall within Eastern Kalahari Bushveld Group 4. The threat status of these groups is Least Threatened as provided by Mbona *et al* (2015).
NFEPA Rivers (Figure 6)	According to the NFEPA database, an unnamed river traverses the eastern portion of the focus and investigation areas and is indicated to be in a largely modified (Class B) (PES1999) and in a natural to near-natural (RIVERCON AB) ecological condition. According to the NFEPA Database the unnamed river is classified as a FEPA River, therefore in terms of the NFEPA Implementation Manual (2011), mining (and/or prospecting) is not considered a compatible land use within 1km (1000 m) of a buffer around a FEPA river. *Please refer to Section 6.1 for further detail on the NFEPA buffer.*
Details of the area in terms of the National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE (Figure 8).	
According to the NBA 2018: SAIIAE there a river is indicated in the eastern section of the focus and investigation areas. The CVB as identified by the NFEPA Dataset is indicated to be a dam according to the NBA 2018 Artificial Wetlands Dataset. The NBA 2018 River dataset also indicates the unnamed river in the eastern portion of the focus area, which at the time of collating the NBA dataset, the feature was dry due to it being ephemeral in nature, indicating that it is data deficient. The Ecosystem Threat Status (ETS) of the river is considered critically endangered (CR) and the Ecosystem Protection Level (EPL) is considered Not Protected (NP).	
Detail of the focus and investigation areas according to the Strategic Water Source Areas (2017 & 2021) Database.	
Surface water SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. They include transboundary areas that extend into Lesotho and Swaziland. The sub-national Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide complete coverage	
The focus and investigation areas are not associated with any groundwater or surface water SWSAs.	

Detail of the focus and investigation areas in terms of the Mining and Biodiversity Guidelines (2013) (Figure 9).	National Web Based Environmental Screening Tool (2020) (Accessed 2025)(Refer to Section 7 below)
According to the Mining and Biodiversity Guidelines Database (2013) the eastern portion of the focus and investigation areas are considered of highest biodiversity importance. Risk for mining: Highest risk for mining. Implications for mining: Environmental screening, EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision making for mining, water use licences, and EAs. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services.	The Screening Tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas. The entire focus and investigation areas are located in an area considered to be of **very high aquatic biodiversity sensitivity**. The trigger features for the very high aquatic biodiversity sensitivity are due to the focus area being located within a FEPA subcatchment and the presence of wetlands and rivers, as confirmed by the NFEPA and NBA Databases.

Detail of the Assessment area in term of the Northern Cape Critical Biodiversity Areas (2016) (Figure 10).	
Critical Biodiversity Area (CBA)	The entire eastern section of the focus area is considered a Category 1 CBA which is considered an Irreplaceable Area. A CBA is an area that must remain in good ecological condition in order to meet biodiversity targets for ecosystem types, species of special concern or ecological processes. CBAs can meet biodiversity targets for terrestrial or aquatic features, or both. Together with protected areas, the portfolio of CBAs identified in a biodiversity plan must collectively meet biodiversity targets for representation of ecosystem types and species of special concern and may also meet biodiversity targets for some ecological processes (SANBI, 2017).
Ecological Support Area (ESA)	Most of the focus and investigation areas are classified as Ecological Support Area (ESAs). According to the Technical Guidelines for CBA Maps document ESAs are areas that must retain their ecological processes in order to meet biodiversity targets for ecological processes that have not been met in CBAs or protected areas; meet biodiversity targets for the representation of ecosystem types or Species of special concern when it's not possible to meet them in CBAs; support ecological functioning of protected areas or CBAs or a combination of these (SANBI, 2017).
Other Natural Area (ONA)	Small, scattered portions of the focus and investigation areas are classified as ONAs. According to the Technical Guidelines for CBA Maps document, ONA consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs (SANBI, 2017).
CBA Reasons	The 2016 Northern Cape CBAs database also includes the "reasons" layer, which is based on the planning units used in the spatial analysis and provides a list of biodiversity and ecological features found in each planning unit, which contribute to the biodiversity target (CBA Map Reason Metadata). According to this Northern Cape CBAs Reasons layer, the triggering biodiversity, and ecological features, for the ESAs and ONAs within the focus area include the following: Olifantshoek Plains Thornveld, Kuruman Mountain Bushveld, Postmasburg Thornveld, All Rivers, FEPA 500 m, FEPA subcatchment, Southern Kalahari Salt Pans, Landscape structural elements, all natural wetlands, and Conservation Areas.

Land Type Data (Job *et al.*, 2019) (Figure 11).
The potential presence of freshwater ecosystems in the focus and investigation areas can be examined in the context of the land type for the area. The majority of the focus and investigation areas fall within the **Ae12 land type** grouping and the remaining portions of the focus and investigation areas fall within **Ib238,Ag110 and Ae7** land type groupings. In the **Ae groupings** 40% of the landscape is occupied by Red and yellow, freely drained apedal soils of the Hutton, Griffin and Clovelly soils. Mishap and Glenrosa soils usually occupy significant proportions of the landscape. Soils with neocutanic, plinthic, duplex horizons and shallow black clay soils may occupy small proportions of the landscape. Katspruit, duplex soils and black clay soils usually occupy bottomland terrain positions with streambeds and erosion. **Ib groupings** are areas where the surface is dominated by exposed rocks and stones and the slopes are usually steep. The soils in the **Ag groupings** are areas were 1 >40 of the landscape is occupied by the red, freely drained apedal soils of the Hutton form. The remainder of the landscape is dominated by Mispah soils (on hard and poorly fractured rock) and Glenrosa soils (on fractured to partly weathered rock). The valley bottom consists of alluvium (Dundee and Oakleaf) soils together with calcareous Katspruit, duplex (Valsrivier, Sterkspruit) and black clay (Bonheim) soils.

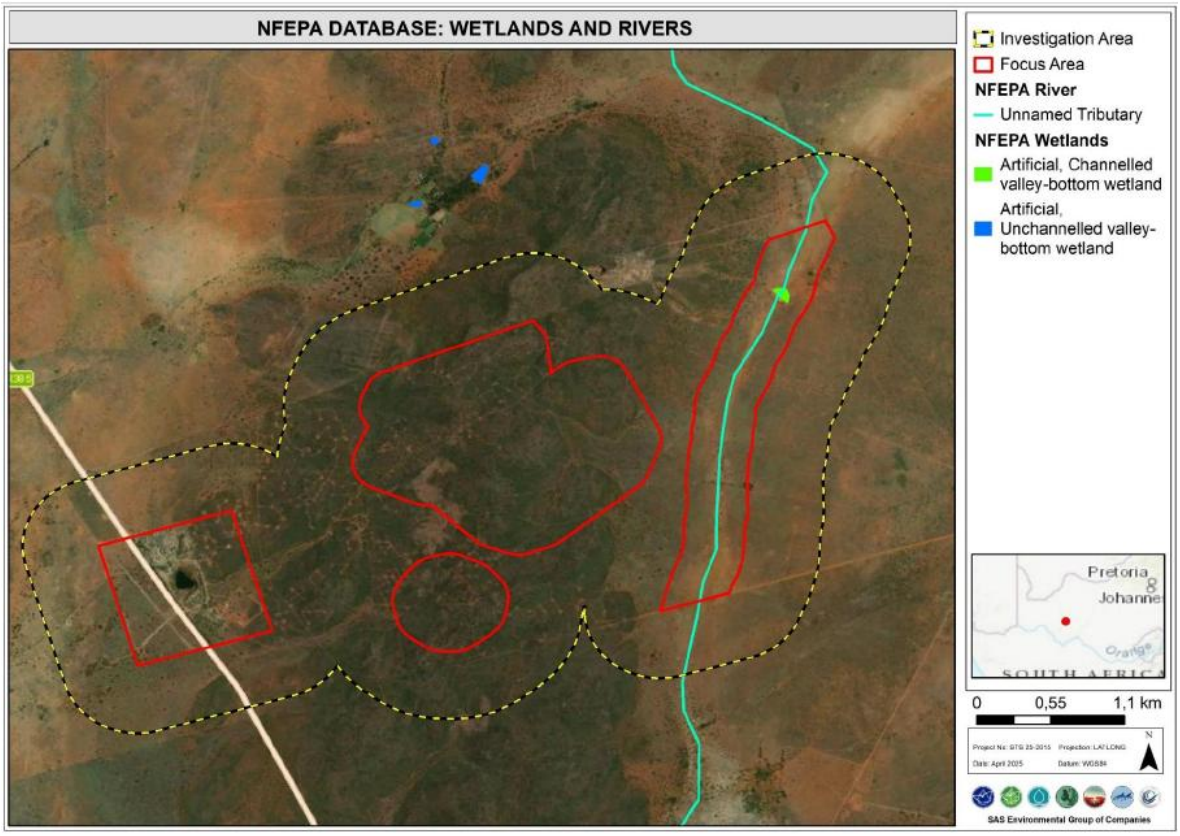


Figure 91: Wetland occurrence in the focus and investigation areas according to the NFEPA database (SAS).

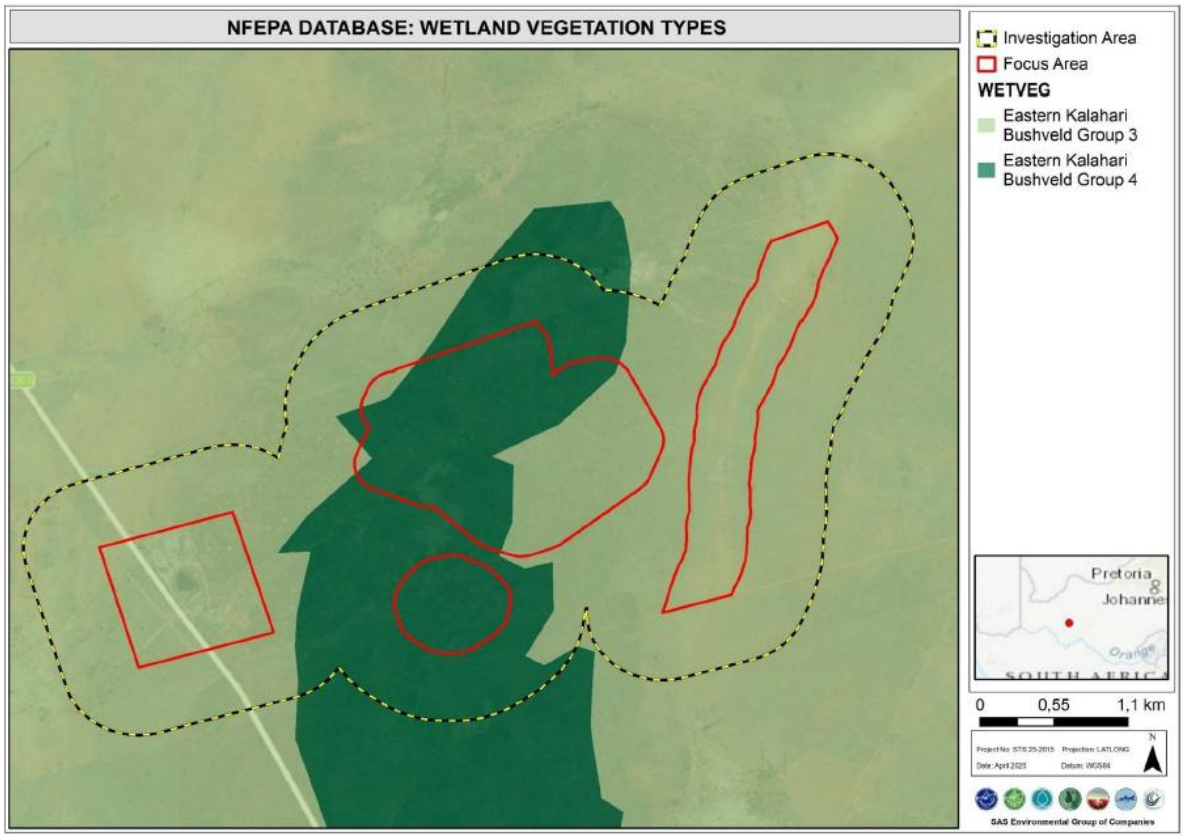


Figure 92: Wetland vegetation types associated with the focus and investigation areas according to the NFEPA database (SAS).

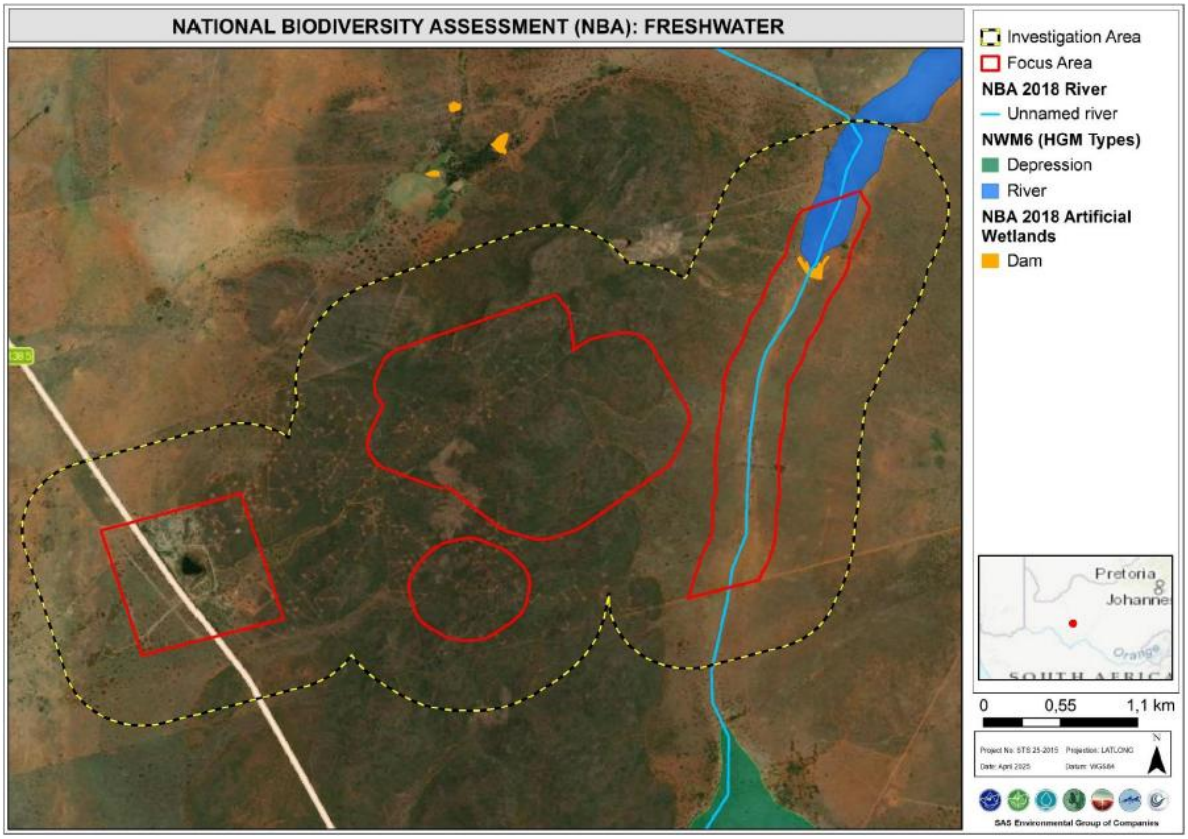


Figure 93: Wetland occurrence in the focus and investigation areas according to the NBA (2018) Wetland database (SAS).

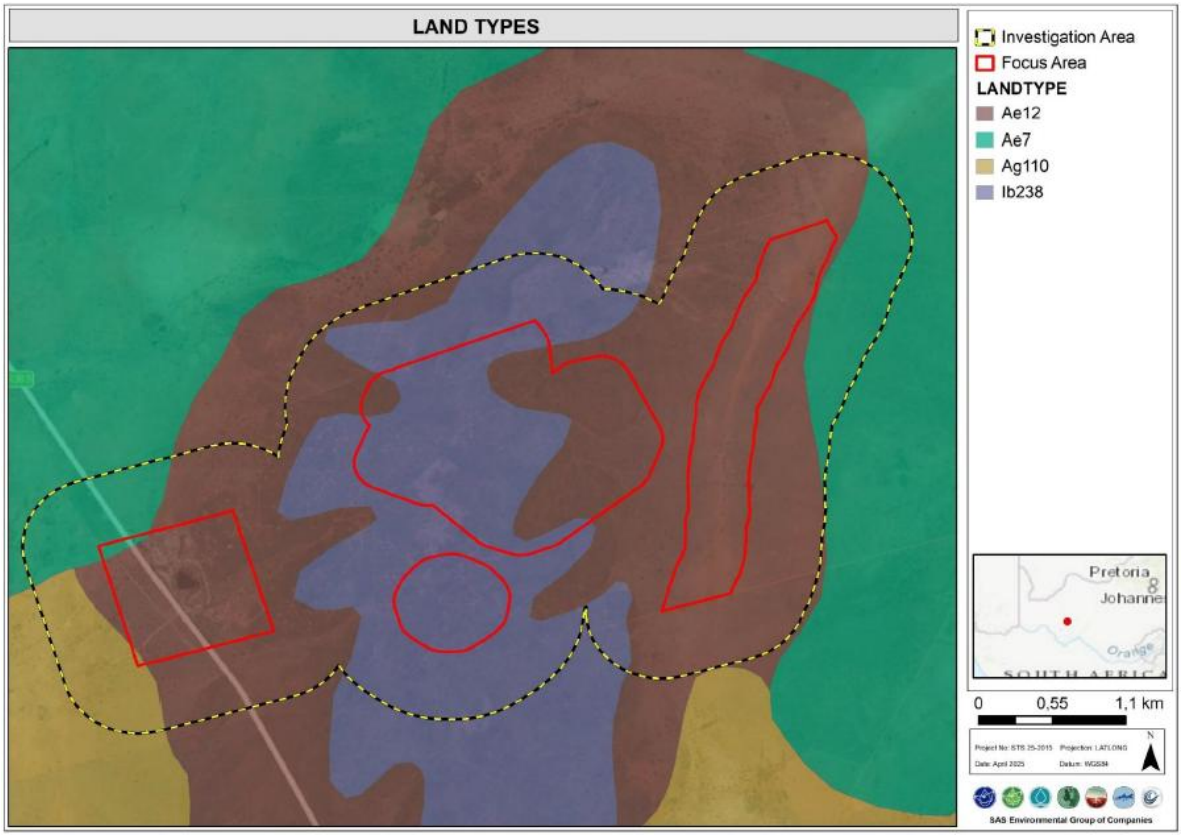


Figure 94: Land types associated with the focus and investigation areas (SAS).

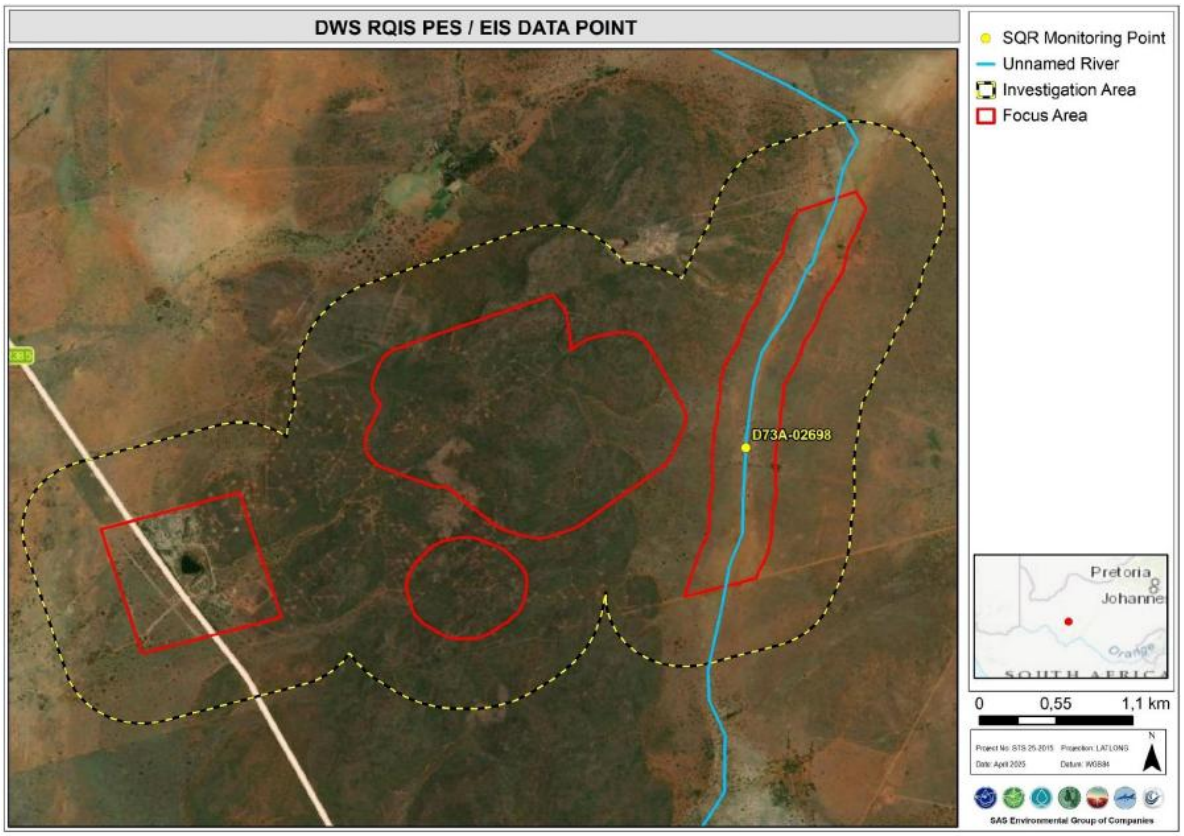


Figure 95: DWS RQOIS PES/EIS assessment point associated with the focus and investigation areas (SAS).

7.3 Freshwater Ecosystem Characterisation

As noted above, various features displaying visual indicators of increased wetness were investigated during the site assessment and categorised according to their dominant characteristics, primarily topography, vegetation and soil characteristics. Of these features, two Episodic Drainage Lines (EDL) without riparian vegetation, numerous Preferential Flow paths (PFPs) and a recharge zone was identified.

7.3.1 Preferential Flow Paths (PFPs)

PFPs are defined as areas where, when present, surface water flows but is not retained in the landscape for a sufficient period to encourage the establishment of a floral community that relies on an increased abundance of water within the effective rooting zone. PFPs receive surface sheet flow originating from the upgradient catchment which incises small channels, or 'rills' in the surface cumulatively defined as PFPs. PFPs are typically found draining from steeply sloped terrain units, as in this case, and collect form higher order episodic drainage lines in the landscape. These PFPs lack riparian and wetland characteristics and may potentially only convey surface water for a short period of time after rainfall events. Thus, these features are

not considered of ecological importance but contribute to the hydrological functioning of the drainage systems at large.

7.3.2 Recharge Zone of an Unnamed Tributary

The “recharge zone” of a small unnamed tributary does not possess well-defined characteristics indicative of either wetland or riparian conditions. The vegetation composition of this area is dominated by species such as: *Pentzia incana, Seriphium plumosum, Cymbopogon* spp and *Hypperhennia* spp. None of these species are considered as indicators of wetland or riparian plant species and are usually associated with disturbance and overgrazing, as is the case in the recharge zone which is used for livestock grazing.

Furthermore, for an area to be classified as a watercourse, signs of a fluctuating water table (mottling, gleying) within the first 50 cm of the soil profile must be present. In the case of the recharge zone, no mottling or gleying was noted within the first 50 cm. However, at around 1 m depth, signs of soil hydromorphy were noted, which indicate subsurface lateral flow of water at a soil/bedrock interface. As such it is likely that subsurface water from this area flows downgradient to an unnamed tributary, south of the focus area.

As such, and in consideration of the above, the recharge zone is a clearly defined low-lying area, which possesses a unique digital signature and based on analysis of available digital satellite imagery and the soil characteristics of the area, it is very likely that water from this area flows into an unnamed tributary and may contribute to the continued ecological functioning thereof.

Neither the PFPs nor the recharge zone met the definition of a watercourse from an ecological perspective (as defined by the NWA) and were therefore excluded from further assessment.

Form a legal perspective, however, a 1 in 100-year floodline has been modelled for the recharge zone (TBC, 2025) and as such does enjoy protection under the NWA. The hydrological assessment (TBC, 2025) does not indicate any floodlines for the PFP’s and therefore it does not enjoy protection from a legal perspective.

7.3.3 Episodic Drainage Lines (EDLs) without Riparian Vegetation

EDLs without riparian vegetation are defined as episodic systems that support some vegetation that relies on an increased abundance of water within the

effective rooting zone, but not to the degree that a riparian vegetation margin can form. These systems typically drain moderately sloped terrain units, as is applicable in this instance. The EDLs fall within the Eastern Kalahari bushveld Group 4, which is considered to be Least Threatened according to Mbona et al., (2015). The EDLs were further classified at Level 3 and Level 4 of the classification system as summarised in the following table.

Table 57: Characterisation of the EDLs associated with the focus area according to the Classification System (SAS).

Freshwater Ecosystem	Level 3: Landscape unit	Level 4: HGM Type
Episodic Drainage Lines without riparian vegetation	**Valley floor:** The base of a valley, situated between two distinct valley side-slopes.	**River:** a linear landform with clearly discernible bed and banks, which permanently or periodically carries a concentrated flow of water.

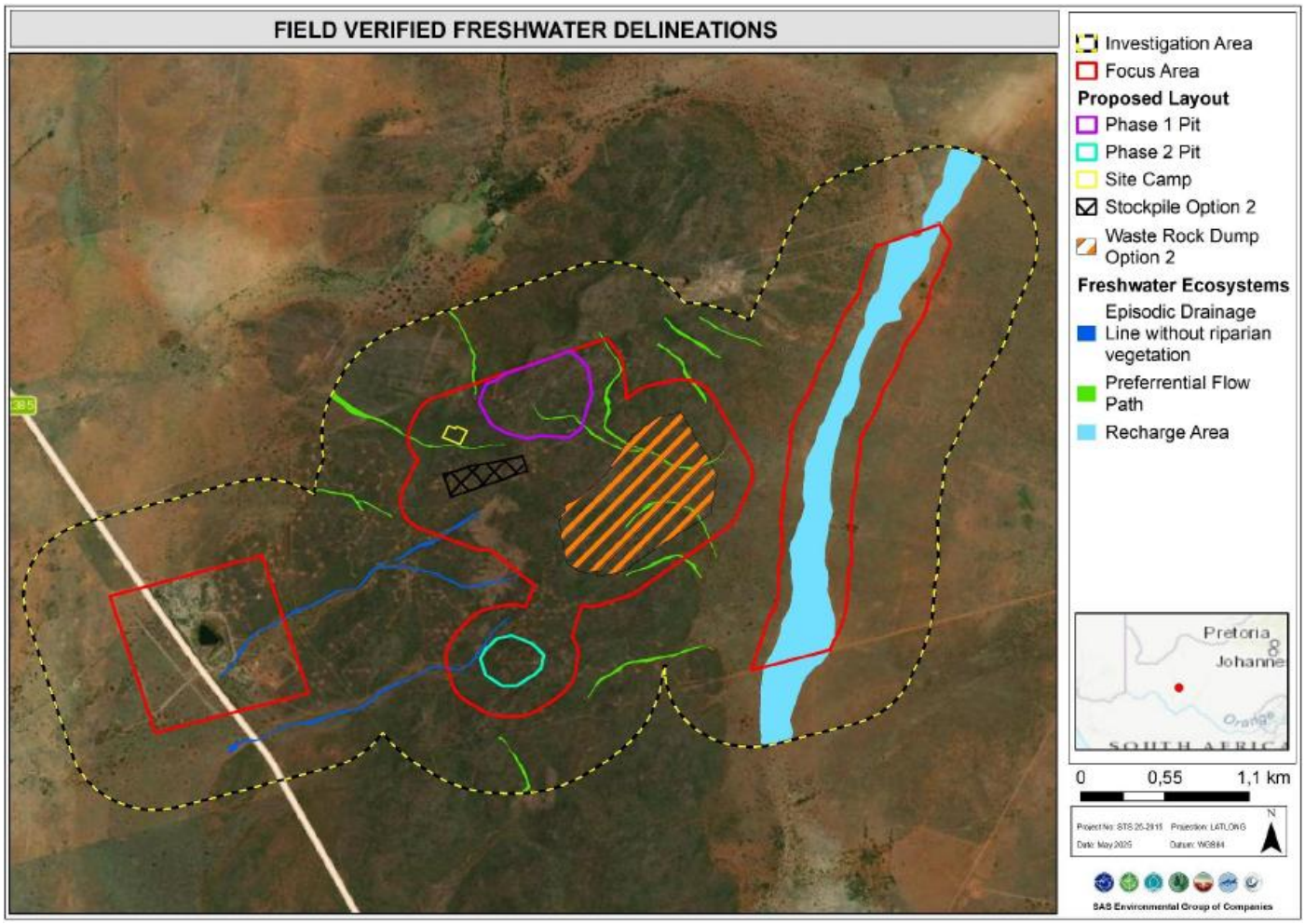


Figure 96: Freshwater ecosystem occurrence in the context of the focus and investigation areas (SAS).

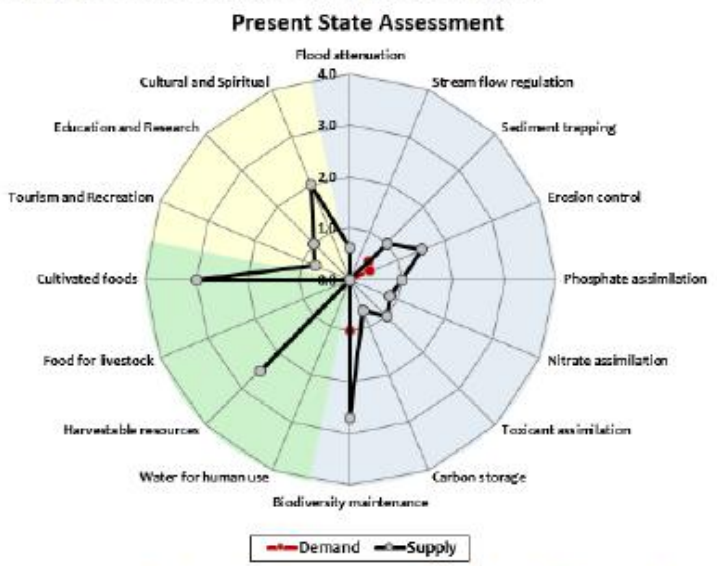
7.4 Freshwater Detailed Assessment Results

Following the site visit, various assessments were undertaken in order to determine the PES, EIS, and ecological service provision of the identified EDLs as well as to assign an appropriate REC, RMO and BAS.

The following table provides a summary of the ecological assessment of the EDLs in terms of relevant aspects (hydrology, geomorphology and vegetation components) associated with the EDLs. As the EDL's are located in close proximity (±243 m), in the same catchment area and with similar limited impacts, the EDLs were assessed and discussed in a combined manner.

Table 58: Characterisation of the EDLs associated with the focus area according to the Classification System (SAS).

Ecological & socio-cultural service provision graph:



Photograph notes: (From left to right) indication of lateral movement of alluvial soil and visual representation of the EDLs associated with the western portions of the focus and investigation areas.

Ecoservice provision	**Biodiversity Maintenance – Moderate; Cultivated Foods – Moderately Low; Harvestable Resources – Low; All other – Very Low** As per the Wet-Ecoservices results, the highest rated ecosystem service associated with the EDLs is biodiversity maintenance to a moderate degree. The supply of the service has been rated as much higher than the demand, which is an accurate representation as the EDLs are not indicated by any database as an important freshwater feature and is only associated with a wetland vegetation type considered as least threatened. The EDLs do however fall within an ESA (Section 3.1). The supply of all other provisioning services is higher than the demand and is ascribed to the isolated setting of the EDLs on privately owned land.
PES discussion	**Riparian Index of Habitat Integrity (IHI): B (Largely natural) (83.8%)** The EDLs were assessed to be in a largely natural ecological state which is ascribed to the isolated nature and minimal anthropogenic impacts imposed on the natural hydrologic regime, geomorphological processes and vegetation community of the systems. The only modifiers noted is wildlife grazing and movement (used as a corridor for herbivores) and the recent informal road crossings constructed within the systems as part of the Makganyane prospecting works (constructed between 2019 and early 2022). These impacts have resulted in changes to the hydrological functioning and sediment balance of the systems as well as Alien and Invasive Plant (AIP) encroachment.
EIS discussion	**EIS Category: Moderate (2.00)** The EDLs display a moderate EIS with biodiversity support and sensitivity of the EDLs to changes in low flows and floods being the most impactful aspect of ecological importance and sensitivity. The EDLs display important aspects of hydro-functional importance including streamflow regulation, flood attenuation (even if only provided seasonally during the rainy season) and breeding and feeding habitat for faunal species. The location of the EDLs on privately owned land restricts the direct human benefits associated with them.
Freshwater Ecosystem drivers and receptors discussion (hydraulic regime, geomorphological processes, water quality and habitat and biota):	

Freshwater Ecosystem drivers and receptors discussion (hydraulic regime, geomorphological processes, water quality and habitat and biota):	
The EDLs are primarily driven by precipitation and runoff (i.e. surface water inputs), and as such is only in flow when sufficient rainfall is received in the region. It was apparent at the time of the assessment in April 2025 that although ample rain had fallen in the preceding weeks and during the site assessment for the stream to flow, small ponding areas occur along the course of the stream where instream infrastructure such as the informal road crossings, is in place. This leads to accumulation of sediment as the water stagnates. No other modifiers of the hydraulic regime were observed during the assessment.	
The geomorphological regime is similarly in a largely natural state, although increased sediment inputs are likely mostly due to trampling by large herbivores and some windborne sediment inputs are also likely. Minimal erosion was noted, nor was active erosion noted on digital satellite imagery. Despite the semi-arid climate, the ELDs are well-vegetated, and the absence of erosion is attributed to the vegetated state of the stream. Due to the episodic nature of the drainage lines, the presence of surface water is very limited, as discussed above, and is largely due to precipitation. As such, water quality parameters were not taken. The vegetation community of the EDLs did not distinctly differ from that of the surrounding terrestrial habitat, with the exception of a few individual *Ziziphus mucronate*, which although is a cosmopolitan species, seemed to favour EDL areas. Numerous AIPs were also noted o be associated with the EDLs and included, but are not limited to: *Datura stramonium*, *Nicotiana glauca*, *Prosopis glandulosa* var. *torreyana*, *Solanum elaeagnifolium*; *Bidens pilosa*, *Chenopodium album*, *Schkuhria pinnata*; and *Tagetes minuta*. During the site assessment it was noted that herbivores use the EDLs as movement corridors as the systems are more easily accessible and less restrictive in terms of tree density.	
REC, RMO & BAS Category	**REC Category: B** **RMO: Maintain** **BAS: B (Maintain)** Since the EDLs have been assessed to be in a largely natural state with a moderate EIS rating, the ecological condition of the EDLs must be maintained and cannot be degraded. As no infrastructure is located within the delineated extents of the EDLs and only a portion of the Phase 2 OC pit and associated sump is located within the 48 m non-development buffer of the southern EDL, only potential indirect impacts to the southern EDL is envisioned. The stockpile area is also located in the immediate catchment of the northern EDL with limited indirect impacts envisioned, as described below. However, as these areas are small in relation to the entire extent of the EDLs, the ecological functioning of the systems are unlikely to be compromised, and the REC can be maintained with the implementation of the provided mitigation measures (Section 8.3).
Extent of modification anticipated	**Moderate to Low** Indirect impacts associated with the Phase 2 OC pit and sump (within the 48 m non-development buffer of the southern EDL) and the stockpile area (within the immediate catchment of the northern EDL) will lead to a moderate to low degree of modification of the EDLs, respectively. The upgrading of existing informal road crossings within the EDLs will also lead to an overall low extent of modification. However, with the implementation of the recommended mitigation measures (Section 8.3) the anticipated modifications can be further reduced.
Risk Assessment Outcome & Business Case:	
MEDIUM TO LOW	The proposed Makganyane mining operation will lead to an overall low impact on the EDLs, with the only medium impact activity associated with the construction and operation of the Phase 2 OC pit and associated sump, located within the 48 m ecological buffer and GN 4167 100 m ZoR, of the southern EDL. However, with the implementation of the recommended mitigation measures, the risk can be suitable mitigated.

7.5 Freshwater Buffers

In order to offer a measure of protection to freshwater ecosystems, in general non-developable buffer areas are necessary to be designated around all freshwater ecosystems in the study and investigation areas. The following table details the results of the refined buffer assessment also depicted in the following figure.

Table 59: Buffers as recommended by the buffer tool for the EDLs (SAS).

Freshwater Ecosystem	Construction phase buffer	Operational Phase buffer	Final aquatic impact buffer
EDLs	27 m	48 m	**48 m**

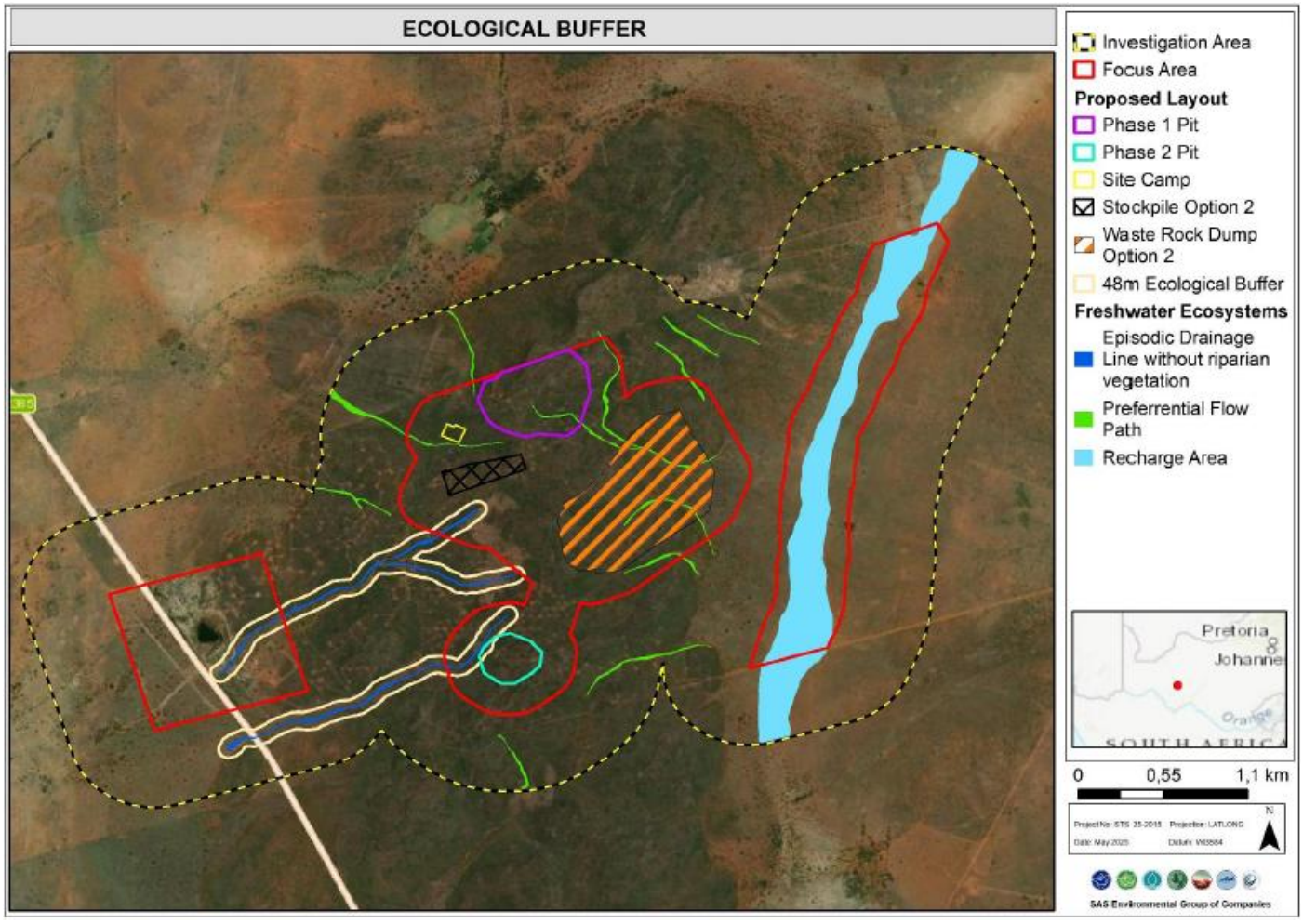


Figure 97: Aquatic ecological buffer associated with the EDLs (SAS, 2025).

7.6 Legislative Zone of Regulation

Certain national and provincial legislative provisions create Zones of Regulation (ZoR) around freshwater ecosystems. These zones are not strict

exclusion areas, but rather areas where specific activities require Environmental Authorisation (EA) or Water Use Authorisation (WUA) to ensure the protection and sustainable use of water resources. The purpose of defining such regulated zones is to control activities within or near freshwater systems that may impact their integrity.

The applicable ZoR for the proposed development can be summarised as follows:

- δ 32 m Zone of Regulation (NEMA EIA Regulations);
- δ 100 m Zone of Regulation (GN 704, NWA);
- δ 100 m Zone of Regulation is applicable to the EDLs (GN 4167 in the absence of a determined 1: 100-year floodline); and
- δ 1:100-year floodline is applicable to the recharge zone (GN 4167) (as determined by the hydrologist – TBC).

In terms of the NFEPA database (2011), the area defined as a recharge zone is considered a FEPA river in which mining (and/or prospecting) is not considered a compatible land use within 1 km (1 000 m) of a buffer around a FEPA river. As such a 1 km buffer area was generated around the 1:100-year floodline of the recharge zone, which indicates that a portion of the proposed Waste Rock Dump is located within the buffer area (Figure 100).

As mentioned earlier, the Mine site is drained by a non-perennial tributary in a southerly direction before eventually joining the Soutloop River some 57 km downstream. These watercourses are predominantly dry, apart from runoff generated during and immediately after significant rainfall events. The proposed WRD is situated within the 1 km buffer of the Soutloop River FEPA; however, the Soutloop River itself lies off-site and there is no direct surface water connectivity between the WRD footprint and the FEPA. The non-perennial stream on site does not function as a hydrological corridor to the Soutloop River. Standard dirty and clean water management measures, as required by GN704 and NEM:WA, will be implemented to prevent any indirect sediment or runoff impacts. On this basis, the FEPA buffer does not constitute a significant development constraint, and the WRD can be developed without adverse impact to the Soutloop River FEPA.

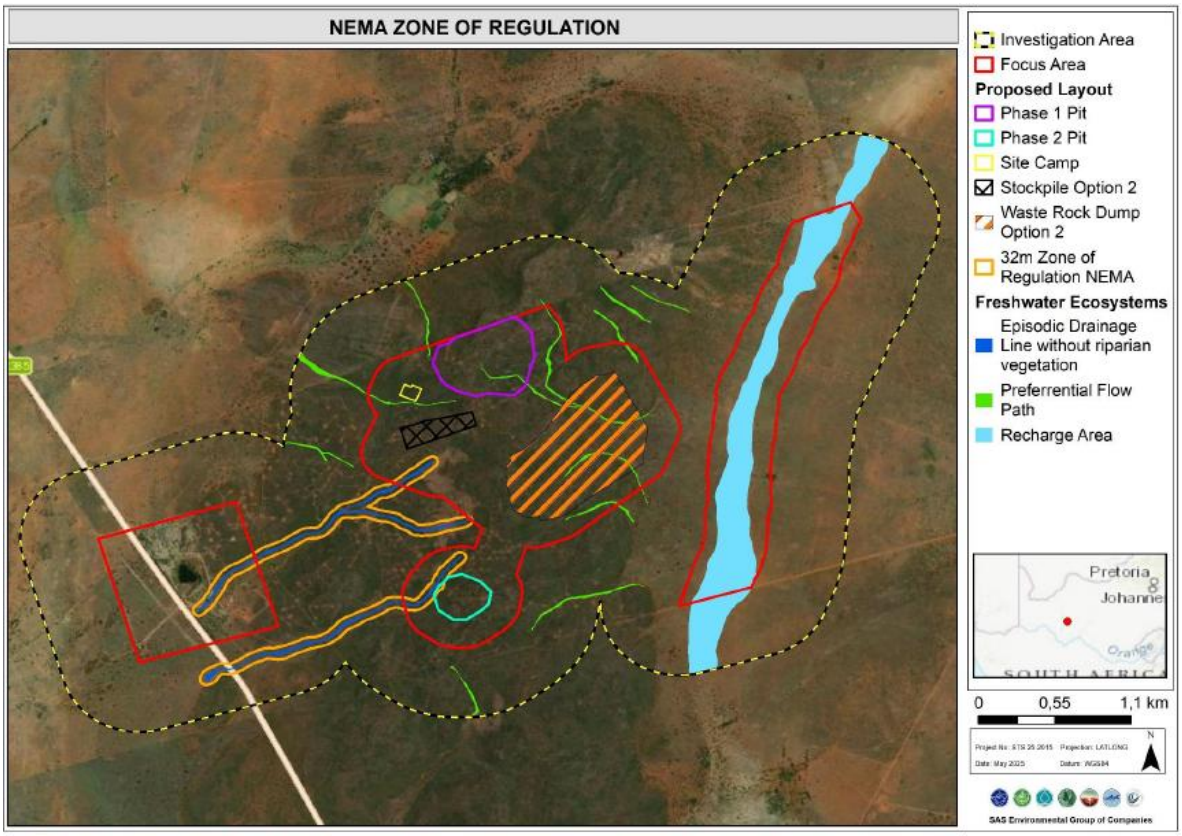


Figure 98: NEMA EIA Regulation Freshwater -related ZoR associated with the focus area (STS).

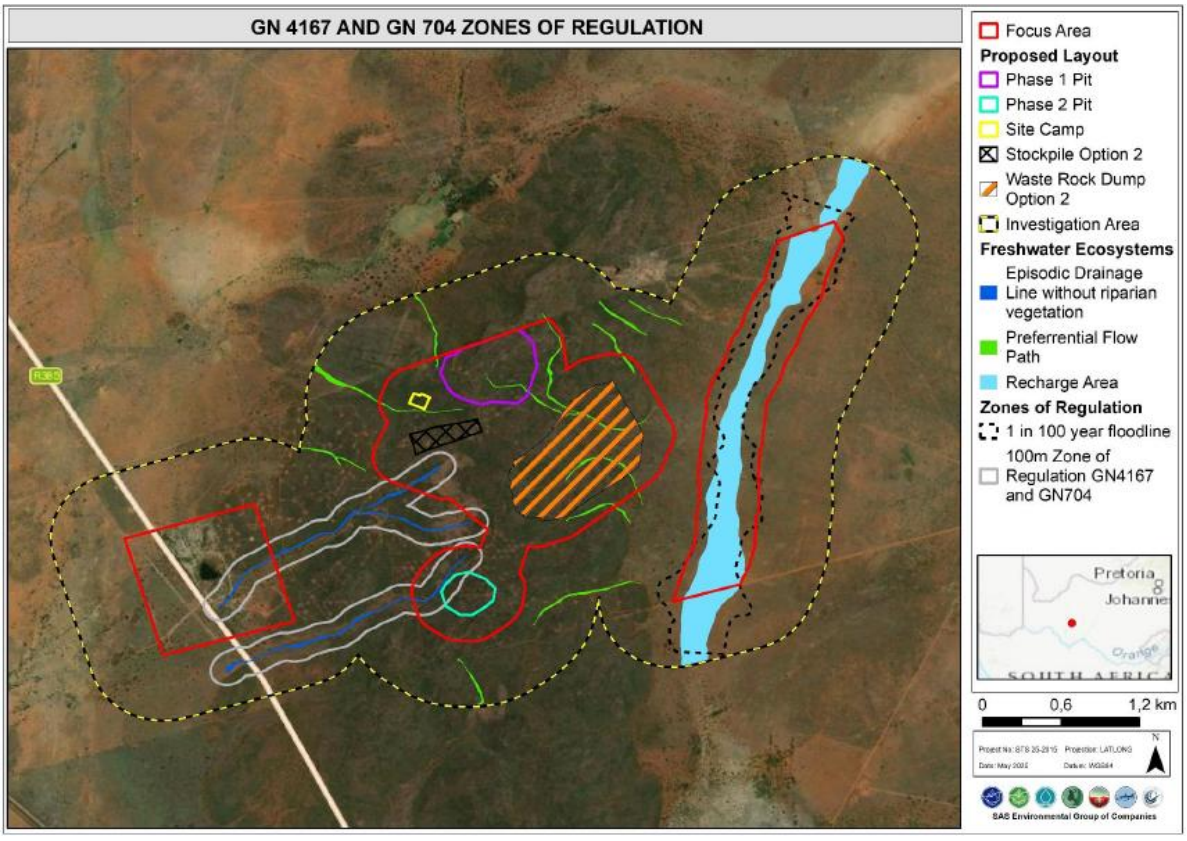


Figure 99: GN 4167 and GN 704 Regulations Freshwater-related ZoRs associated with the focus area (STS).

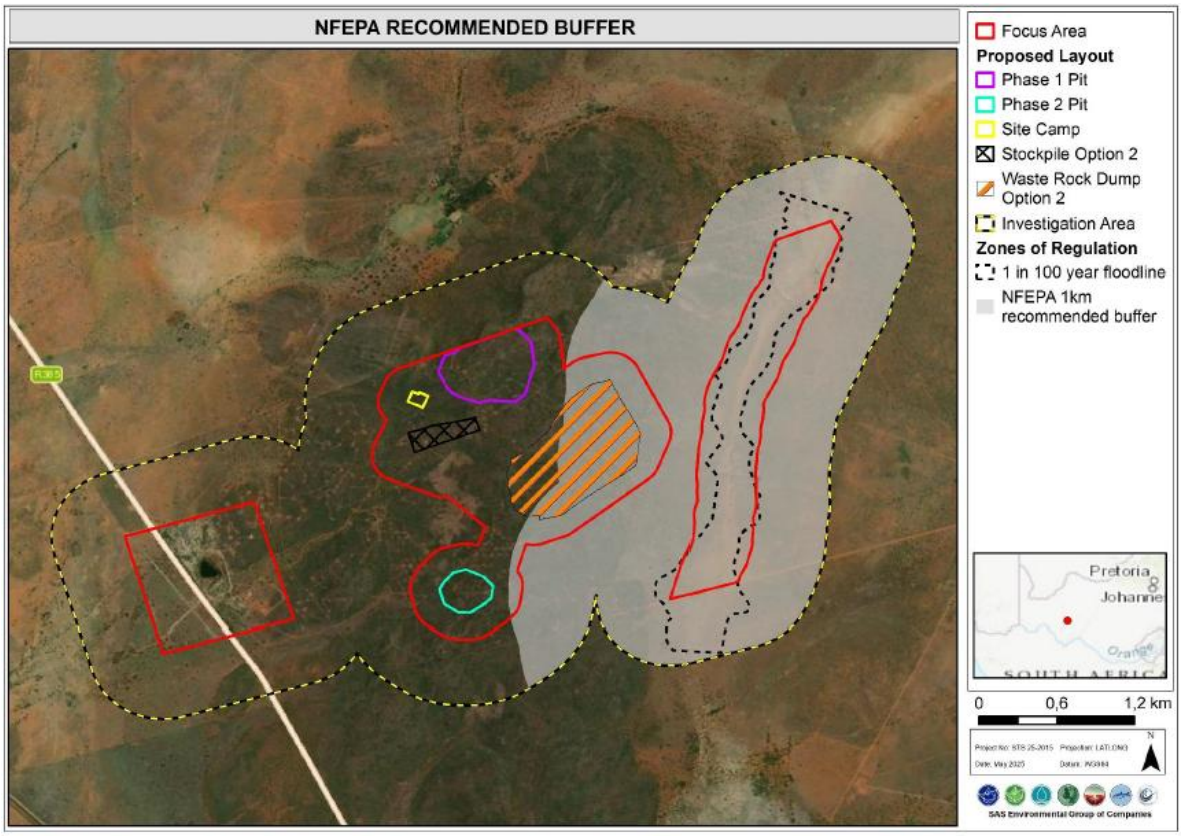


Figure 100: NFEPA recommended 1 km buffer around the FEPA River (STS).

7.7 Freshwater Sensitivity Verification

Based on the site verification and detailed assessments undertaken by SAS the designation of very high freshwater sensitivity (Figure 90) to the entirety of the focus and investigation areas is disputed. As a general principle, all freshwater ecosystems (EDLs) in the focus and investigation areas have been designated as sensitive features in line with the inherent sensitivity associated with freshwater ecosystems. For parts of the focus and investigation areas located outside of the delineated freshwater ecosystem boundaries which are designated by the web-based screening tool as areas of very high sensitivity, a designation of low sensitivity has been assigned.

7.8 Risk and Impact Assessment

Section 8. Risk and Impact Assessments of the SAS report (Appendix R) discusses the risk and impact assessment outcomes and highlights all potential impacts that may affect the identified freshwater ecosystems. The potential impacts were incorporated into this report under *Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts*.

The Risk Assessment was undertaken according to the DWS specified Risk Assessment Matrix (RAM) as promulgated in GN 4167 of 2023 as it relates to the NWA. The use of the DWS RAM (2023) is to determine in consultation with relevant competent authority (DWS) whether there is a need to apply for a Water Use Authorisation. Please refer to Table 6 and Appendix F of the SAS report (Appendix R) for the results of the DWS risk assessment.

7.9 Cumulative and Residual Impacts

Freshwater ecosystems within the region are under continued threat due to expansion of mining operations in the surrounding landscape, as well as poor land use practices such as overgrazing and not controlling invasive vegetation which can affect freshwater ecosystems. The demand for water and impounding small drainage lines has also led to significant loss of recharge of watercourses in the region. In many cases the destruction of freshwater habitat within mining footprints continues to increase. There is thus an increased threat to freshwater ecosystems in the wider area in both the context of systems directly affected and those with mining operations in their catchments, leading to a decline in levels of freshwater ecosystem state and functionality over a wider, regional area. A key cumulative risk in the region is reduced water tables due to the formation of a cone of depression in groundwater which reduces freshwater ecosystems recharge. This has had a very significant impact on systems such as the Gamagara and Kuruman rivers.

As the proposed mining operation has been suitably designed to best avoid the EDLs and associated ecological buffer, along with the fact that the EDL systems are isolated and not connected to a larger system, no significant cumulative impacts are envisioned.

Residual impacts arise from activities of which the effects persist long after the activity has ceased due to the self-perpetuating nature of such impacts (e.g. erosion). Residual impacts may cease with human remediation. Residual impacts could also result from the change in runoff and interflow characteristics from the catchment of the freshwater ecosystems in which the mining operation is proposed (includes open cast pits and the waste dump area). Runoff would occur in a modified way from the catchment of the systems once mining has occurred even if rehabilitated.

7.10 Conclusion and Recommendations

The site assessment confirmed the presence of two Episodic Drainage Lines (EDLs) without riparian vegetation, associated with the western portions of the focus and investigation areas. Numerous artificial features were also identified during the site assessment which included Preferential Flow Paths (PFPs), and a recharge zone. Neither the PFPs nor the recharge zone met the definition of a watercourse from an ecological perspective and were therefore excluded from further assessment. From a legal perspective, however, a 1 in 100-year floodline has been modelled for the recharge zone and as such does enjoy protection under the NWA. The hydrological assessment (TBC, 2025) does not indicate any flood lines for the PFP's and therefore does not enjoy protection from a legal perspective.

The following table provides a summary of the assessment of the EDLs.

Table 60: Summary of results of the field assessment (SAS).

Freshwater Ecosystem	Present Ecological State (PES) / Ecostatus	Ecoservices	Ecological Importance and Sensitivity (EIS)	Recommended Ecological Category / Recommended Management Objective / Best Attainable State
EDLs	Largely Natural	Moderate to Very Low	Moderate	REC Category: B BAS Category: B RMO: Maintain

Following the freshwater ecosystem assessment, most of the activities associated with the proposed mining development have been assessed to be associated with a "low" degree of risk to the freshwater environment, due to the suitable placement of infrastructure and the reshaping and redesigning of disturbance areas in consultation with the freshwater specialist and in line with the mitigation hierarchy. The only exception is the construction and operation of the proposed Pit 2 which was assessed to have a moderate risk significance on the southern EDL. The moderate risk is ascribed to the fact that the Pit 2 area is located adjacent to and within in the 48 m ecological buffer of the southern EDL and would result in numerous indirect impacts which will need to be appropriately managed as per the recommendations set out in this report.

SAS recommended that if the mitigation measures, as stipulated in this report and the mitigation measures contained within the SWMP are strictly adhered to, the proposed MIOM operation, from a water resource

management point of view, can be considered acceptable for authorisation in terms of the EA and WUA processes.

8. SITE SPECIFIC TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, AND GROUNDCOVER

(Information extracted from the Biodiversity Assessment as part of the Environmental Authorisation Process for the Proposed Mining Rights attached as Appendix J)

8.1 DFFE Screening Tool Result

The DFFE Screening Report notes that the plant species sensitivity of the area is of low significance, while the Terrestrial Biodiversity Sensitivity is indicated as Very High due to the presence of the CBA1, an Ecological Support Area (ESA), and the FEPA sub-catchment.

Figure 101: Plant species theme sensitivity according to the DFFE screening report (2024).

Figure 102: Terrestrial biodiversity theme sensitivity according to the DFFE screening report (2024).

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per Government Notice 320 published in terms of NEMA, dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" – section 3, subsection 1:

- δ An applicant intending to undertake an activity identified in the scope of the protocol, on a site identified on the screening tool as being of 'Very High' sensitivity for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment; however;
- δ Where the information gathered from the site sensitivity verification differs from the designation of 'Very High' terrestrial biodiversity sensitivity on the screening tool and it is found to be of a 'Low' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

Scientific Terrestrial Services (STS) was accordingly appointed to assess and discuss the biodiversity sensitivity of the study area.

8.2 Results of the Desktop Analysis

The following section contains data accessed by STS as part of the desktop assessment and are presented as a "dashboard" report below.

The purpose of the STS study was to investigate and provide detail on the biodiversity associated with the MIOM, while focusing on pre-selected Focus Area, from a detailed desktop-based perspective (i.e., consulting all relevant national and provincial biodiversity databases), together with preliminary high-level, field-verified results. The desktop assessment was used in the preparation of the field assessment to verify and to assist in the data interpretations. The following figure shows the focus areas used in the assessment.

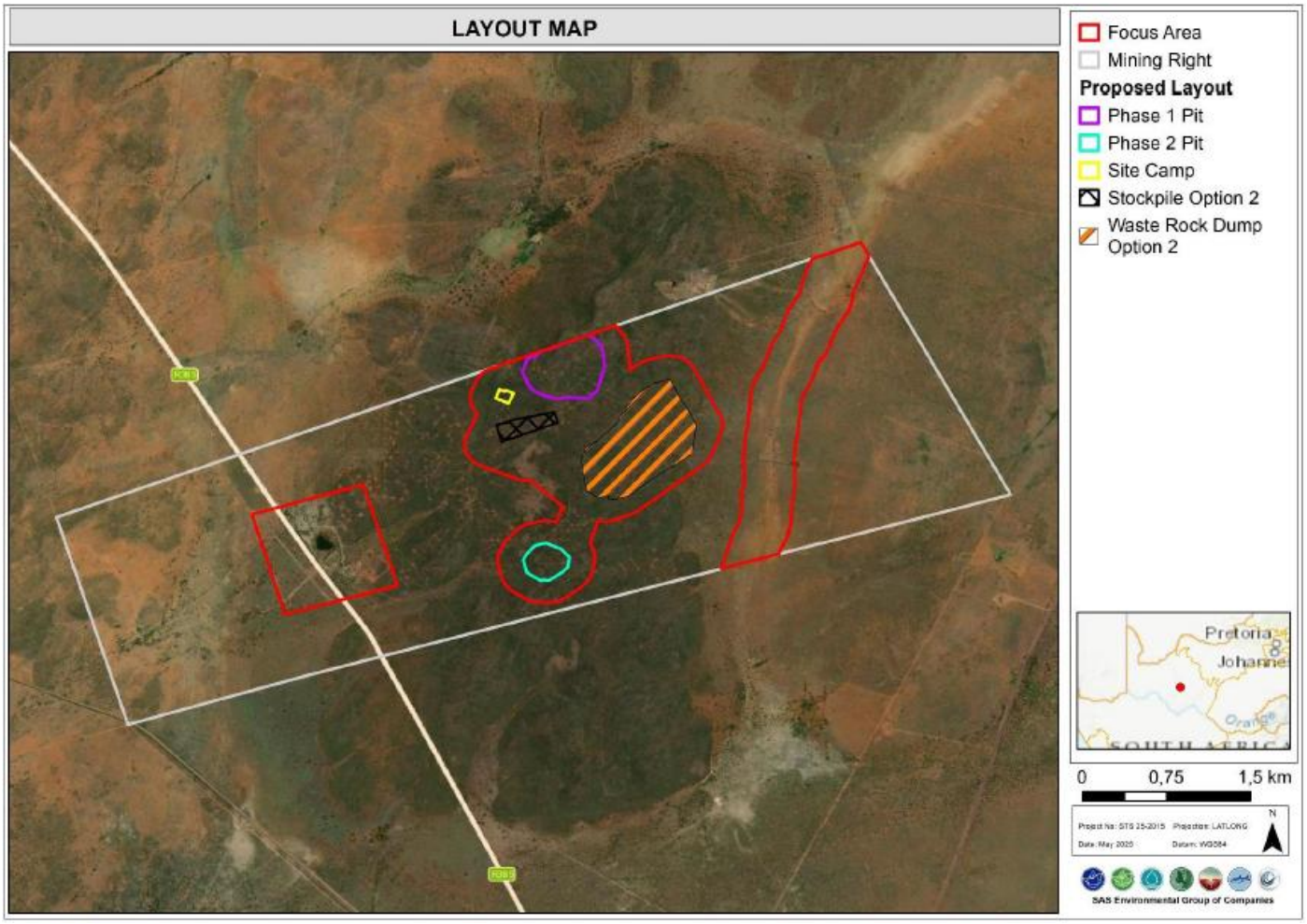


Figure 103: Layout of the focus areas in relation to the proposed development (STS).

Table 61: Summary of the conservation characteristics for the MIOM and Focus Area (STS)

DETAILS OF THE MRA AND FOCUS AREA IN TERMS OF THE 2024 FINAL VEGETATION MAP OF SOUTH AFRICA, LESOTHO, AND SWAZILAND					
Biome(s) and Bioregion(s)	The MRA and Focus Area are situated in the **Eastern-Kalahari Bushveld Bioregion** within the **Savanna Biome.**				
Vegetation Type(s) - Figure 4	The MRA is situated within the **Least Concern (LC) Kuruman Mountain Bushveld** (SVk10), the **LC Olifantshoek Plains Thornveld** (SVk 13), and the **LC Postmasburg Thornveld** (SVk14) vegetation types. The Focus Area are however situated in only the first two listed vegetation types (i.e., SVk 10 and 13).				
DESCRIPTION OF THE VEGETATION TYPES ASSOCIATED WITH THE MRA AND FOCUS AREAS ACCORDING TO MUCINA & RUTHERFORD (2006)					
KURUMAN MOUNTAIN BUSHVELD (SVK 10): CENTRAL PORTION OF THE MRA AND FOCUS AREA					
Climate	Summer and autumn rainfall with very dry winters.				
	MAP (mm)	**MAP (mm)**	**MAP (mm)**	**MAP (mm)**	**MAP (mm)**
	369	17.5	36	2786	84
Altitude (metres; m)	1 100–1 800				
Distribution	Northern Cape and North-West Provinces.				
Conservation	**LC.** Target 16%. None conserved in statutory conservation areas. Very little transformed.				
Geology & Soils	The Kuruman and Asbestos Hills consist banded iron formation, with jaspilite, chert and riebeckite-asbestos of the Asbestos Hills Subgroup of the Griqualand West Supergroup (Vaalian).				
Vegetation & landscape features (Appendix D)	Rolling hills with generally gentle to moderate slopes and hill pediment areas with an open shrubveld with *Calobota cuspidosa* formerly (*Lebeckia macrantha*) prominent in places. Grass layer is well developed.				
OLIFANTSHOEK PLAINS THORNVELD (SVK 13): MAJORITY OF THE MRA AND FOCUS AREA					
Climate	Summer and autumn rainfall with very dry winters.				
	MAP (mm)	**MAT (°C)**	**MFD (days)**	**MAPE (mm)**	**MASMS (%)**
	289	16.8	40	2728	83
Altitude	1 000–1 500 m				
Distribution	Northern Cape Province.				
Conservation	**LC.** Target 16%. Only 0.3% statutorily conserved in the Witsand Nature Reserve. Only about 1% of the area has been transformed and erosion is very low.				
Geology & Soils	Red aeolian sand of Tertiary to Recent age (Kalahari Group) with silcrete and calcrete and some andesitic and basaltic lava of the Griqualand West Supergroup.				
Vegetation & landscape features	A very wide and diverse unit on plains with usually open tree and shrub layers with, for example, *Vachellia luederitzii*, *Boscia albitrunca* and *Searsia tenuinervis* and with a usually sparse grass layer.				
POSTMASBURG THORNVELD (SVK14): SMALL SOUTHWESTERN SECTION OF THE MRA ONLY					
Climate	Summer and autumn rainfall with very dry winters.				
	MAP (mm)	**MAT (°C)**	**MFD (days)**	**MAPE (mm)**	**MASMS (%)**
	306	17.0	27	2947	84
Altitude	1 180 – 1 440 m				

Distribution	Northern Cape Province: Limited area around Postmasburg along the short valley of the Groenwaterspruit to the northeast and southwest, west to Bermolli and around Heuningkrans.
Conservation	**LC**. Target 16%. None of the unit is conserved in statutory conservation areas, but very little has been transformed. Erosion is very low
Geology & Soils	Red aeolian sand of the Kalahari Group overlying the volcanics and sediments of the Griqualand West Supergroup that outcrop in places. Deep soils are of the Hutton form.
Vegetation & landscape features	Flats surrounded by mountains supporting open, shrubby thornveld characterised by a dense shrub layer and often lacking a tree layer; the grass layer is very sparse. Shrubs are generally low and with a karroid affinity.
DETAILS OF THE FOCUS AREA IN TERMS OF THE 2018 NATIONAL BIODIVERSITY ASSESSMENT	
NBA (2018) - Figure 5	The NBA (2018) classifies the Olifantshoek Plains Thornveld as **poorly protected** and the Kuruman Mountain Bushveld and the Postmasburg Thornveld as **not protected**. **DEFINITION:** Ecosystem protection level informs whether ecosystems are either adequately protected or under-protected. Ecosystem types are categorised as *not protected, poorly protected, moderately protected* or *well protected*, based on the proportion of each ecosystem type that occurs within a protected area recognised in the NEMPAA.
DETAILS OF THE FOCUS AREA IN TERMS OF THE 2022 RED LIST OF ECOSYSTEMS – TERRESTRIAL REALM	
RLE (2022) - Figure 5	According to the 2022 RLE dataset, the central portion of the Focus Area are located within the remaining extent of the **Kuruman Mountain Bushveld** vegetation type. The Eastern, northern and western sections of the Focus Area are located within the remaining extents of the **Olifantshoek Plains Thornveld** vegetation type. All the vegetation types have a **LC threat status**. The RLE dataset further indicates the **Kuruman Mountain Bushveld**, and the **Olfantshoek Plains Thornveld** ecosystems are **endemic** to South Africa. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. The revised list (known as the RLE 2022) is based on assessments that followed the IUCN RLE framework (version 1.1) and covers all 456 terrestrial ecosystem types described in South Africa (Mucina and Rutherford 2006; with updates described in Sieben et al., 2021). The revised list identifies 120 threatened terrestrial ecosystem types (55 Critically Endangered (CR), 51 Endangered (EN) and 14 Vulnerable (VU) types). Following a series of consultations with conservation authorities and the public in 2020/21, the revised list of terrestrial ecosystems that are threatened and in need of protection was the approved by the minister for implementation in august 2022. The revised list was published in the government gazette (Gazette Number 47526, Notice Number 2747) and came into effect on 18 November 2022.

NATIONAL PROTECTED AND CONSERVATION AREAS ASSOCIATED WITH THE MRA AND FOCUS AREA	
The NPAES (2018)[7], SACAD[8] (2024, Q3), SAPAD[9] (2024, Q3), and the IBA (2015) databases were checked to determine if any protected and/or conservation areas are located within 10 km of the MRA and Focus Area.	
SAPAD (2024, Q3); SACAD (2024, Q3); & NPAES (2018); & IBA (2015)	According to the NPAES 2018 database, the MRA and Focus Areas are **not located** within **Priority Focus Area, Negotiated Areas, or Protected Areas**. The SAPAD (2024; Q3) database indicates that the MRA and Focus Area are not located within 10 km of any protected areas. According to SACAD (2024; Q3) database, the MRA and Focus Area are not located within 10 km of any conservation areas. The MRA and Focus Area are not located within 10 km of an IBA.
STRATEGIC WATER SOURCE AREAS FOR SURFACE WATER (SWSAs; 2021)	
SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. they include transboundary areas that extend into Lesotho and Eswatini. The Sub-National Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide a complete coverage	
SWSAs for Surface Water (2021)	The MRA and Focus Area are not within 10 km of a Surface SWSA.
NORTHERN CAPE CRITICAL BIODIVERSITY AREAS (CBA) (2016)	
Critical Biodiversity Area (CBA) – Figure 6	The entire eastern section of the MRA and Focus Area is considered a CBA 1: Irreplaceable Area. A CBA is an area that must remain in good ecological condition in order to meet biodiversity targets for ecosystem types, species of special concern or ecological processes. CBAs can meet biodiversity targets for terrestrial or aquatic features, or both. Together with protected areas, the portfolio of CBAs identified in a biodiversity plan must collectively meet biodiversity targets for representation of ecosystem types and species of special concern and may also meet biodiversity targets for some ecological processes (SANBI, 2017).
Ecological Support Areas (ESA)	Majority of the central section of the MRA and Focus Area is classified as an **ESA**. ESAs are areas which must retain their ecological processes to meet biodiversity targets for ecological processes that have not been met in CBAs or protected areas. Similarly, ESAs are required to meet biodiversity targets for representation of ecosystem types or species of special concern when it is not possible to meet them in CBAs. These areas support ecological functioning of protected areas or CBAs or a combination of these (SANBI. 2017).
Other Natural Areas (ONA)	Small, scattered portions of the Focus Area and the eastern and western portions of the MRA are located within areas classified as **ONA**s.

	According to the Technical Guidelines for CBA Maps document ONA consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs (SANBI. 2017).
CBA Reasons	The 2016 Northern Cape CBAs database also includes the "reasons" layer, which is based on the planning units used in the spatial analysis and provides a list of biodiversity and ecological features found in each planning unit, which contribute to the biodiversity target (CBA Map Reason Metadata). According to this Northern Cape CBAs Reasons layer, the triggering biodiversity, and ecological features, for the CBA's, ESAs and ONAs within the MRA and Focus Areas include the following: Olifantshoek Plains Thornveld, Kuruman Mountain Bushveld, Postmasburg Thornveld, All Rivers, FEPA 500 m, FEPA subcatchment, Southern Kalahari Salt Pans, Landscape structural elements, all natural wetlands, and Conservation Areas.
NORTHERN CAPE PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK (NCPSDF, 2012)	
The NCPSDF is to function as an innovative strategy that will apply sustainability principles to all forms of land use management throughout the northern cape as well as to facilitate practical results, as it relates to the eradication of poverty and inequality and the protection of the integrity of the environment.	
The MRA and Focus Area occurs within the **Gamagara corridor (Figure 7)**. The Gamagara corridor comprises the mining belt of the John Taolo Gaetsewe and Siyanda districts and runs from lime acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese.	
CENTRES OF ENDEMISM	
The MRA and Focus Area are not situated within a centre for endemism.	
DETAIL OF THE FOCUS AREA IN TERMS OF THE MINING BIODIVERSITY GUIDELINES (2012)	
Highest Biodiversity Importance - Figure 8	According to the Mining and Biodiversity Guidelines database (2012), the eastern section of the MRA and Focus Area is located within an area identified as **Highest Biodiversity Importance.** **Risk for mining:** Highest risk to mining. **Implications for mining:** Environmental screening, EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision making for mining, water use licences, and environmental authorisations. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services.

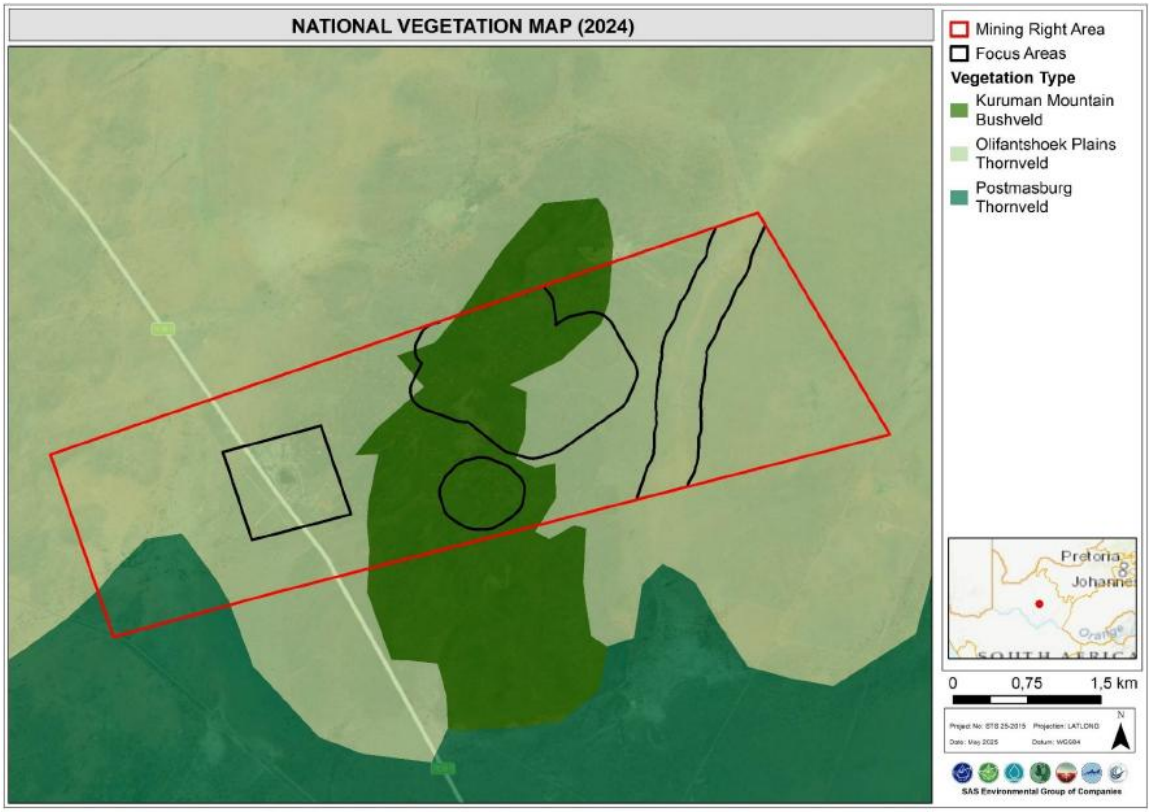


Figure 104: National VEGMAP (SANBI, 2024) of South Africa depicting the original extent of the vegetation types associated with the MIOM and Focus Areas (STS)

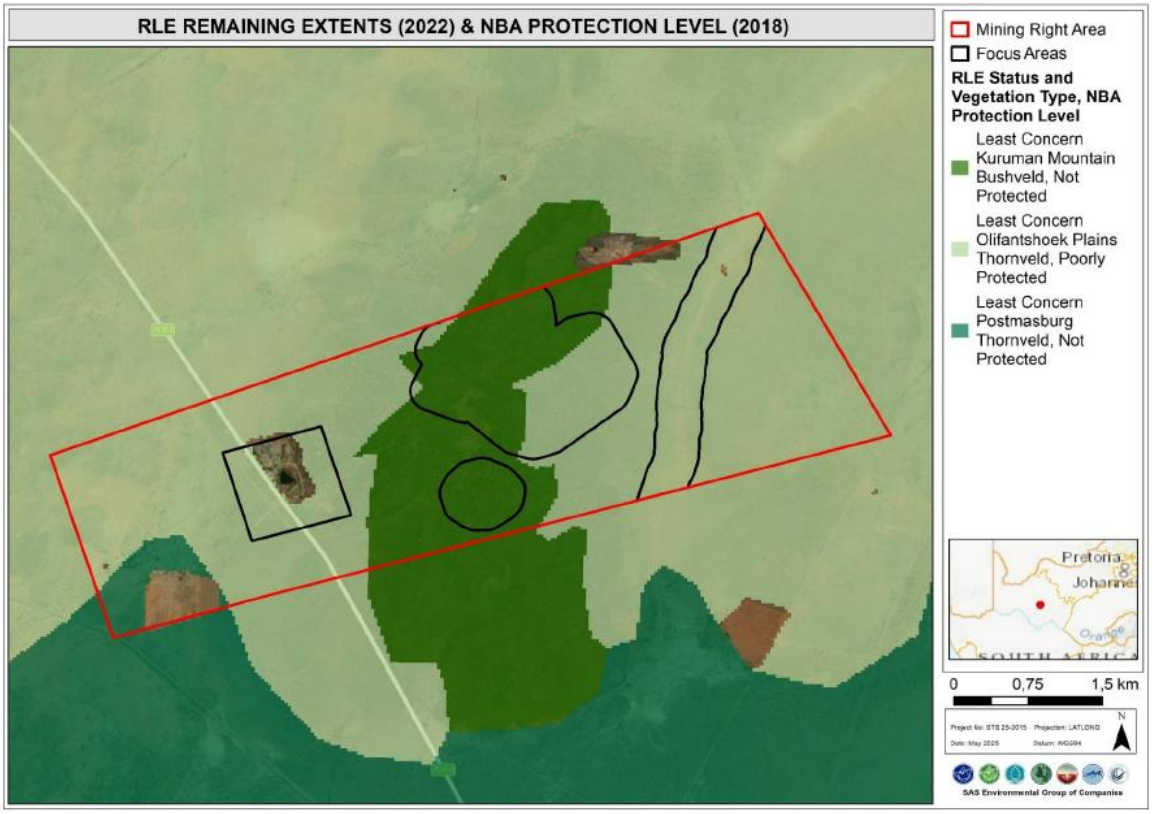


Figure 105: The remaining extent of threatened ecosystems, provided by the RLE database with the protection level of the vegetation types associated with the MIOM and Focus Areas as identified by the NBA 2018 database.

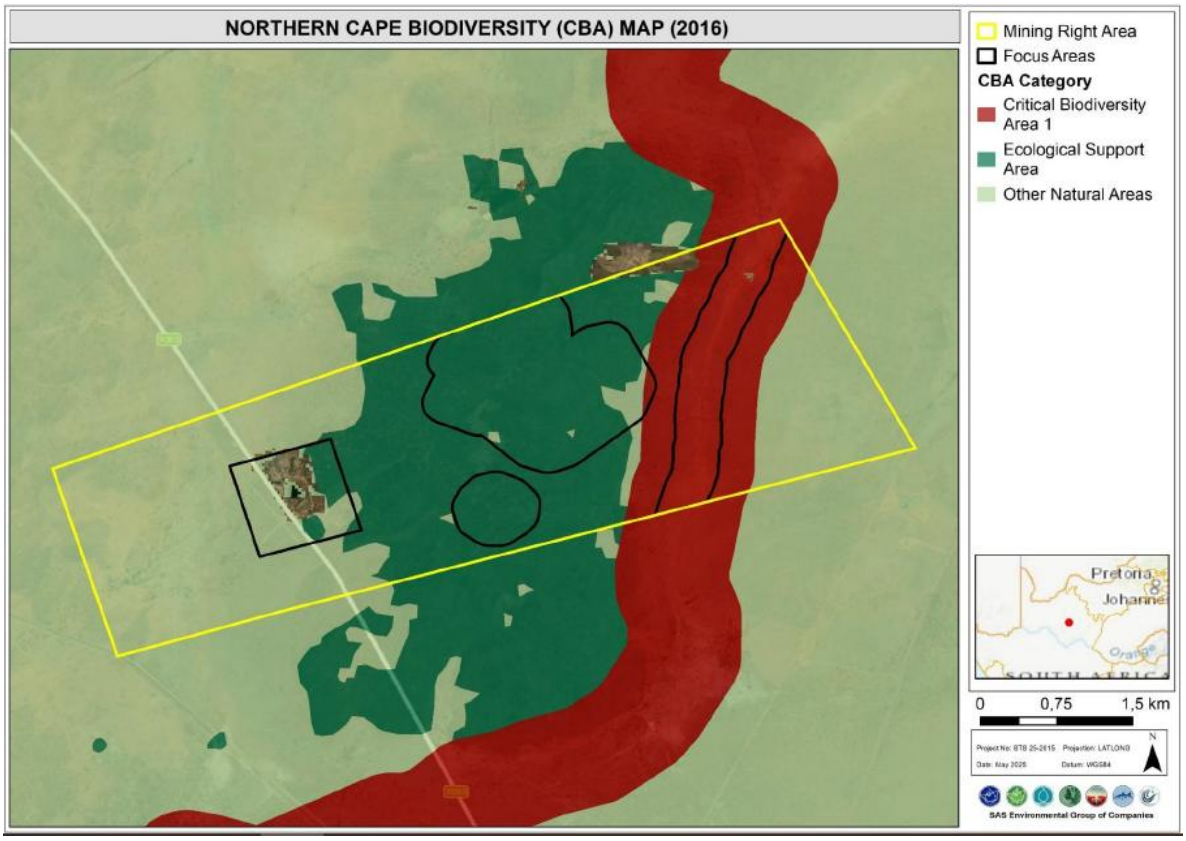


Figure 106: The CBAs and ESAs in relation to the MIOM and Focus Areas (STS).

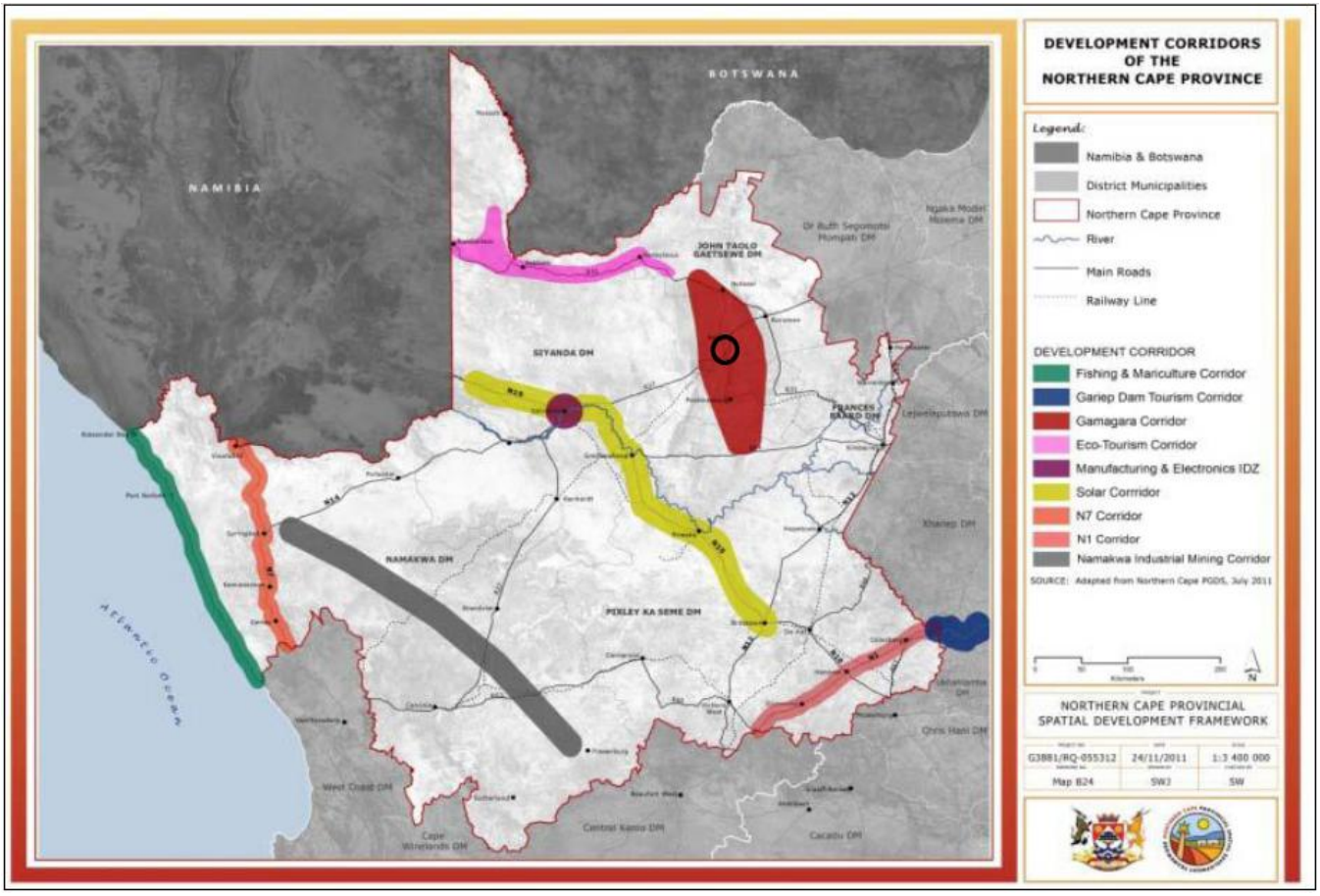


Figure 107: Development Corridors located within the Northern Cape, including the location of the MIOM and Focus Areas indicated by the black circle (STS)

8.3 Site Verification Report

The site verification and field assessments confirmed the low plant species theme sensitivity (as identified by the DFFE screening tool) for both the MIOM and the Focus Areas. However, the very high sensitivity for the terrestrial biodiversity theme was verified within the MIOM and the Focus Areas. The following table presents the site-verified results for the study area in comparison with the DFFE screening tool outcomes.

Table 62: Specialist comparison with the screening tool sensitivity rating and professional rating. The table further provides the specialist recommendation for biodiversity reporting (STS).

Theme	DFFE Screening Sensitivity	Comments	Specialist Proposed Sensitivity	Proposed Assessment	Applicable Legislation
Animal Species Theme	Low Medium	Although most of the MRA and Focus Areas are considered to be in an area of low sensitivity, with a small portion of medium sensitivity in the southwestern corner, these sensitivities were disputed after field verification and a high sensitivity was confirmed. The habitat within the MRA and Focus Areas supports one confirmed (*Smutsia temminckii* (Temminck's Ground Pangolin, VU) and several potential faunal SCCs with increased POC in these areas.	High	Animal Species Specialist Assessment	GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020 (as amended in GN 3717 of 2023).
Plant Species Theme	Low	No threatened species were triggered by the screening tool. Additionally, following ground-truthing, it was established that no threatened species are likely to occur within the Focus Areas.	Low	Terrestrial Plant Species Compliance Statement	GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species as published in Government Gazette 43855 dated 30 October 2020 (as amended in GN 3717 of 2023).
Terrestrial Biodiversity Theme	Very High	Portions of the study area, particularly the Freshwater Habitat was verified to be an CBA contributing to ecological functions and services within the Focus Areas and larger context.	Very High	Terrestrial Biodiversity Specialist Assessment	GN 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial
		The remainder of the Focus Areas (excluding the Freshwater Habitat, i.e., eastern portion of the Focus /study area) are not considered to be important ecological features (ESA) or representative vegetation of the Olifantshoek Plains Thornveld and Kuruman Mountain Bushveld vegetation types. Therefore, the CBA could not be confirmed for the remaining CBA area.	Low	Terrestrial Biodiversity Compliance Statement	Biodiversity as published in Government Gazette 43110 dated 20 March 2020

8.4 Results of the Floral Assessment

STS found that the Focus Areas has been significantly impacted by prospecting activities from 2022 to 2024. These historic prospecting activities has impacted the vegetation communities within the Focus Areas, especially in terms of the vegetation structure – i.e., the impacted areas were associated with a lower woody tree cover and a higher abundance of both small shrubs and grass species than expected from the reference vegetation (i.e., Kuruman Mountain Bushveld). Historic prospecting has resulted in the loss of fauna;

habitat resulting in displacement of many larger mammal and avifaunal species, leading to a general decline in population abundance within the Focus Areas. The ecosystems drivers (e.g., fire and herbivory) within the Focus Areas are present albeit modified, based on the proximity to the historic mining activities and agricultural activities (i.e., cattle grazing).

A portion of the Focus Areas (to the west) is situated within a historic diamond mine, this anthropogenic activity has significantly impacted the vegetation structure and composition of the surrounding vegetation, resulting in a compromised ecological state. The introduction of various Alien and Invasive Plants species (AIPs) and the extensive removal of the indigenous vegetation have degraded habitat integrity within the area. Additionally, the absence of post-closure rehabilitation activities and rehabilitations has further reduced ecological function, leading to an overall poor ecological condition, characterised by severely or irreversibly modified areas where composition, structure and ecological function has been compromised.

Within the far eastern portions of the Focus Areas, the landowner has also indicated that they have been spraying pesticides to decrease the population of *Prosopis glandulosa* (an AIP species); however the impact of the spraying is evident in the woody component throughout this section of the Focus Areas where native species such as *Senegalia mellifera* subsp. *detinens* are particularly observed to be affected (this is mostly evident in the far eastern section of the Focus Areas).

8.5 Vegetation Types, Fine Scale Habitats, and Ecological Overview

Following the site assessment, four (4) broad habitat units (with associated subunits) were identified within the Focus Areas that were based on the main vegetation types. The identified habitat units are as follows (also refer to *Section 3.3.1 – 3.3.3* of the Biodiversity Assessment attached as Appendix J):

1. **Kuruman Mountain Bushveld (±274 ha):** The Kuruman Mountain Bushveld habitat is represented by a short closed thornveld. The majority of the Kuruman Mountain Bushveld habitat unit meets the definition of indigenous vegetation as per the NEMA definition. However, large portions of this habitat unit have been recently impacted by prospecting activities, which only ceased end of 2024 therefore these sections of the Kuruman Mountain Bushveld are not considered indigenous vegetation. In some of the initial prospecting site indication of secondary succession is visible.

The Kuruman Mountain Bushveld is associated with various terrain of the Focus Area including rocky hills and valleys;

2. **Olifantshoek Plains Thornveld (±119 ha):** This habitat is mostly associated with the eastern portions of the Focus Areas. Overall, the vegetation structure included a tall open to semi-closed thornveld with a sparsely developed woody layer and a well-developed grass layer. The vegetation within this habitat is considered to be indigenous vegetation;

3. **Freshwater Habitat (±114 ha):** This habitat was associated with two watercourses characterised as Episodic Drainage Lines riparian (EDL) (without habitat). However, various Preferential Flow Path (PFP) were also identified however these features do not meet the requirements of a watercourse. The EDL and PFP are located within the central Focus Areas. The vegetation structure of both the EDL and PFPs are identical to the surrounding Kuruman Mountain Bushveld vegetation. The EDL and PFP was identified with their distinct topography (in low laying areas and following natural channels) and often showing a lack of vegetation (with a rock base). The Freshwater Habitat also includes a Recharge area that is not considered true watercourse based on the definition provided by the NWA. The vegetation associated with the Recharge area was predominantly comprised of grasses and forbs with a scattered presence of shrubs;

4. **Transformed Habitat (33 ha):** The Transformed Habitat is mostly represented by the historic mining areas and mining infrastructure and farmhouses. The floral communities associated with this habitat unit have been significantly compromised due to anthropogenic activities and comprise mostly of AIPs and pioneer species. The Transformed Habitat has been severely impacted and is in an overall poor ecological condition. The Transformed sub-unit is not considered to be indigenous vegetation since it has undergone significant clearance of vegetation and significant soil disturbance within the past 10 years (NEMA). The Transformed Habitat occurs mostly in the western extent of the Focus Areas. Within this sub-unit, no clear vegetation structure can be linked to these areas as the natural vegetation structure has been altered or completely transformed (through mining activities). Furthermore, the Transformed Habitat has experienced a shift, in terms of species composition, structure and

function, from the reference vegetation types. This habitat is dominated by AIPs and invasive species and does not provide suitable habitat for threatened Floral SCC; however, the possibility of provincially protected species (NCNCA) is considered high with common occurring species such as *Gomphocarpus frutcosus* observed on site.

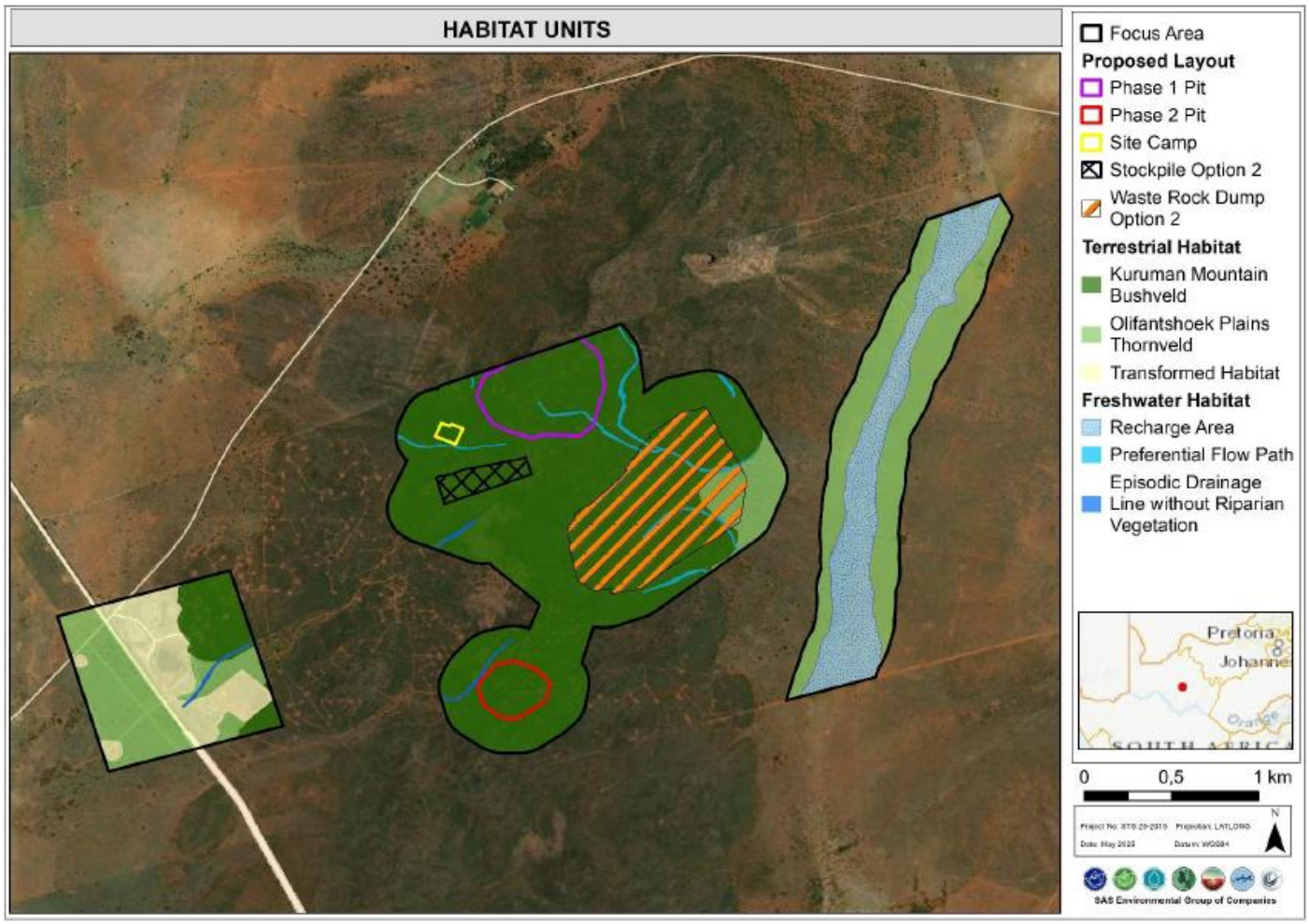


Figure 108: Proposed layout associated with terrestrial habitat units found within the Focus Areas (STS).

8.6 Biodiversity Priority Areas / Conservation Significance

The conservation features and how they pertain to the habitat units identified for the Focus Areas are presented in the below table.

Table 63: Biodiversity Priority Areas / Conservation Significance (STS).

Ecological Support Area (ESA) 1 [11]	The majority of the Focus Areas are identified as an ESA by the Northern Cape CBA database (2016). According to this Northern Cape CBAs Reasons layer, the triggering biodiversity, and ecological features, for the ESAs and ONAs within the Focus Areas include the following: Olifantshoek Plains Thornveld, Kuruman Mountain Bushveld, Postmasburg Thornveld, All Rivers, FEPA 500 m, FEPA subcatchment, Southern Kalahari Salt Pans, Landscape structural elements, all natural wetlands, and Conservation Areas. Therefore, since the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld are considered to be representatives of the reference vegetation types, the presence of ESA is confirmed in these Habitat units. Furthermore, the EDLs which are confirmed watercourses are also confirmed as ESA habitat.
Critical Biodiversity Area (CBA)	The entire eastern section of the Focus Areas is considered a CBA 1: Irreplaceable Area. A CBA is an area that must remain in good ecological condition in order to meet biodiversity targets for ecosystem types, species of special concern or ecological processes. CBAs can meet biodiversity targets for terrestrial or aquatic features, or both. The CBA associated with the Focus Areas mainly follow the distribution of the Recharge area identify with a buffer including the Olifantshoek Plains Thornveld and a portion of the Kuruman Mountain Bushveld. According to this Northern Cape CBAs Reasons layer, the triggering biodiversity, and ecological features, for CBAs, include the following: Olifantshoek Plains Thornveld, Kuruman Mountain Bushveld, Postmasburg Thornveld, All Rivers, FEPA 500 m, FEPA subcatchment, Southern Kalahari Salt Pans, Landscape structural elements, all natural wetlands, and Conservation Areas. The Recharge area, while not identified as a watercourse (SAS 25 – 0028, 2025), this feature is likely important from a hydropedological perspective where it contributes to the recharge of a downstream system. Therefore, based on the ecosystem service and functionality of the Recharge area this is regarded as a CBA. Furthermore, the presence of the Olifantshoek Plains Thornveld and the Kuruman Mountain Bushveld is confirmed but should be noted that these habitat unts does not represent sensitive ecosystems (sei-intact and impacted by anthropogenic activities) or any threatened species of concern. The CBA is therefore, confirmed for the eastern portions of the Focus Areas.
Highest Biodiversity Importance	The eastern portion of the Focus Areas are associated with a CBA 1 and ESA areas, since the CBA and ESA is confirmed for the Recharge area, Olifantshoek Plains Thornveld and Kuruman Mountain Bushveld this Highest Biodiversity Importance is also confirmed.

8.7 Alien and Invasive Plant (AIP) Species

A total of 16 AIP species were recorded during the March 2024 field assessment. Of the 16 AIPs recorded, eight (8) species are listed under NEMBA Category 1b, one (1) listed as NEMBA Category 3. The remaining seven (7) species are not listed (NL) under NEMBA, but these species are identified as problem plants as they can have a negative impact on the indigenous floral communities within and surrounding the Focus Areas. Refer to Table 2 of the STS report (Appendix J) for more information on the AIPs recorded on site.

Although the extent of AIPs within the Focus Areas is relatively low, AIPs can easily proliferate in areas of disturbance. As such, it is recommended that the invasive alien plan be updated to include all newly authorised activities.

8.8 Site Ecological Importance (SEI) and Areas of Concern

All habitats within the Focus Areas were allocated an importance category, i.e., SEI category. SEI is a function of the biodiversity importance (BI) of the receptor and its resilience to impacts (receptor resilience [RR]). BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor. For an SEI of "Very High" and "High", avoidance mitigation is recommended. The following table indicates the individual SEI scoring for each habitat unit respectively. Figure 65 indicates the SEI for the Focus Areas.

Table 64: SEI importance for the different habitat units associated with the Focus Area (STS).

Unit	CI	FI	BI	RR	SEI	Development Constraints
KURUMAN MOUNTAIN BUSHVELD	**Low** No confirmed or highly likely populations of threatened SCC are anticipated to occur within the Kuruman Mountain Bushveld habitat.	**Medium** This habitat is considered a large semi-intact area. However, the Kuruman Mountain Bushveld have been impacted upon by the historic prospecting activities. However, the negative ecological impacts are all considered to be past events and given the fact that some prospecting areas have shown signs of rehabilitation the habitat is still considered to provide habitat connectivity,	**Low**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Low**	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
OLIFANTSHOEK PLAIN THORNVELD	**Low** No confirmed or highly likely populations of threatened SCC are anticipated to occur within the Olifantshoek Plains Thornveld habitat.	**Medium** This habitat is considered to be an area of relatively small extent that is semi-intact with only minor current impacts. Current anthropogenic activities, such as grazing, have impacted upon the habitat integrity of this habitat unit. However, this habitat is still considered to provide narrow corridors of good habitat connectivity to the surrounding natural areas.	**Low**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Low**	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
FRESHWATER HABITAT: EDLs	**Low** No confirmed or highly likely populations of threatened SCC are anticipated to occur within the Freshwater Habitat.	**Medium** The EDLs are small however are considered semi-intact habitat. The EDLs provide narrow habitat connectivity. The EDLs have not been impacted by any major past event and only minor current negative ecological impacts have been observed.	**Low**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Low**	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities..
FRESHWATER HABITAT: RECHARGE ZONE	**Low** No confirmed or highly likely populations of threatened SCC are anticipated to occur within the Freshwater Habitat.	**High** The Recharge Zone is a large area of semi-intact habitat, however anthropogenic activities have impacted the integrity of this habitat. Indeed, some areas of the Recharge Zone has been extensively grazed and this has led to an increase in the presence of agricultural weeds and AIPs. Furthermore, the Recharge Zone is considered to be impacted by some major past ecological impacts (i.e., building of dam walls). Although the vegetation is considered modified the habitat still provides good habitat connectivity.	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities

Unit	CI	FI	BI	RR	SEI	Development Constraints
FRESHWATER HABITAT: PFP	**Low** No confirmed or highly likely populations of threatened SCC are anticipated to occur within the Freshwater Habitat.	**Low** The PFPs are very small in extent and provides only narrow corridors of good habitat connectivity. The PFPs has mostly sustained minor current negative ecological impacts with no major historic impacts identified.	**Low**	**High** Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low**	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.
TRANSFORMED HABITAT	**Very Low** No confirmed and highly unlikely populations of threatened SCC and no natural habitat remaining within the Transformed Habitat.	**Very Low** The Transformed Habitat provides no habitat connectivity except for flying species or flora with wind-dispersed seeds. The habitat is associated with several major current negative ecological impacts.	**Very Low**	**High** The Transformed Habitat is comprised of mostly short-lived species (majority of which are aliens or weeds) therefore, the Transformed Habitat is expected to be able to recover relatively quickly between 5–10 years (to the current state) to restore more than 75% of the original species composition and functionality.	**Very Low**	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

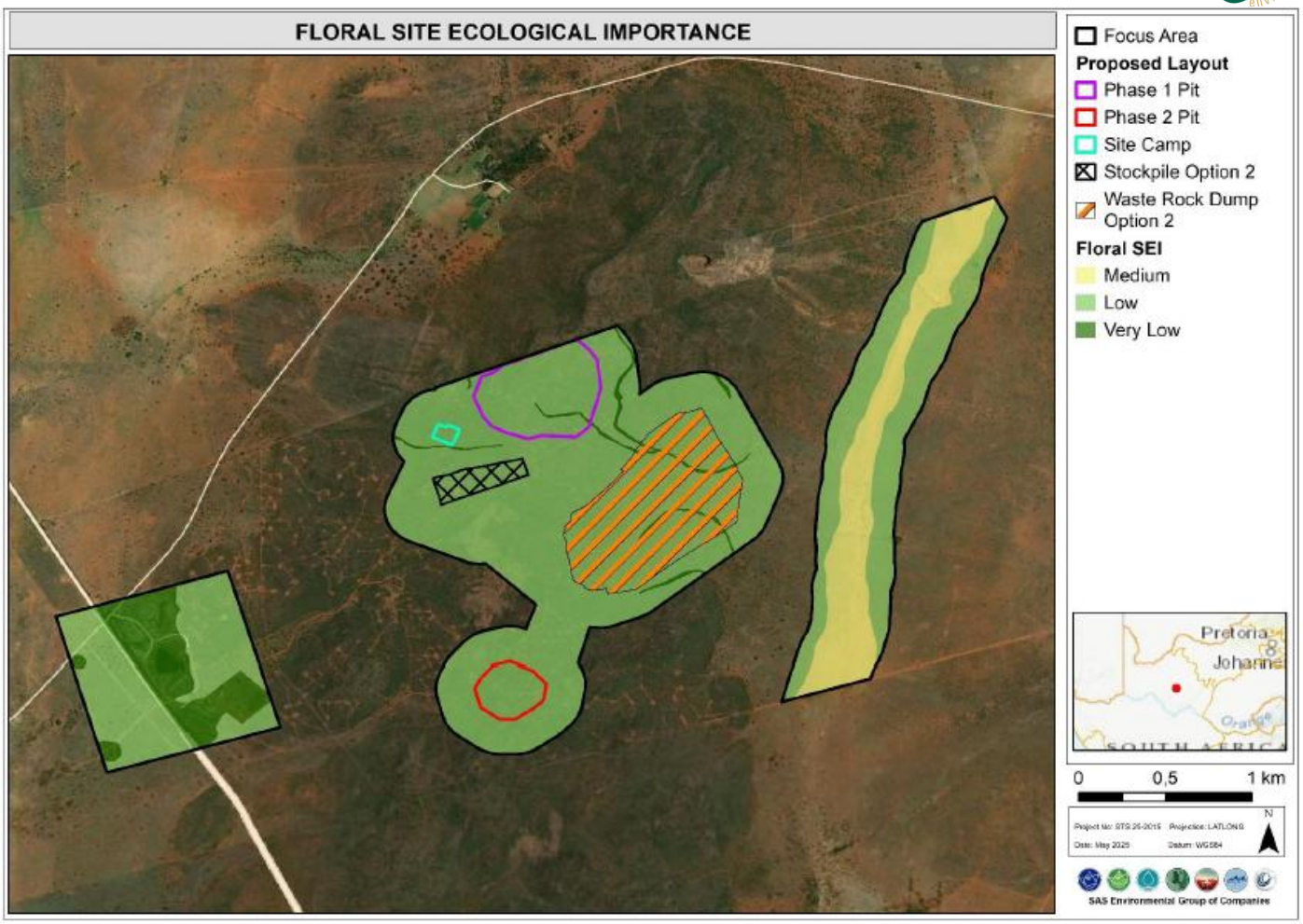


Figure 109: Conceptual illustration of the floral habitat sensitivity associated with the proposed layout (STS).

8.9 Impact Assessment

The following infrastructure is proposed for the MIOM:

- δ The proposed mining operations will include two open cast pits, a stockpile area and a waste dump area; and
- δ Offices, parking and other supporting infrastructure will be constructed as required.

The table below indicate the extent of habitat loss, of the habitat units within the Focus Areas, as a result on the proposed Makganyane mining activities.

Table 65: Impact on habitat units within the Focus Areas (STS).

Habitat Unit	Total extent (ha)	Proposed extent loss (ha)
Kuruman Mountain Bushveld	273,83	92,98
Olifantshoek Plains Thornveld	118,64	5,99
Transformed Habitat	32,46	NA
Freshwater Habitat		
Episodic Drainage Line	3,34	NA
Preferential Flow Path	102,52	2,98
Recharge Area	8,31	NA
Total Extent	539,13	101,95

The proposed activities and development exclude sensitive habitat (i.e., Medium SEI) namely the Freshwater Habitat: Recharge Area and is mostly positioned within habitats such as the Kuruman Mountain Bushveld.

Also refer to *Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts*.

8.10 Impact Discussion

The impact assessment was undertaken on all aspects of floral ecology deemed likely to be affected by the proposed MIOM application. The below sections provide a discussion of the impact assessment outcome in more detail.

8.10.1 Impact on Floral Habitat Diversity

The verified habitat conditions that were determined during the site visit indicated that the Recharge area (within the Freshwater Habitat) are of medium SEI, and the Kuruman Mountain Bushveld, Olifantshoek Plains Thornveld and EDL (within the Freshwater Habitat) of low SEI and the PFP (within the Freshwater Habitat) and Transformed Habitat are of very low SEI.

The proposed activities will largely impact on semi-intact habitat (i.e., Kuruman Mountain Bushveld), the impacted habitats within the Focus Areas are not regarded as sensitive floral communities, and the loss of floral species (and associated habitat) will not result in significant, negative residual impacts. These habitats were associated with low and very low SEI scores and thus no avoidance mitigation is recommended (SANBI, 2020).

However, minimisation and rehabilitation mitigation measures are the key focus in these habitats, ensuring that 1) loss of any remaining indigenous vegetation is reduced, 2) areas where mining-related disturbances took place outside of the mining footprints are rehabilitated and revegetated, and 3) additional, or potential cumulative, impacts to surrounding habitats (especially if more sensitive) must be managed and prevented.

The most significant, negative impacts stemming from the proposed activities will take place within the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld (lesser extent). Both these habitat units are in a fair ecological condition and support diverse floral communities as well as confirmed populations of protected plant species.

Indirect impacts that are anticipated from the proposed activities ranges from the potential spread of AIPs, the fragmentation of movement and dispersal corridors, sedimentation of Freshwater Habitat because of poor stormwater management and increased erodibility of watercourses. These indirect impacts can result in degradation of habitats and species beyond the proposed footprints and must be strictly managed if the proposed footprints are authorised. If managed, the indirect impacts can remain limited in their extent and the perceived effects on floral ecology can be kept to a local scale. Mitigation of indirect impacts is more feasible and achievable than for direct impacts.

Considering the mitigation hierarchy, the proposed activities are avoiding loss of sensitive floral habitat and species by optimising layouts within partially modified habitats. However, with the current layout, loss of sensitive flora (Provincially and Nationally protected species) is unavoidable. Restoring the “woodland” habitats (Kuruman Mountain Thornveld and Olifantshoek Plains Thornveld) post-mining has a moderately low to moderate probability of success (since the duration of activities are considered low) and therefore the loss of these habitats will not result in significant (depending on the activity, open cast pits will have a far greater impact on vegetation communities than stockpile or temporary structures), negative residual impacts to the associated floral communities, if concurrent rehabilitation is implemented. Therefore, the decommissioning and closure phase can improve the overall condition of the vegetation communities (including ecological processes) when adequately reinstated through

effective rehabilitation activities. This is especially true for habitats that are currently of low ecological integrity (i.e., Transformed Habitat and impacted Kuruman Mountain Bushveld).

8.10.2 Impact on Floral SCC

Of the threatened species assessed (i.e., VU, EN, CR, or NT species), none were recorded within the Focus Areas. Therefore, the proposed activities are not anticipated to directly impact on any populations of threatened species within the Focus Areas.

However, several species protected under the NCNCA, TOPS and NFA were recorded or are likely to occur within the Focus Areas. These species will require marking as part of final site walkdowns prior to vegetation clearing activities. Permit applications are required for the removal of NCNCA-protected species, and DFFE for nationally protected trees and/or TOPS species, and it is recommended that species be relocated out of the proposed mining footprints and not destroyed (where possible for some provincially protected species and TOPS species, however protected trees have a low likelihood of success after relocation therefore the permit should indicate destruction of the individuals). Permits from the Northern Cape Environmental Department and from the DFFE should be obtained to remove, cut, or destroy any of the above-mentioned protected and/or threatened species before any vegetation clearing may take place.

To determine the number of protected species that will be impacted, a detailed walkdown of the footprint areas must take place within the optimal flowering season of all or most of the anticipated SCCs. This will be an essential step in determining accurate numbers of protected species (and population sizes) within the proposed project footprints. A species rescue and relocation plan along with monitoring methods is recommended. All rescue and relocation activities (successes, failures, exact number of species rescued) must be documented and monitored until it is evident that the species have successfully established within the relocated areas.

8.10.3 Impact on CBAs, ESAs, Threatened Vegetation and Protected

The proposed mining activities will impact on ESAs within the Focus Areas. Loss of ±115 ha of ESA habitat is anticipated to take place if the proposed mining project is authorised. The ESA is already considered to be impacted

by the surrounding mining activities (i.e., extensive prospecting activities). The isolated and fragmented nature of the disturbance within Focus Areas is not expected to significantly alter the functioning of the ESA as the majority of the larger ESA remains intact. However, the fragmentation of the associated movement and dispersal corridors within the ESA will result in impeded ecological processes and drivers, thus resulting in local scale impacts over the long term. It should be noted that the CBA will not be impacted upon by the proposed mining activities, and by managing edge effects to the ESA adequately the impact on the surrounding CBA is considered to be low.

8.10.4 Probable Residual Impacts

Several of the habitats that will be affected by the proposed mining activities have historically been impacted by mining activities (e.g., prospecting) and/or transformed to varying degrees.

Although ESAs will be impacted, the extent of these impacts is expected to be isolated, with no anticipated landscape-level effects on broader ecological processes. While the proposed mining activities will still result in some residual impacts, these are not considered significant in nature, as they do not involve critical or irreplaceable biodiversity elements, such as RLEs or CBAs, which would typically trigger the need for a formal biodiversity offset. Even with extensive mitigation, residual impacts on the receiving floral ecological environment are deemed likely. The following points highlight the key residual impacts that have been identified:

- Permanent loss of and altered floral species diversity;
- Edge effects such as further habitat fragmentation and AIP proliferation;
- Permanent loss of floral SCC and suitable habitat for such species; and
- Disturbed areas not rehabilitated to an ecologically functioning state with resulting significant loss of floral habitat, species diversity, and SCC/protected floral species likely to be permanent.

8.10.5 Cumulative Impacts

For the assessment of potential cumulative impacts on vegetation and plant species associated with the proposed activities, consideration was given to past, present, and future (known) projects and natural drivers that affect these aspects. Four areas of concern were identified:

- **Habitat fragmentation:** The proposed project will result in fragmentation of the landscape (including ESA habitat);

- **Spread of AIPs:** Numerous AIPs were recorded within the current Focus Areas, and these species pose a considerable risk to the habitat integrity of the remaining areas of natural, intact habitats. Potential poor AIP management from the mine as well as additional disturbances from mining edge effects may contribute to the spread of such species and a consequent cumulative decrease in habitat integrity within the Focus Areas and surrounds. Leading to possible degradation of important biological features such as ESAs and CBAs; and

- **Impacts to SCC population dynamics:** Should the proposed application be authorised and granted, the habitat for of provincially and nationally protected species will be impacted upon, and cumulative loss of these species are anticipated.

8.11 Conclusion

The highest impacts are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas (i.e., indigenous vegetation), of varying SEI (mostly low SEI), being cleared. The anticipated impacts within the more sensitive habitat units namely Kuruman Mountain Bushveld and Freshwater Habitat (EDL and Recharge area) resulting in the highest impact scoring. However, based on the proposed layout the majority of the planned activities will be taking place in the less sensitive habitats and sensitive habitat are mostly avoided, with only minor activities taking place in the Freshwater Habitat (EDL).

Based on the above, it is the floral specialists' opinion that the project may be approved, provided that a floral walkdown (of the footprint areas) is implemented to ensure all possibly occurring floral SCC are relocated before vegetation clearing commences, and that stringent mitigation measures are implemented including monitoring of the footprint extents (including edge effects management) to ensure no additional loss of ESA integrity and functioning.

9. SITE SPECIFIC FAUNA

9.1 DFFE Screening Tool Result

The DFFE screening report classifies the Animal Species Theme Sensitivity of the area as depicted in the following figure.

Figure 110: Animal species theme sensitivity according to the DFFE screening report (2024).

Scientific Terrestrial Services (STS) was accordingly appointed to assess and discuss the faunal sensitivity of the study area.

9.2 Faunal Assessment Results

9.2.1 Existing Impacts

The Focus areas have been significantly impacted by prospecting, from 2022 to 2024. The historic prospecting has impacted the vegetation communities within the Focus areas and resulted in the displacement of many larger mammal and avifaunal species, leading to a general decline in population abundance within the Focus areas. The ecosystem drivers (e.g., fire and herbivory) within the Focus areas are present albeit modified, based on the proximity to the historic mining activities and surrounding agricultural activities (i.e., cattle grazing).

A portion of the Focus Areas (to the west) is situated at a historic diamond mine, and this anthropogenic activity has impacted the vegetation structure

and composition of the surrounding vegetation, resulting in a compromised vegetation composition through the introduction of various Alien and Invasive Plants species (AIPs) and the removal of the indigenous vegetation. Therefore, the habitat integrity of the vegetation surrounding the old mining activities has decreased and considering that the post-mine closure activities and rehabilitations have been neglected the state of this area is in an overall poor ecological condition. The old pit of the historic diamond mine which is filled with freshwater does however supply drinking water for faunal species.

Within the far eastern portions of the Focus areas, the spraying of herbicides to decrease the population of *Prosopis glandulosa* is evident in the woody component throughout this section of the Focus areas.

9.2.2 Faunal Habitat

Based on the results of the field investigations undertaken in April 2025, the following habitat units were identified within the Focus Areas. These habitat units are discussed briefly in terms of faunal utilisation and importance. For a more detailed description and discussion of these habitat units in terms of the vegetative composition refer to *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 8.5 Vegetation Types, Fine Scale Habitats, and Ecological Overview* above.

1. **Kuruman Mountain Bushveld:** The rocky nature of this habitat provided shelter and suitable habitat for reptiles, small to medium mammals and arachnids while the increase in vegetation attracted an increase in avifaunal and insect species. This habitat unit has the potential to support faunal SCC with an affinity for more rocky areas.

2. **Olifantshoek Plains Thornveld:** The varied habitat structure, with trees and shrubs interspersed among the grass, provides suitable shelter for fauna and is especially favoured by avifauna, which were notably abundant in this area, albeit only common species being observed. This habitat unit has the potential to support faunal SCC with an affinity for more open areas with more prominent grass layers.

3. **Freshwater Habitat (EDLs & PFPs):** While the Recharge area has the potential to support several faunal SCC the PFPs and EDLs also serve as an important movement corridor for fauna and play an important role in connectivity within the landscape.

4. **Transformed Habitat:** Due to these disturbances, which have reduced the availability of forage and shelter, these areas are not favourable for fauna habitation.

The findings of each faunal class associated with the various habitat units are presented as a “dashboard” report below.

Table 66: Field assessment results pertaining to mammal species within the Focus Areas (STS).

Mammal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Atelerix frontalis (Southern African Hedgehog)	This species occurs across a variety of habitats in Southern Africa. This species may potentially be found in the Mountain Bushveld and Thornveld habitats as well as along the edges of the Freshwater Habitat associated with the Focus Areas. The Focus Areas is within the known distribution of this species.	NT	Medium
Felis nigripes (Black footed Cat)	This species is found in the arid south and central parts of southern Africa in open dry habitats that have some vegetation cover. The Bushveld and Thornveld habitats may be utilised by this species in the Focus Areas. The Focus Areas is within the known distribution of this species.	VU	Medium
Smutsia temminckii (Temminck's Ground Pangolin)	This species has a wide distribution North of the Orange River in South Africa. It prefers woodland, grassland and rocky hills. The Mountain Bushveld and Thornveld Habitat in the Focus Areas are favourable habitats for this species. Two of the farmers from different properties within the MRA have confirmed the presence of this species on their properties. One of the farmers also provided photographs of this species taken on their property.	VU	**Confirmed**
Mellivora capensis (Honey Badger)	The Honey Badger has a widespread distribution across South Africa and is found in most habitats. The Bushveld and Thornveld habitats may be utilised by this species. The Focus Areas is within the known distribution of this species.	P - TOPS	Medium

Vulpes chama (Cape Fox)	The Cape Fox prefers open areas such as arid shrub and grasslands. The Bushveld and Thornveld habitats provide potentially suitable habitat for this species in the Focus Areas. They mostly feed on rodents, hares, insects and carrion. The Focus Areas is within the known distribution of this species.	P - TOPS	Medium

Mammal Discussion

A lower than expected abundance and diversity of mammals were observed in the Focus Areas likely due to the existing farming activities, historical prospecting and mining activities, potential hunting and trapping and the overall skittish nature of mammal species in the presence of humans. The Mountain Bushveld provides suitable habitat for some smaller to medium mammal species, whilst the remaining habitats have the potential to support a higher diversity of larger mammal species and provide grazing mammals with forage opportunities and some shelter. Transformed and more degraded areas are particularly devoid of mammals although some common species may occur particularly those that are adapted to exist in anthropogenically disturbed environments. Mesopredators will occur within the Focus Areas and surrounds, but large predators were completely absent from the Focus Areas and are not expected to occur within. The Freshwater Habitat (EDLs) although limited within the Focus Areas, serve as an important movement corridor for mammals travelling between habitats within the Focus Areas and landscape. This habitat may also provide a seasonal water source for mammals after rainfall.

The Focus Areas is connected to natural open areas surrounding it, ensuring ample habitat for mammals. The activities of farming, historical mining, and prospecting, as well as potential hunting and trapping in both the Focus Areas and its surroundings, most likely reduced the diversity and abundance of mammal species that were once present in the region. Despite fencing within and around the Focus Areas, most mammal species are still able to overcome these by crawling under, moving through or jumping over.

Common mammal species observed or signs thereof, apart from the photographs above, include *Geosciurus inauris* (Cape Ground Squirrel), *Raphicerus campestris* (Steenbok), *Lupulella mesomelas* (Black-backed Jackal), *Hystrix africaeaustralis* (Porcupine), *Cynictis penicillata* (Yellow Mongoose), *Sylvicapra grimmia* (Grey Duiker), *Lepus saxatilis* (Scrub Hare) and *Phacochoerus africanus* (Warthog). Although no mammal SCC was flagged by the screening tool or observed during the field assessment; one species, *Smutsia temminckii* (Temminck's Ground Pangolin, VU) was confirmed within the MRA by two different landowners. Several additional mammal SCCs and protected species have an increased POC within the Focus Areas. These species include: *Mellivora capensis* (Honey Badger, P- TOPS), *Atelerix frontalis* (Southern African Hedgehog, NT), *Felis nigripes* (Black footed Cat, VU), and *Vulpes chama* (Cape Fox, P-TOPS).

Table 67: Field assessment results pertaining to avifaunal species within the Focus Areas (STS).

Avifaunal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Gyps africanus (White-backed Vulture)	The white-backed vulture inhabits woodland regions of southern Africa. It relies on large mammalian carcasses as a food resource and very occasionally takes live prey. The Focus Areas may potentially be utilised for foraging but no breeding will occur in the herein as suitable large trees are mostly absent from the Focus Areas.	CR	Medium
Cursorius rufus (Burchell's Courser)	The Burchell's Courser is near endemic to South Africa and occurs widely in a fragmented pattern over arid interior regions. Open desert and semi-desert habitat with very sparse vegetation cover is its preferred habitat.	VU	Medium
Sagittarius serpentarius (Secretarybird)	This species favours open grassland and scrub with sufficient scattered trees for roosting/nest sites. The *Senegalia-Tarchonanthis* Thornveld may be utilised by this species in the Focus Areas where they may hunt reptiles, small mammals or invertebrates.	EN	High
Falco biarmicus (Lanner Falcon)	The Lanner Falcon occurs in open grassland, cleared woodland and agricultural fields where they will hunt birds, small mammals, reptiles and insects. Cliffs are favoured nesting sites but pylons, trees and building structures can also be utilised. The Kuruman Mountain Bushveld, Rocky Outcrops and the *Senegalia-Tarchonanthis* Thornveld may be utilised by this species in the Focus Areas.	VU	Medium
Polemaetus bellicosus (Martial Eagle)	The Martial Eagle occurs in a variety of habitats but prefers mesic and arid savanna and it is also commonly found in open shrubland and forest edges. The Kuruman Mountain Bushveld and *Senegalia-Tarchonanthis*	EN	Medium

	Thornveld may be utilised by this species for foraging purposes, but this species is unlikely to breed within the Focus Areas.		
Aquila rapax (Tawny Eagle)	Tawny Eagles are found in lightly wooded savannah and thornveld as well as semi-desert habitats. Scavenging and piracy are two of the most important foraging strategies for Tawny Eagles. The Focus Areas may provide suitable habitat for the Tawny Eagle.	EN	Medium
Coracias garrulus (European Roller)	Non-breeding migrant ranging from Morocco to southwestern and central Europe with its non-breeding range within Africa. European Rollers make use of abandoned excavated burrows and natural cavities as they are hole-nesters. Potential suitable habitat for this species may be found throughout the Focus Areas.	NT	Medium
Neotis ludwigii (Ludwig's Bustard)	Ludwig's Bustard is near-endemic to the region, primarily found in western Namibia and western South Africa. Within this area, they mostly inhabit the dry Karoo region of western South Africa. Ludwig's Bustards have a diverse diet, including small ground-dwelling animals such as insects and vertebrates. Their preferred food is the locust, which is abundant in their habitat. They are also known to eat flowers and seeds. There are recorded sightings of this species south of the Focus Areas, and given the presence of suitable habitat, they may potentially inhabit the Focus Areas.	EN	Medium
Ardeotis kori (Kori Bustard)	This species prefers dry, open savanna, Dwarf shrublands in the Nama Karoo and occasionally western grasslands that have clumps of trees near watercourses. This species has previously been recorded in close proximity to the current Focus Areas and has a high probability of occurring within the Focus Areas.	NT	High

Avifaunal Discussion
Avifaunal diversity associated with the Focus Areas appeared to be restricted to common species, with the more generalist and adaptable species being abundant. For avifauna, vegetation structure is commonly accepted as a primary determinant of avifaunal assemblages. The Thornveld Habitat and Mountain Bushveld Habitat offered the most structurally diverse habitats in the Focus Areas and appeared to contain the highest diversity of avifauna. Open patches with more grass species are also present in the eastern parts of the MRA providing locations of altered structure for avifauna preferring open landscapes. However, the vegetation here remains homogenous limiting resource opportunities. Anthropogenic structures such as fences do not restrict the movement of avifaunal species, making them capable of utilising the whole Focus Areas and surrounding landscape. Common avifaunal species observed during the field assessment include: *Emberiza flaviventris* (Golden-breasted Bunting), *Curruca subcoerulea* (Chestnut-vented Warbler), *Lanius minor* (Lesser Grey Shrike), *Streptopelia capicola* (Cape Turtledove), *Pycnonotus nigricans* (Red-eyed Bulbul), *Vidua regia* (Shaft-tailed Whydah), *Lophotis ruficrista* (Red-crested Korhaan) and *Lophoceros nasutus* (African Gray Hornbill) to name a few (refer to Appendix C for the full list of species identified on-site). The avifaunal species observed mostly consisted of small insectivores, granivores and mixed feeders. Predatory birds that were observed consisted of common species such as, *Melierax canorus* (Pale Chanting-Goshawk), *Polihierax semitorquatus* (Pygmy Falcon) and *Falco rupicolus* (Rock Kestrel). Other raptor species are likely to be present, as their wide-ranging habits suggest they may still forage in the area. Most birds seemed to avoid the Transformed Habitat and preferred the more natural adjacent habitat units. The diversity of bird species was highest in the Kuruman Mountain Bushveld Habitat and Thornveld Habitat, where the vegetation structure was more diverse and provided better opportunities for foraging and shelter. No avifaunal SCCs were observed during the field assessment, although several have the potential to occur in the Focus Areas. The online screening tool triggered a medium sensitivity for *Neotis ludwigii* (Ludwig's Bustard, EN) in the MRA. This sensitivity was confirmed as potential foraging habitat is available for this species. *Sagittarius serpentarius* (Secretarybird, VU) and *Ardeotis kori* (Kori Bustard, NT) both have a high POC within the Focus Areas as suitable habitat is available (notably in the more open areas) and as records of these species exist around the MRA. Other avifaunal SCCs which can potentially be found within the Focus Areas include *Gyps africanus* (White-backed Vulture, CR), *Aquila rapax* (Tawny Eagle, EN), *Cursorius rufus* (Burchell's courser, VU), *Falco biarmicus* (Lanner Falcon, VU), *Polemaetus bellicosus* (Martial Eagle, EN) and *Coracias garrulus* (European Roller, NT).

The proposed development in the Focus Areas will impact the availability of habitat for avifauna, leading to habitat loss and fragmentation. This will cause the dispersal of many bird species to adjacent habitats, reducing their abundance and diversity within the Focus Areas. The relocated species will possibly face increased competition for food and space in the surrounding areas. Furthermore, the development will lead to the localised loss of habitat, diversity, and bird abundance, while edge effects such as noise, dust, and potential expansion of the project footprint will impact bird species in the immediate vicinity. In addition, the increased movement of vehicles due to the new development may lead to higher avian mortality rates from collisions.

Table 68: Field assessment results pertaining to herpetofauna species within the Focus Areas (STS).

Herpetofaunal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Pyxicephalus adspersus (Giant Bullfrog)	Inhabiting various vegetation types within Grassland, Savanna, Nama Karoo, and Thicket biomes, this species typically reproduces in seasonal, shallow, grassy pans situated in flat, open areas. It also utilises non-permanent vleis and shallow water along the edges of waterholes and dams. While occasionally found in clay soils, it exhibits a preference for sandy substrates. Artificial ponding, within the Focus Areas, after heavy rainfall events may support this species by providing suitable breeding and aestivation sites as well as food resources. Bullfrogs typically emerge from aestivation after the first rains of the season following winter. They will emerge from their burrows between October and March (most active between November and January) during or after heavy rainfall events.	TOPS - Protected	**Medium**
Herpetofauna Discussion			
No reptile SCCs were observed during the site visit or are expected to occur within the Focus Areas and associated habitats. The overall reptile abundances are expected to be higher than that which was observed as habitat, shelter and food were present throughout the Focus Areas notably within the Mountain Bushveld Habitat. Reptiles are inherently secretive and shy, making their detection and identification in the field challenging (specifically during site visits of limited duration). Although reptile observations were limited abundance and diversity are expected to be the highest in the Mountain Bushveld habitat as it provided good shelter, basking opportunities and food resources for reptiles. Common reptile species that might be found within the Focus Areas include *Varanus albigularis* (Rock Monitor, LC), *Naja nivea* (Cape Cobra, LC), *Pachydactylus capensis* (Cape Gecko, LC), *Zygaspis quadrifrons* (Kalahari Dwarf Lizard, LC), *Pedioplanis inornata* (Plain Sand Lizard, LC), *Psammophis leightoni* (Cape Sand Snake, LC), *Chamaeleo dilipis* (Flap-neck Chameleon, LC), *Acontias occidentalis* (Western Legless Skink, LC), *Bitis arietans arietans* (Puff Adder, LC) and *Agama aculeata* (Ground Agama, LC) to name a few.			

The clearance of vegetation is anticipated to prompt the localised migration of reptile species from the Focus Areas into the surrounding areas. This migration may elevate competition for food resources and habitat in the adjacent regions, potentially leading to a reduction in both abundance and diversity levels as a consequence of heightened resource competition. This effect on species diversity is expected to be limited, while reptile abundance is likely to diminish owing to edge effects impacting reptile species and their food resources in the immediate proximity of the development footprint. Moreover, the amplified vehicle movement to and from the footprint areas, along with increased human-wildlife conflict, is likely to heighten the risk of persecution for reptile species.

One TOPS-protected amphibian species has a medium POC within the study area, namely *Pyxicephalus adspersus* (Giant Bullfrog P-TOPS). Although there are no known records of this species in close proximity to the Focus Areas, the Focus Areas remains within the overall distribution range of the species. No amphibian species were observed during the site visit, however several common species may potentially be found within, such as *Tomopterna adiastola* (Confused Sand Frog), *Kassina senegalensis* (Bubbling Kassina), *Xenopus laevis* (African Clawed Frog) and *Breviceps adspersus* (Common Rain Frog). While the arid environment of the Focus Areas and the sparse presence of permanent watercourses or waterbodies lessen its suitability for amphibians, rainfall events create temporary ponds that can facilitate amphibian breeding and presence within the Focus Areas.

Table 69: Field assessment results pertaining to herpetofauna species within the Focus Areas (STS).

Invertebrate SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Opistophthalmus carinatus (Robust Burrowing Scorpion)	This species is found in a wide range of vegetation and soil types that have varying topography and geology. Rocky habitats on hillsides and at the bases of hills are the preferred habitat. The Mountain Bushveld Habitat may be a suitable habitat for this species.	P - TOPS	Medium
Opistophthalmus wahlbergii (Kalahari Burrower)	This species is found on sand dunes that typically have woodland vegetation. They also are found around human infrastructure. This species can be expected to be found in the more sandy areas of the Thornveld habitat.	P - TOPS	Medium
Harpactira sp (Common Baboon Spiders)	Baboon spiders live in silk-lined burrows under stones or large pieces of wood. Suitable habitat for these species can be found in the Mountain Bushveld and Thornveld Habitats within the Focus Areas.	P - TOPS	Medium
Invertebrate Discussion			
Insect abundance was high on site but consisted of a moderate diversity that was dominated by common species in the orders: Coleoptera (beetles), Orthoptera (crickets and grasshoppers) and Lepidoptera (moths and butterflies). Insects are the most common macro-organisms in landscapes and play a vital role in ecosystem functioning. High insect abundance and diversity typically indicate a healthy landscape. Insects serve as pollinators, help recycle nutrients back into the soil, and reduce the parasitic load in an environment by recycling dung back into the ground. They also provide a valuable food source for other faunal species. Low insect diversity and abundance may lead to reduced sustainability for other animal species and less effective ecosystem functioning.			
During the field assessment, observed arachnid (spiders and scorpions) abundances were low possibly due to their cryptic nature that makes them difficult to observe in the field. The Mountain Bushveld Habitat was considered of higher value for arachnids as it provided valuable shelter for such species as well as an increase in insect abundance that serves as their main food resource. Three TOPS-protected arachnid species may potentially be found within the Focus Areas, as suitable habitat is available, notably within the Mountain Bushveld and Thornveld Habitat. The proposed development and associated infrastructure will lead to the loss of habitat and food resources, reducing the diversity of insects and other invertebrates. As large portions of natural habitat in the Focus Areas will be transformed, this loss of invertebrate abundance and diversity might have a negative cascading effect on the other faunal species in the Focus Areas, notably due to a reduction of food resources that invertebrates, notably insects, provide for other species. Impacts such as additional lighting and footprint creep will affect insect species near the proposed development, in addition to direct habitat loss.			

9.3 Site Ecological Improvement (SEI) and Areas of Concern

All habitats within the Focus Areas were allocated an importance category, i.e., SEI category. SEI is a function of the biodiversity importance (BI) of the receptor and its resilience to impacts (receptor resilience [RR]). BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor.

Table 70: A summary of the sensitivity of each habitat unit and the implications for the proposed activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
KURUMAN MOUNTAIN BUSHVELD	**Medium** Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU).	**Medium** Mostly minor current negative ecological impacts with some major impacts (historical prospecting) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**Low** This habitat is unlikely to be able to recover fully after a relatively long period more than 15 years is required to restore <50% of the original species composition and functionality. The species associated with this habitat have a low likelihood of remaining at a site even when the impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**High**	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high-impact activities.
OLIFANTSHOEK PLAINS THORNVELD	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. **Confirmed POC**: *Smutsia temminckii* (Temminck's Ground Pangolin, VU). **High POC**: *Sagittarius serpentarius* (Secretarybird, EN) & *Ardeotis kori* (Kori Bustard, NT).	**Medium** The Olifantshoek Plains Thornveld is mostly subject to minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance (especially as a result of the impacts due to ongoing farming activities such as grazing).	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
FRESHWATER HABITAT: RECHARGE AREA	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU). **High POC**: *Sagittarius serpentarius* (Secretarybird, EN) & *Ardeotis kori* (Kori Bustard, NT).	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.	**High**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**High**	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high-impact activities.
FRESHWATER HABITAT: PFP & EDL	**Medium** Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU).	**Medium** Mostly minor current negative ecological impacts with some major impacts (historical prospecting) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
TRANSFORMED HABITAT	Low No confirmed and highly unlikely populations of SCC and < 50% of receptor contains natural habitat with limited potential to support SCC.	Low The Transformed almost has no habitat connectivity but migrations are still possible across some modified or degraded natural habitat. Low rehabilitation potential. The habitat is associated with several major current negative ecological impacts.	Low	High Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

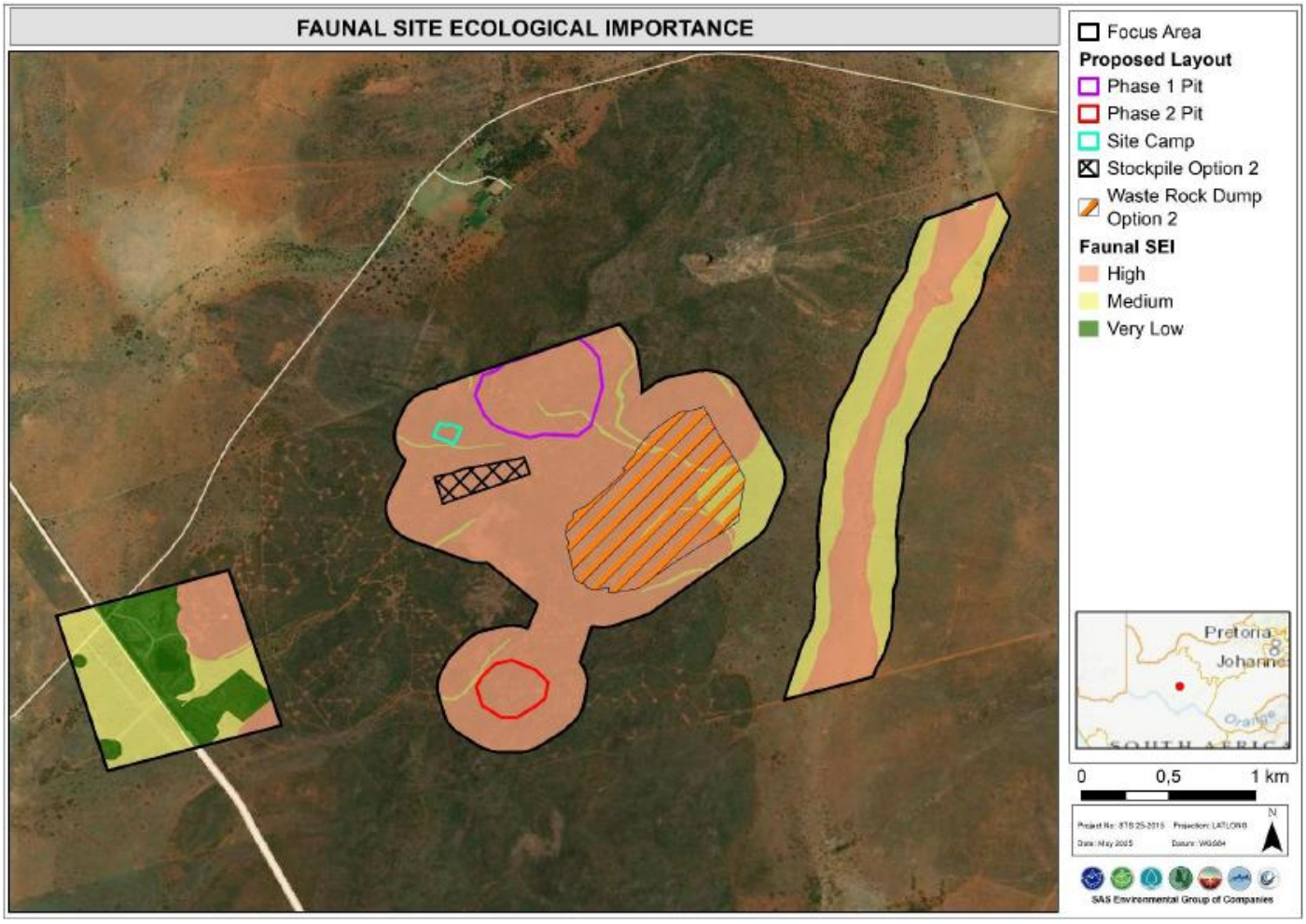


Figure 111: Habitat sensitivities associated with the Focus Areas in relation to the proposed layout (STS).

9.4 Impact Discussion

The impact assessment was undertaken on all aspects of faunal ecology deemed likely to be affected by the proposed MIOM. The proposed activities will result in the loss of faunal habitat associated with the removal of vegetation in habitats of high and medium faunal SEI as well as the displacement of species within the footprint areas leading to reduced diversity and abundance within the Focus Areas.

9.4.1 Impact on Faunal Habitat and Diversity

The proposed mining activities will impact on faunal species predominantly as a result of loss of habitat due to vegetation clearance and earthworks. The subsequent loss of habitat will lead to a decrease in species abundance and diversity, as species will be displaced from the Focus Areas. Whilst some species which are highly tolerant to degraded / transformed habitats may continue to exist within the mining footprint, the majority of species will no longer be able to inhabit the Focus Areas. Such activities will result in a localised loss of species in the Focus Areas, whilst the mining activities may also significantly impact upon habitat connectivity and the current movement patterns of faunal species in the area.

Overall, the perceived impact significance of the proposed project on faunal habitat and diversity (prior to mitigation) ranges from Medium to Low-Medium for the Planning Phase, High to Medium-High during the Mining Phase and Medium during the Decommissioning and Rehabilitation Phase. These impact scores can be reduced in most cases through the effective implementation of the proposed mitigation measures given in this report. The highest impacts can be expected during the Mining Phase when vegetation will be cleared, and faunal habitat will be lost leading to a reduced diversity and abundance of fauna within the Focus Areas. Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a Medium-High significance at a local scale, it is unlikely that faunal species will be affected at a population level if strict mitigation measures and a thorough rehabilitation plan are implemented.

9.4.2 Impact on Faunal SCC

Within the Focus Areas, no faunal SCCs were triggered by the online screening tool, however several additional SCCs have increased and confirmed POC within the Focus Areas and MIOM. Within the MIOM the screening tool did flag a medium sensitivity for *Neotis ludwigii* (Ludwig's Bustard, EN). This sensitivity was confirmed due to potential suitable habitat being present.

Within the Focus Areas, one mammal SCC namely *Smutsia temminckii* (Temminck's Ground Pangolin, VU) was confirmed. This species will utilise the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitats as well as some of the Freshwater Habitat within the Focus Areas. The

proposed mining development has the potential to impact this species in two significant ways. Firstly, it may directly displace individual members of the species from the Focus Areas and potentially kill individuals if not safely relocated out of the way of large machinery. Secondly, the associated vegetation clearing could result in a reduction of suitable foraging and/or breeding habitat within the region. Two additional threatened mammal species (South African Hedgehog / *Atelerix frontalis*, Black Footed Cat / *Felis nigripes*) & and two TOPS-protected species (Honey Badger / *Mellivora capensis*, & Cape Fox / *Vulpes chama*) have medium POC within the Focus Areas due to distribution overlap and potential suitable habitat.

Two avifaunal SCCs have high POC within the Focus Areas namely, *Ardeotis kori* (Kori Bustard, NT) and *Sagittarius serpentarius* (Secretarybird, EN). Both these species are known to occur within the region and have suitable habitat within the Focus Areas. These species will most likely be found within the Olifantshoek Plains Thornveld and Freshwater Habitat (Recharge Area) where they will likely forage and potentially nest. The disturbance due to the construction of the mine will displace any individuals should they occur within the Focus Areas, albeit suitable habitat loss is minimal. Additionally, there are seven avifaunal SCCs that have a medium POC to occur within the Focus Areas as potentially suitable habitat is available and distributions overlap. Most of these avian species require extensive habitats to meet their dietary needs, thus their presence within the Focus Areas is expected to be only temporary should they occur.

One TOPS-protected amphibian *Pyxicephalus adspersus* (Giant Bullfrog, TOPS-P), has medium POC to occur within the Focus Areas. This species will rely on potential artificial ponding areas after heavy rains to breed, forage and aestivate within the Focus Areas.

Three TOPS-protected arachnid species, *Opistophthalmus carinatus* (Robust Burrowing Scorpion), *Opistophthalmus wahlbergii* (Kalahari Burrower, P-TOPS) and Baboon spiders in the genus *Harpactira* have medium POC within the Focus Areas. These species are most likely to be found in the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitat. Vegetation clearance activities and earth works will place many of the smaller, slow moving SCC and protected species at risk, not only from a loss of habitat but also potential mortalities as they come into contact with faster moving heavy machinery.

9.4.3 Probable Residual Impacts

Even with extensive mitigation, residual impacts on the receiving faunal ecological environment are likely. The following points highlight the key residual impacts that have been identified:

- Continued degradation of natural habitat adjacent to the site as a result of edge effects;
- Continued decrease of faunal diversity and abundance in the Focus Areas;
- Continued loss of potential and confirmed SCCs in the Focus Areas;
- Edge effects such as further habitat fragmentation and AIP proliferation; and
- Disturbed areas are highly unlikely to be rehabilitated to baseline levels of ecological functioning and loss of faunal habitat and species diversity will most likely be long term.

9.4.4 Cumulative Impacts

Historical and current diamond mining activities, albeit small scale, to the north and west of the Focus Areas have already resulted in local habitat loss and disturbance to faunal species in the immediate area. Such impacts have led to habitat transformation and the displacement of species, many of which likely relocated to the Focus Areas in order to escape disturbances. To the north-east of the Focus Areas, additional mining operations have already caused significant habitat loss in the larger region, increasing pressure on species as habitat loss continues.

The proposed activities will result in the loss of faunal habitats within the development areas and a decrease in the abundance of fauna. This may also reduce the presence of specific faunal species in the area. As a result, fauna may be forced to move into surrounding vegetated areas, leading to more competition for territories and breeding sites. Additionally, this displacement could lead to increased competition for resources, potentially resulting in higher mortality rates and reduced species diversity. Increased human presence and activity in the area, during construction and once the development is operational, could potentially lead to noise disturbance, illegal harvesting and persecution of fauna in or adjacent to the Focus Areas. There is also an increased risk of fire frequency, which could negatively impact

faunal communities outside the development footprint. Dumping of other waste material in sensitive areas / areas outside of demarcated dump sites will further add to the overall cumulative impact on the receiving environment.

Based on the general landscape and habitat within the Focus Areas the site has the potential to host intermediate assemblages of fauna and several potential and confirmed SCCs. These SCCs have potential foraging and breeding habitat within the Focus Areas, as such, uncontrolled development/activities within the respective habitats (particularly the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitat) will potentially result in the loss of breeding or foraging habitat for these species.

9.5 Conclusion

The site assessment indicated that the Focus Areas has the potential to host several faunal SCCs and protected species. Including nine avifaunal species, five mammal species, one amphibian and three invertebrate species. One mammal species has been confirmed, *Smutsia temminckii* (Temminck's Ground Pangolin, VU) while two avifaunal species, *Ardeotis kori* (Kori Bustard, NT) and *Sagittarius serpentarius* (Secretarybird, EN) have high POC within the Focus Areas. These species are all expected to be impacted upon through the current development either directly through displacement or through losing foraging and breeding habitat.

The highest impacts on faunal ecology are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas (i.e., indigenous vegetation), of high and medium faunal SEI, being cleared. Medium-High and High impacts prior to mitigation can be anticipated within the Focus Areas. Following mitigation measures, impact scoring can be reduced for the most part although impact significance will mostly stay the same (Medium-High).

Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a Medium-High significance at a local scale, it is unlikely that faunal species will be affected at a population level. With the implementation of stringent mitigation measures and environmental management including thorough rehabilitation plan, it is believed that the project can be considered for authorisation.

10. SITE SPECIFIC CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT

(Information extracted from the Heritage Impact Assessment for the Proposed Makganyane Iron Ore Mine – Mining Right, Northern Cape Province, 2025 as well as the Palaeontological Impact Assessment for the Opencast Mining Right Application on Farm Makganyene 667, Northwest of Postmasburg, Northern Cape Province, 2025)

10.1 Baseline Description

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological Sensitivity Map (PSM) to guide developers, heritage officers and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the earmarked properties is placed on the PSM, it shows that the farms extend over moderate (green) areas of concern as presented in the following figure.

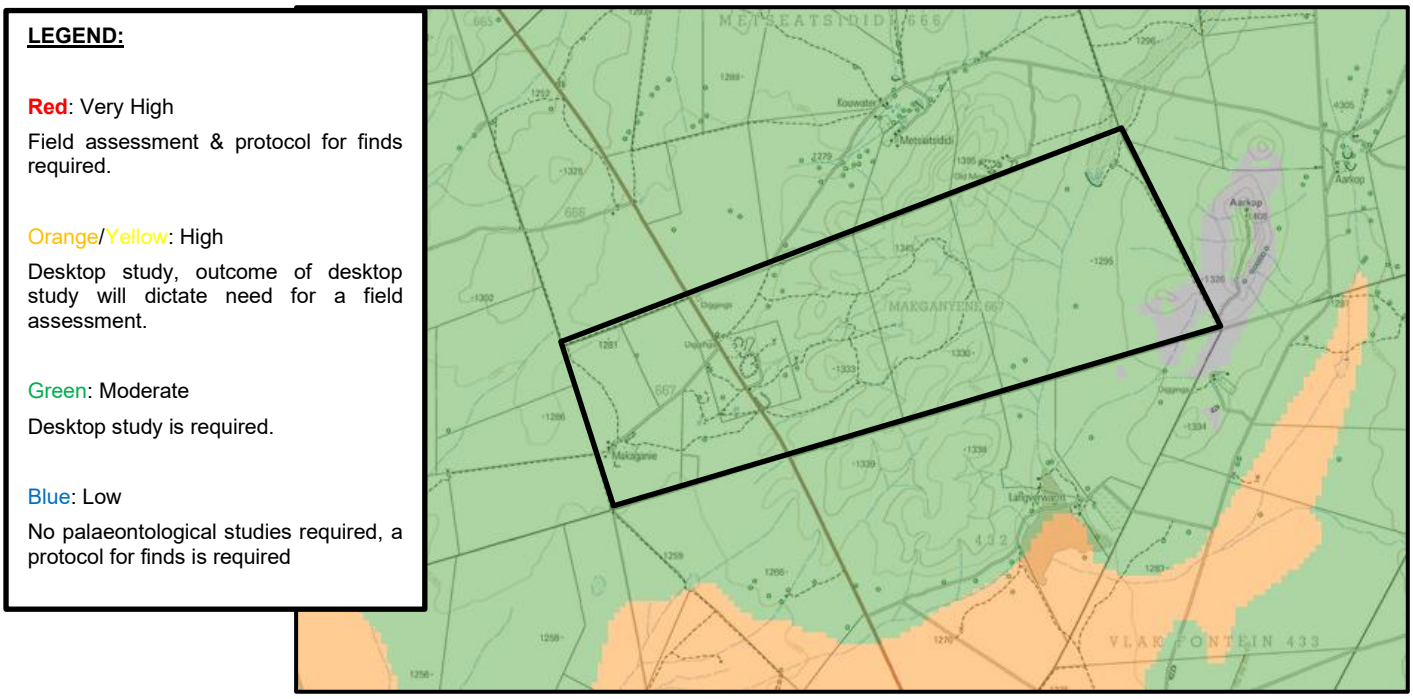


Figure 112: The SAHRA palaeontological sensitivity map shows that the proposed mining footprint (black polygon) extends over an area of moderate (green) concern (image obtained from the PalaeoSensitivity Map).

The DFFE Screening Report notes the Archaeological and Cultural Heritage sensitivity of the area as Low, while the palaeontological sensitivity of the area is marked as Medium.

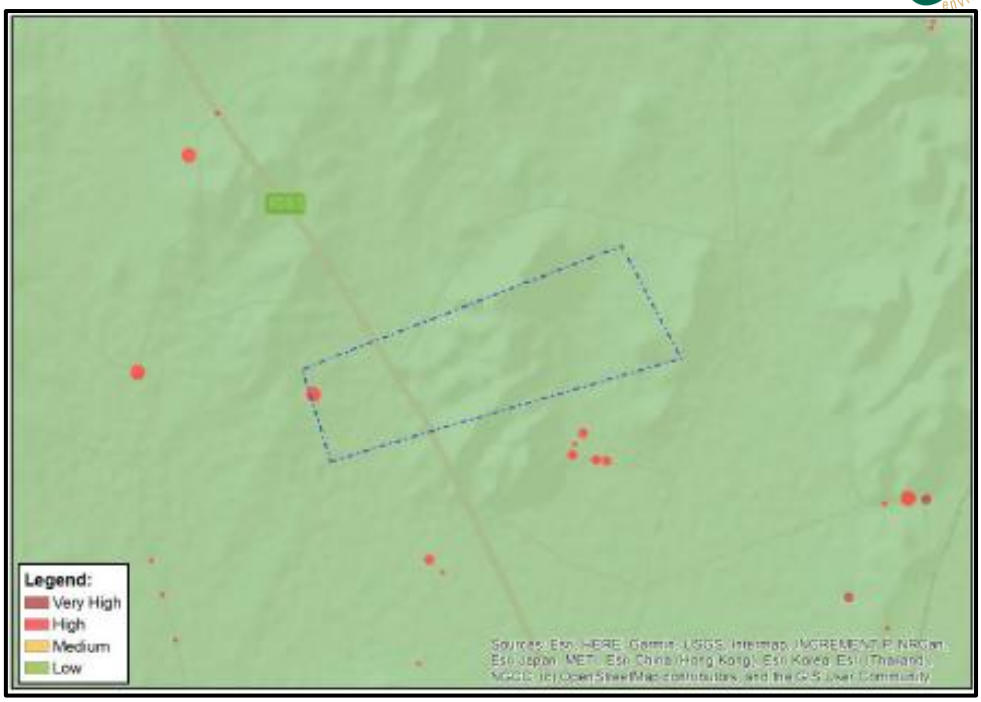


Figure 113: Archaeological theme sensitivity of the proposed area according to the DFFE screening report (2024).

Figure 114: Palaeontological theme sensitivity of the proposed area according to the DFFE screening report (2024).

10.2 Heritage Resources

The Heritage Impact Assessment (HIA) notes that based on the results of the field work and previous studies conducted in the area cultural layering dating back to the Stone Age with scatters and sites dating to the ESA (Arch), MSA and LSA are on record for the larger area. Sites and artefacts dating to these periods are scattered over the landscape with ESA (Arch) and MSA

artefacts found close to the Banded Iron Stone Ridges with isolated artefacts found on the thick Hutton sands marking the plains in the study area that is underlain by colluvial rubble. The contact zone between the Quaternary sands and the Banded Iron Stone at the foot of the ridges that divides the area in two is known to contain higher densities of lithics (e.g. Kusel 2013).

Ten Stone Age find spots and four features were recorded within the Project area (following figure) in 2019. Find spots consist of isolated Stone Age artefacts and were recorded with the Prefix “FS” and numbered numerically. These isolated find spots are out of context and of no significance apart from mentioning them in this report. Artefacts are mostly undiagnostic although MSA and LSA elements were noted. Raw material varies and consists of Banded Iron Stone, Quartzsite and chert. The closest quartzite source is from the Langberge approximately 15 km away (Beaumont 2007) and therefore transported to the study area.

Van der Walt (2019) recorded four features consisting of three burial sites (two cemeteries and one stone cairn) and one feature relating to exploration. These sites were revisited and verified in April 2025 whereby an additional grave and Historical farmstead were recorded and given the prefix “MG”. Graves and burial sites are of high social significance (Field rating GP A), and the exploration trenches are of no heritage significance (Field Rating GPC). Additionally, a possible mining adit was investigated, however if present, the adit was closed during the course of previous mining activities in the area.

The general site distribution of the recorded observations in relation to the project layout is spatially illustrated in the following figure and briefly described in Tables 16 – 18 of the HIA (Appendix K). Selected features are illustrated in Figure 7.9. to 7.22 of the HIA (Appendix K).

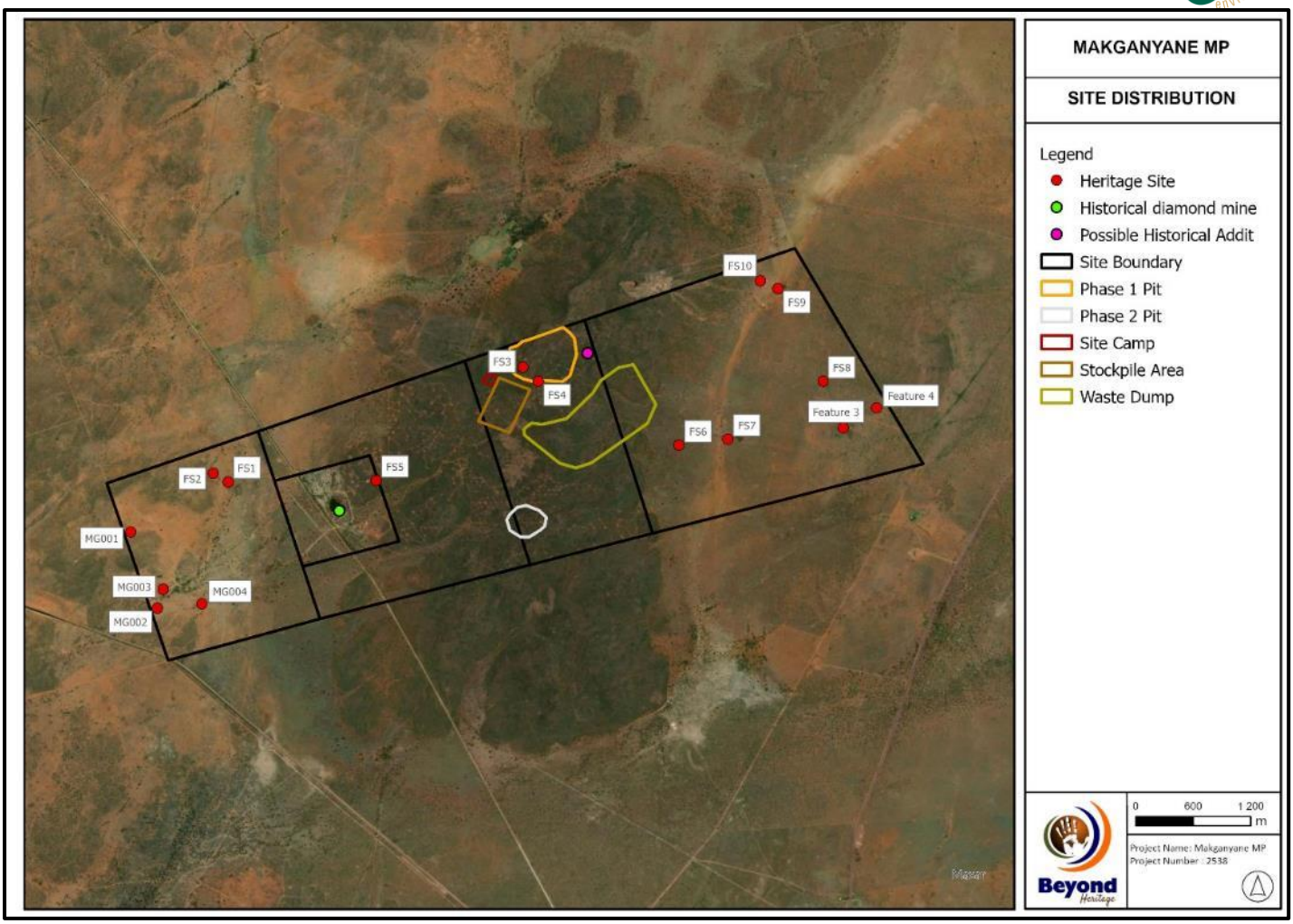


Figure 115: Position of the stone age find spots and heritage features recorded within the project area (Beyond Heritage).

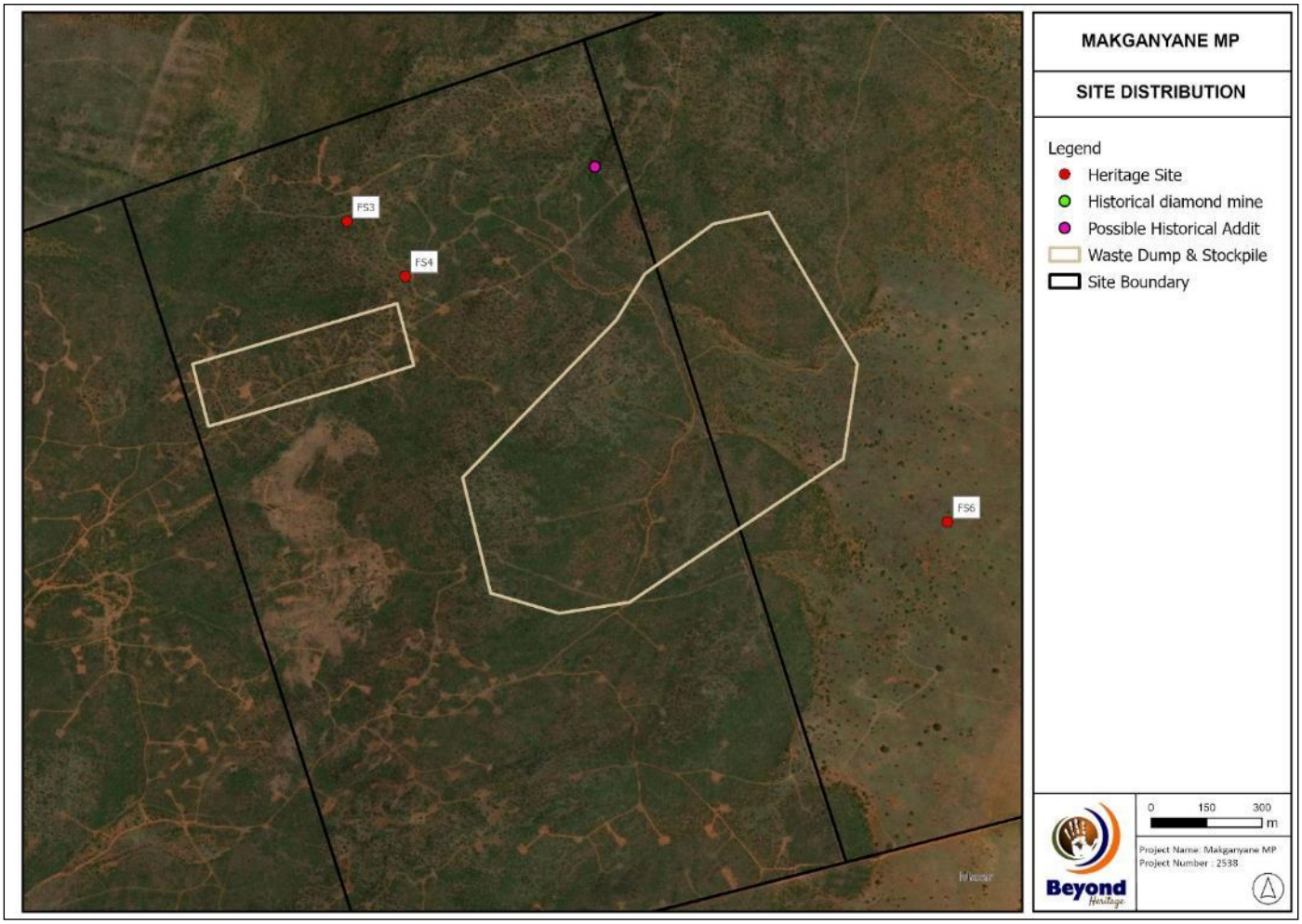


Figure 116: Map indicating the amended layout of the waste dump and stockpile in relation to the Project area that was assessed (Kraljevic 2025). The layout avoids heritage observations. (Beyond Heritage).

Table 71: Stone age scatters, features, and additional sites recorded in the study area (Beyond Heritage).

FEATURE NUMBER	DESCRIPTION	FIELD RATING AND SIGNIFICANCE
FS1	Archaeological - Stone Age, Miscellaneous flake on quartzite	GP C Low
FS2	Archaeological - Stone Age, Flake with dorsal removals on quartzite	GP C Low
FS3	Archaeological – MSA, Pointed flake with dorsal removal and faceted striking platform	GP C Low
FS4	Archaeological – LSA, End and side scraper with use wear	GP C Low
FS5	Archaeological - Stone Age, Broken flake with bulb of percussion	GP C Low
FS6	Archaeological - Stone Age, Blade with dorsal removal on red sands	GP C Low
FS7	Archaeological - Stone Age, miscellaneous flake	GP C Low
FS8	Archaeological - Stone Age, miscellaneous flake	GP C Low
FS9	Archaeological - Stone Age	GP C Low

FEATURE NUMBER	DESCRIPTION	FIELD RATING AND SIGNIFICANCE
FS10	Archaeological - Stone Age, Miscellaneous flake with use wear/trampling on chert	GP C Low
Feature 1	Peens family cemetery. Fenced in with granite headstones	GP 3A High Significance
Feature 2	Stone packed graves of farm labourers	GP 3A High Significance
Feature 3	Stone cairn on small hill possibly pre-colonial grave	GP 3A High Significance
Feature 4	Exploration trenches measuring approximately three by two meters	GP C Low Significance
MG002	A single, historical grave which is stone packed and has a headstone with inscription.	GP 3A High Significance
MG003	A large Historical farmstead which consists of multiple structures and a water reservoir. Some of the structures are partially dilapidated.	GP B Medium Significance

10.3 Cultural Landscape

Historical land use and the cultural landscape are linked since the cultural landscape is shaped to some extent by the history of the area. The general area is associated with agriculture and mining developments with widespread Stone Age occurrences. The farmstead (MG003) is illustrated on historical maps from 1967 and is likely older than 60 years and is protected by the NHRA (Section 34).

10.4 HIA Conclusion

The HIA concludes that a background scatter of isolated MSA artefacts were recorded, that possibly washed down from higher up on the ridge. The stone tools are isolated, out of context and scattered too sparsely to be of significance apart from mentioning them in this report and is given a field rating of GP C (Low).

Two cemeteries, a stone cairn, exploration trenches, as well as a burial site and historical farmstead were recorded in the study area. Although these sites will not be impacted, they should be added to development plans along with the graves and avoided with a 30 m buffer zone.

The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to, based on SAHRA's approval. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.5 HIA Recommendations

The HIA (Appendix K) proposed the following recommendations:

- δ The extent of the recorded cemeteries and burial sites should be avoided with a 30 m buffer zone with access provided to family members;
  - o A Heritage Management plan must be compiled for the recorded cemeteries including an access protocol for the next of kin;

- δ Historical farmstead (MG003) should also be added to development plans and avoided with a 30 m buffer zone;

- δ Development activities must be confined to the approved development footprint only;

- δ Monitoring of the project area by the ECO during pre-construction and construction phases for heritage and palaeontological chance finds, if chance finds are encountered to implement the Chance Find Procedure for the project as outlined in Section 9 of the HIA.

10.6 Palaeontological Context

The Palaeontological Impact Assessment (PIA) notes that the project area is in the moderately sensitive Makganyene Formation diamictites and the Quaternary Kalahari sands, probably the Gordonia Formation.

From the SAHRIS and DFFE maps above (Figure 112 and Figure 114) the area is indicated moderately sensitive that correctly applies to the windblown sand and sand dunes of the Kalahari sands but questionably to the Makganyene Formation. The latter formation is included in the moderately sensitive section, but this formation is composed of diamictites of glacial origin and banded jasper (Eriksson et al., 2006, p. 253). Such diamictites are the deposition of debris that has been dropped when the glaciers melted but are too old to have incorporated any fossil material as they predate the origin of body fossils. They should be indicated as having zero palaeosensitivity.

Windblown sands and sand dunes have been transported from another area and do not preserve fossils in primary context. Occasionally fragments of more durable fossils, such as bones or silicified wood, can be entrained by the sands but these are not of scientific interest because they have been

transported. In addition, no fossil traps such as palaeo-pans or palaeo-springs are visible in the satellite imagery, so it is very unlikely that any fossil fragments occur in the project area.

10.7 PIA Conclusion and Recommendations

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying aeolian sands or soils of the Quaternary. There is a very small chance that transported, fragmented fossils may occur below the sand cover in fossil traps such as palaeo-pans or palaeo-springs although, no such features are visible in the satellite imagery. The rocks of the Postmasburg Group (Transvaal supergroup) that will be mined for iron and/or manganese are ancient and have been metamorphosed so they do not preserve any fossils.

Nonetheless, a Fossil Chance Find Protocol should be added to the EMPR. If fossils are found by the environmental officer, or other responsible person once excavations have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

11. SITE SPECIFIC SOCIO-ECONOMIC ENVIRONMENT

(Information obtained from the Socio-Economic Impact Assessment, 2025 attached as Appendix M)

11.1 Social and Labour Plan

The Applicant prepared a Social and Labour Plan (SLP) in accordance with the requirements of the MPRDA and its associated regulations. The SLP (attached as Appendix T) outlines the strategies, commitments and programmes to be implemented in respect of local economic development, human resource development, and measures to mitigate potential socio-economic impacts associated with the mining operation. This section of the DEIAR does not duplicate the contents of the SLP but acknowledges it as the guiding framework for socio-economic contributions and obligations.

11.2 Stakeholder Engagement during SEIA

Stakeholder engagement is a critical component of the Socio-Economic Impact Assessment (SEIA) process. It provides an opportunity for stakeholders to express their views, concerns, and suggestions regarding the proposed project. The engagement process of the SEIA was designed by Eco Thunder (appointed socio-economic specialists) to be inclusive, transparent, and respectful of all participants and included the following steps:

- Stakeholder Identification: Identifying a comprehensive list of stakeholders who could potentially be affected by or have an interest in the proposed project. This list included local community members, local and regional government officials, representatives from the mining sectors, environmental and socio-economic advocacy groups, and others.

- Information Dissemination & Stakeholder Consultation: The SEIA specialist disseminated information about the proposed project and the socio-economic impact assessment process to identified stakeholders. This was done through consultation and surveys. These surveys provided a platform for stakeholders to express their views, concerns, and suggestions.

- Feedback Incorporation: Overall, the survey indicates that the local community generally views the project positively and expects socio-economic benefits, particularly through job creation and local economic stimulation. However, concerns were raised regarding health, dust, traffic-related risks, and the capacity of local health services. These concerns will be addressed through appropriate mitigation measures during the construction and operational phases of the project.

11.3 Key Findings of the SEIA

The proposed MIOM aims to enhance local mining capacity while balancing economic growth and environmental stewardship. This project is strategically aligned with national and regional priorities, seeking to provide substantial socio-economic benefits to local communities through employment opportunities and infrastructure enhancements.

Nationally, South Africa prioritises sustainable mining practices, balancing economic growth with socio-economic and environmental responsibilities. The MIOM project is aligned with these national objectives, adhering strictly to regulatory guidelines to manage mineral resources efficiently and sustainably.

The Tsantsabane Local Municipality, characterised by high unemployment and underutilised economic potential, stands to benefit significantly from this project. Key anticipated benefits include employment opportunities for local residents, enhanced skills development through targeted training initiatives, and stimulation of local economic activities through direct and indirect project expenditure.

Integration with existing infrastructure such as local roads (particularly the R385 provincial road), utilities, and careful environmental management practices are integral aspects of the project design, ensuring minimal ecological disruption. Given its proximity to local communities and sensitive environmental features, the project's design incorporates comprehensive mitigation measures addressing nuisance impacts (noise and dust), and community safety concerns.

- The assessment of the key issues indicated that there are no fatal flaws, associated with the Makganyane Mining Right project.

- Positive impacts, including employment and local economic growth, can be maximised through effective planning and implementation of enhancement measures.

- Potential negative impacts, such as noise and dust, and increased pressure on local services, are typical of mining projects and can be significantly mitigated through the recommended measures.

- Employment opportunities generated by the project will predominantly benefit nearby communities, contributing positively to local economic stimulation and skills development.

- Continuous communication, comprehensive planning, and the effective implementation of recommended mitigation measures will ensure the project's beneficial contribution to the local community and broader region.

11.4 Recommendations of SEIA

The following recommendations are made based on the SEIA:

- δ Local Employment: Prioritise the employment of local unskilled and semi-skilled workers to enhance positive socio-economic impacts and reduce external migration pressures.

- δ Local Procurement: Actively engage local suppliers for materials and services to boost the local economy and minimise transportation-related environmental impacts.

- δ Operational Impact Mitigation: Implement rigorous management plans to address operational impacts, including regular dust suppression, noise management, and effective traffic management.

- δ Safety and Security: Enhance safety measures and security protocols, particularly regarding access control and traffic management around the mining site.

- δ Community Liaison: Maintain an effective communication channel through a community liaison officer to proactively manage stakeholder concerns and ensure transparency.

By implementing these recommendations, the MIOM can ensure that it contributes positively to the local community and economy, while minimising any potential negative impacts.

11.5 Conclusion of SEIA

The proposed MIOM project represents an important development for the Northern Cape, particularly within the Tsantsabane Local Municipality, showcasing a balanced approach to economic development and environmental management. This initiative is positioned to play a role in the socio-economic advancement of the region by providing employment opportunities, stimulating local economic activity, and enhancing infrastructure development.

The project is poised to offer a potential boost to the local economy by creating direct and indirect job opportunities, predominantly sourced from nearby communities. This is particularly vital in an area characterised by high

unemployment and economic underdevelopment. The initiative can support revitalising the local economy.

Furthermore, the project is aligned with national policies that support sustainable mining practices and economic empowerment, ensuring that its implementation partially contributes to broader developmental goals. The strategic location of the project and its integration with local socio-economic structures are designed to optimise both environmental sustainability and economic viability.

However, the realisation of these benefits is contingent upon the project's adherence to rigorous environmental standards and its ability to effectively implement the recommended mitigation measures. Effective stakeholder engagement and transparency in operations are essential to foster community support and ensure the long-term success of the project. This engagement includes addressing any concerns related to environmental impacts, such as noise, dust, and traffic, which are common challenges in construction and mining projects.

Based on the findings of the SEIA, the development is supported, provided that the recommended mitigation measures are implemented. Effective stakeholder engagement, transparency, and responsiveness to community concerns are crucial to maintaining public trust and acceptance of the project.

12. HEALTH IMPACT ASSESSMENT

(Information extracted from the Rapid Appraisal Health Impact Assessment attached as Appendix P)

Infotox (Pty) Ltd was appointed as the responsible specialist for the Health Impact Assessment associated with the proposed MIOM development. The Health Impact Assessment is not concerned with emissions or releases of which the potential impact is limited to the mining property (within the fence line), but with the environmental emissions which have a potential impact on health of receptor communities in the vicinity of the mine.

The International Finance Corporation (IFC) differentiates between two types of health impact assessments, namely, a Rapid Appraisal HIA (“RAHIA”) and a comprehensive HIA. A comprehensive HIA is recommended when the project is likely to attract or involve a significant influx of people, for example a large

construction work force. Since none of these factors are envisioned for the MIOM Project, the RAHIA was a fitting format for the Health Impact Assessment.

12.1 Sensitivity Receptors

The RAHIA identified three farmsteads (following figure) within ±2 km of the proposed MIOM fence line as potential sensitive receptors.

The most proximate identified farm (with residential buildings) is 910 meters to the north of Pit 1 and is a reasonable representation of a potential public receptor in close proximity to the north of the project site.

A second tentatively identified public receptor was the “farmhouse” noted on the western portion of the project site. However, it was established that the farmhouse is currently unoccupied, and there are no plans for it to be inhabited during the mining phases. The farmhouse is thus not included as a public receptor, but two other proximate farms, noted to the south/south-east of the plant, are included.

Thus, in total, three proximate receptors are identified. The remaining farmsteads depicted in are all situated at greater distances from the project site and are also not as significantly impacted by dust emitted from the proposed mining activity. Accordingly, exposure at the nearest three farms represents a conservative estimate of exposure at farms within the broader study area, and it is not necessary to quantify $PM_{2.5}$ exposure at the other more remote farmsteads.

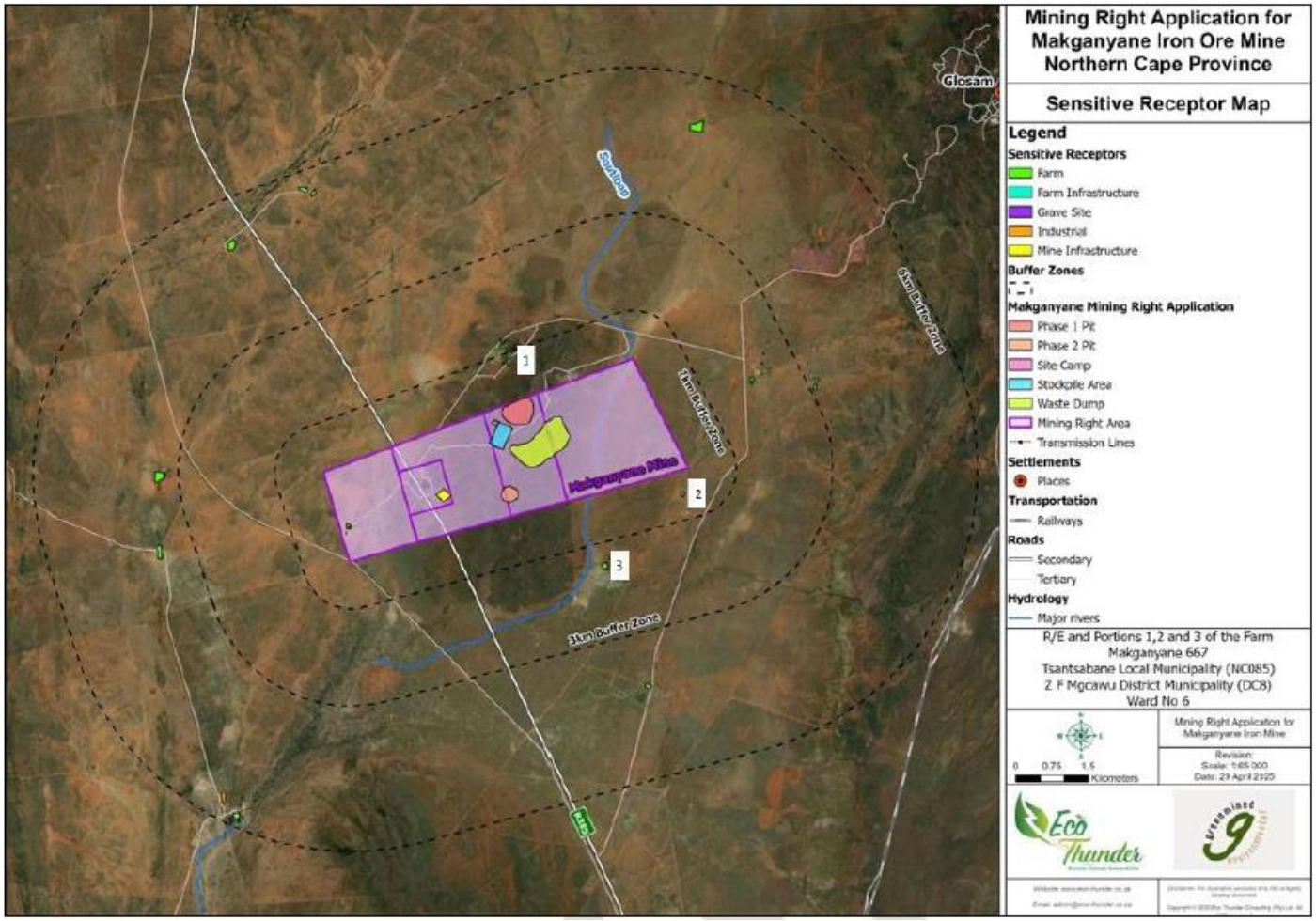


Figure 117: Public receptors (numbered 1 – 3) within the broader study area (Infotox, 2025)

12.2 Demography

The Tsantsabane LM population is assumed to represent the receptor area of the proposed mining right application and the population percentage in the childhood age group is slightly lower than the Northern Cape and ZF Mgcawu DM percentages, but the elderly age group (65+) percentages are comparable. The sensitive groups represent approximately 30% of the all-ages group in the Tsantsabane LM.

12.3 Exposure-response Assessment

Predicted (modelled) or measured (monitored) impacts of mining and industrial emissions on air concentrations are used as a basis to assess impacts on health. For the purposes of the Human Health Risk Assessment (HHRA), this is achieved by calculating the potential increase in risk of hospital admissions or mortality due to specific causes, associated with modelled air concentrations of $PM_{2.5}$.

Regarding exposure to $PM_{2.5}$, the health effects of interest quantified in the HHRA are:

- δ Short-term (24-hour) $PM_{2.5}$ concentrations:
  - o Cardiovascular (including stroke) hospital admissions.

- δ Long-term (annual average) $PM_{2.5}$ concentrations:
  - o Acute bronchitis symptoms, ages 8-12.
  - o Chronic bronchitis incidence in age group 27^{+}.
  - o All-cause (natural) mortality.
  - o Lung cancer incidence (annually) (ages 30+).

12.4 Receptor Exposure Assessment

According to the AIR all short-term averages (24 hours or less) were presented as 99^{th} percentile concentrations. Air concentrations at the representative proximate public receptors (farmsteads) marked 1, 2 and 3 in Figure 117 were estimated from the concentration isopleths of the AIR. The following table shows the estimated concentrations, that are equal to the modelled incremental increases in daily and annual $PM_{2.5}$ concentrations due to proposed activities at the MIOM. The incremental increases are used for the calculation of human health risks.

Table 72: Modelled incremental increases in $PM_{2.5}$ concentrations, estimated at the identified proximate receptors (Infotox, 2025)

Receptor number	Incremental increase in PM2.5 concentrations (µg/m³ air)			
	Daily (99th percentile)		Annual average	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
1	50.0	12.0	4.5	2.0
2	7.0	1.8	0.7	0.2
3	8.0	2.0	0.9	0.3
Scenario 1: Baseline emissions with proposed dust mitigation measures: spraying water on all haul roads 2x daily plus chemical dust suppressant on the haul road to the main gate. Scenario 2: Enhanced dust mitigation measures: Scenario 1 plus additional measures.				

12.5 Risk Results

The results of the risk calculations are presented as attributable risk fractions (AFs) in the following tables. The AFs are the fractional increase in the

disease burden that may reasonably be attributed to airborne $PM_{2.5}$ generated from the proposed operations.

Table 73: Proximate Receptor 1: Attributable fractions (Afs) and percentage increase in the risk of a health effect associated with modelled $PM_{2.5}$ exposure.

Scenario / Health effect	Attributable fractions (AFs)		% Increase in risk	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
All-cause (natural) mortality	0.03	0.02	3.4	1.5
Cardiovascular (including stroke) hospital admissions	0.04	0.01	4.4	1.1
Acute bronchitis symptoms, ages 8-12	0.12	0.05	11.5	5.3
Chronic bronchitis incidence, ages 27+	0.06	0.03	6.0	2.7
Lung cancer incidence, ages 30+	0.16	0.07	15.6	7.3
Scenario 1: Baseline emissions with proposed dust mitigation measures: spraying water on all haul roads 2x daily plus chemical dust suppressant on the haul road to the main gate. Scenario 2: Enhanced dust mitigation measures: Scenario 1 plus additional measures – windbreaks around dust sources and chemical dust suppressant in addition to water spraying on Route 2.				

Table 74: Proximate Receptor 2: AFs and percentage increase in the risk of a health effect associated with modelled $PM_{2.5}$ exposure.

Scenario/ Receptor	Attributable fractions (AFs)		% Increase in risk	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
All-cause (natural) mortality	0.01	<0.01	0.5	0.2
Cardiovascular (including stroke) hospital admissions	0.01	<0.01	0.6	0.2
Acute bronchitis symptoms, ages 8-12	0.02	0.01	1.9	0.5
Chronic bronchitis incidence, ages 27+	0.01	<0.01	1.0	0.3
Lung cancer incidence, ages 30+	0.03	0.01	0.2	0.8
Scenario 1: Baseline emissions with proposed dust mitigation measures: spraying water on all haul roads 2x daily plus chemical dust suppressant on the haul road to the main gate. Scenario 2: Enhanced dust mitigation measures: Scenario 1 plus additional measures – windbreaks around dust sources and chemical dust suppressant in addition to water spraying on Route 2.				

Table 75: Proximate Receptor 3: AFs and percentage increase in the risk of a health effect associated with modelled $PM_{2.5}$ exposure.

Scenario/ Receptor	Attributable fractions (AFs)		% Increase in risk	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
All-cause (natural) mortality	0.01	<0.01	0.7	0.2
Cardiovascular (including stroke) hospital admissions	0.01	<0.01	0.7	0.2
Acute bronchitis symptoms, ages 8-12	0.02	0.01	2.4	0.8
Chronic bronchitis incidence, ages 27+	0.01	<0.01	1.2	0.4
Lung cancer incidence, ages 30+	0.03	0.01	3.3	1.1
Scenario 1: Baseline emissions with proposed dust mitigation measures: spraying water on all haul roads 2x daily plus chemical dust suppressant on the haul road to the main gate. Scenario 2: Enhanced dust mitigation measures: Scenario 1 plus additional measures – windbreaks around dust sources and chemical dust suppressant in addition to water spraying on Route 2.				

The AFs and percentage increases presented above are the calculated increases in the risk of a health effect (mortality, respiratory or cardiovascular), presenting as an increased occurrence of a specific health outcome, attributable to the $PM_{2.5}$ fraction of fugitive dust escaping from the proposed mining activities. The AFs and percentages express the fractional increase in the current disease burden. This fractional increase can be attributed to modelled increases in $PM_{2.5}$ concentrations at the various receptors, in case the proposed mining activities should take place.

The health risks associated with $PM_{2.5}$ concentrations at the identified sensitive receptors are presented in Tables 73 - 75 are interpreted as follows:

- AFs in the order of < 0.01 to 0.05 indicate an increased risk of a health effect in the range of less than 0.1 to 5%, under the modelled air quality conditions at the various receptors. The implication of such low AFs is that, for all practical intents and purposes, the associated health risks will be insignificantly different from current or background risks.
- Slightly higher AFs in the range of more than 0.05 to 0.1 (more than 5, up to 10% increase in risk) are viewed as indicating low risks of marginal concern.
- Higher AFs in the range of 0.1 to 0.2 (a 10 to 20% increase in risk) are viewed as indicating low risks and the higher AFs up to less than 0.4 (40%) as indicating a moderate risk of some, but not serious concern.
- AFs of 0.4 (40%) and higher are viewed as of concern.

12.6 HHRA Discussion

At proximate Receptor 1, situated ±900 meters to the north of Pit 1, the proposed mining activities are associated with the following risks to health:

- δ Insignificant risks of all-cause (natural) mortality and of cardiovascular hospital admissions in terms of both Scenario 1 and 2 dust suppression measures.
- δ Low risks of marginal concern (Scenario 1) and insignificant risks (Scenario 2) of chronic bronchitis.
- δ Regarding risks of acute bronchitis in children and of lung cancer in adults (aged 30+):
  - o Low risks in Scenario 1 and 2, but
  - o Risks in Scenario 2 are only of marginal concern.

Provided that additional (Scenario 2) dust suppression measures are implemented, the mitigated risks at Receptor 1 are at most rated as low, and not of serious concern.

At proximate receptors 2 and 3, situated to the south of the proposed site risks of all health effects are insignificantly different from background (current) health risks, also in Scenario 1, with only the dust suppression measures proposed by the client.

12.7 HHRA: Surface- and Groundwater Contaminants

Groundwater flow models indicate that the mostly dry riverbeds of the Soutloop River do not receive any significant groundwater baseflow and are therefore not regarded as potential receptors of groundwater contamination that may originate from the mining rights area. Human health risks due to Soutloop River water use, on the few occasions when waterflow should actually occur, are thus unlikely to be different from the current (background) health risks, and a subsequent health impact is also unlikely.

Regarding the baseline groundwater quality, none of the water quality parameters or analysed inorganic constituent concentrations exceeded SANS 241:2015 limits (see Section 6.1). Therefore, at baseline, groundwater is considered to be of good quality and suitable for human consumption (Groundwater Complete 2025).

Impacts on groundwater quality due to the proposed mining activities are important with regard to potential impacts on health in case the water quality should deteriorate. The geohydrological investigation concluded that the risk of a negative impact on groundwater quality is low. Based on the assessment of "Low" risks of an impact on groundwater quality, it is concluded that the public utilisation of groundwater sources under the conditions of the proposed mining activities are not associated with risks to human (or animal) health, because water quality is not likely to be affected by the proposed mining operations.

Cumulative impacts on groundwater quality are unlikely, since active operations at other mine(s) in the broader study area occur at remote sites not near enough for any cumulative impacts to apply (Groundwater Complete 2025). Therefore, cumulative impacts on health, via potential impacts on groundwater quality are thus also unlikely.

12.8 Health Impact Assessment and Rating

The impact rating considers, amongst other factors, the vulnerability of the exposed community receptors to the health effects of $PM_{2.5}$, for which the cardiovascular system and the respiratory tract have been identified as the main targets of exposure to $PM_{2.5}$.

Section 9.2 of the RAHIA (Appendix P) assesses the vulnerability of the organ systems in receptors in the vicinity of the proposed mine. The RAHIA presents the following summary of the baseline health status of the project area.

- Diseases transmitted by vectors dependent on water or natural vegetation for breeding, such as malaria, are not considered, because the proposed mining project is not situated in a known malaria region.

- Sexually transmitted diseases and other diseases ameliorated or evoked by lifestyle changes due to socio-economic impacts are not assessed, because it is unlikely that there will be an influx of people seeking employment or working at the mine and it is also unlikely that the disposable incomes in receptor communities will be increased due the construction at or operation of the mine. A shift from a rural to an urban lifestyle is not relevant. Socio-economic changes due to the construction and operation of the mine are thus unlikely in the defined receptor area,

and communicable and non-communicable diseases due to socio-economic changes are not assessed.

- Construction and operation activities at the proposed mine may increase ambient air $PM_{2.5}$ concentrations at the identified receptors in the Tsantsabane LM. Diseases indicating vulnerability to the health effects of air pollutants, and that are represented amongst the most important natural causes of death, are diseases affecting the respiratory tract, including tuberculosis, diseases of the cardiovascular system and diseases associated with a compromised immune system. A compromised immune system, such as in persons infected with HIV, increases the vulnerability to respiratory diseases.

- Younger children and older adults are more vulnerable to the effects of air pollution by default. The relevant age groups for which mortality data are readily available in the public domain are the group of children younger than 15 years of age and adults aged 65 years and older. Specific attention is given to the vulnerabilities in these groups.

- Provincial cause of death data for the under 15 population are divided into the infant (younger than 1 year of age) and the 1-to-14 years age group. Most of the infant age group causes of death are those specific to the perinatal period, affected by maternal factors and complications of pregnancy and delivery, or congenital malformations. Amongst the leading causes of death in this group, only 2 causes indicate vulnerability to a health influence of ambient air $PM_{2.5}$ pollution, namely “influenza and pneumonia” and “other acute lower respiratory infections”. These findings are as expected for the infant age group.

- Considering that the majority of the highest ranked causes of death in the infant age group are not directly related to vulnerabilities to ambient air quality, detailed attention was given to the causes of death in the 1-to-14 years age group, where factors specific to the foetus, infant, mother or events at the time of delivery do not play an important role. This allows focus on the causes of death that might be influenced by exposure to $PM_{2.5}$ due to the proposed Makganyane project.

- Based on the data and conclusions presented in the RAHIA, there are grounds to assume increased vulnerability to health effects related to exposure to the air pollutants of interest in the receptor group, regardless of age. There is a degree of uncertainty related to this comparative assessment, since mortality data specific to the Tsantsabane LM were not available, but it is likely that a moderately increased vulnerability exists in the receptor population.

- The conclusions of the $PM_{2.5}$ vulnerability assessment are:
  - Regarding the all-ages population, communities are slightly more vulnerable to the cardiovascular and moderately more vulnerable to the respiratory effects of $PM_{2.5}$.
  - The younger-than-15-years age group is moderately more vulnerability to the respiratory effects of $PM_{2.5}$. Cardiovascular vulnerability is comparable to the South African group in general.
  - The age group of 65 years and older are moderately more vulnerable to the respiratory and slightly more vulnerable to cardiovascular effects of $PM_{2.5}$.

The health impact assessment focused on the potential negative health impacts due to the proposed mining activities, resulting in:

- Exposure to the $PM_{2.5}$ fraction of dust emissions, impacting on health via potential increases in the incidences of:
  - Mortality due to all natural causes.
  - Cardiovascular (including stroke) hospital admissions.
  - Acute bronchitis symptoms in children.
  - Chronic bronchitis incidence in adults aged 27+.
  - Lung cancer incidence in adults aged 30+.

- Potential changes in surface- and groundwater quality, which might impact the health of water consumers in various ways, depending on the chemical or biological properties of the potential contaminants.

As presented in *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity* the impact assessment concluded that all the identified impacts will have a Low significance after mitigation.

12.9 Reasoned Opinion Regarding the Acceptability of the Proposed Activity

Based on the RAHIA:

- Dust emissions health effects, assessed in terms of modelled $PM_{2.5}$ concentrations in air, are predicted to have at most a Low-Medium negative impact if only the mitigation measures of Scenario 1 is implemented.

- If additional dust suppression measures as proposed in the AIR (Scenario 2) are implemented, all impacts on health are rated as Low.

- Surface water streams are non-perennial (Eco-Thunder 2025), and it is thus unlikely that these are continuously used for household drinking water.

- Nonetheless, impacts on health via impacts on water quality are rated as low in terms of the rating process used for the RAHIA, provided that:
  - The waste rock dump is managed with standard engineered barriers and recommended surface- and groundwater monitoring is conducted.
  - Stormwater management is done according to the SWMP.
  - Routine maintenance of the sewage system is done to decrease the risk of failure and spillage that may contaminate surface- and groundwater.

Therefore, an EA may be issued for the proposed development of the MIOM, and proposed operations may commence, provided that:

- Scenario 2 (enhanced) dust mitigation measures recommended in the AIR and in the RAHIA are implemented as strictly as possible, in order to reduce dust emissions at the proposed mine.

- Ground- and surface water mitigation measures are implemented, and provided that monitoring continues as recommended in the SWMP, the waste rock assessment report, the surface water hydrological report and the groundwater impact report.

13.1 Road Network and Traffic Assessment

(Information obtained from the Traffic Impact Assessment, 2025 attached as Appendix S)

13.1.1 Intersection and Access Management

As mentioned earlier, access to the proposed MIOM will be provided via the R385. The Traffic Impact Assessment (TIA) mentions that the minimum allowable intersection and access spacing is dependent on the development environment, road classification and type of intersection control. The following two tables respectively show the minimum spacing requirements for the R385, in the vicinity of the Makganyane Mine, as well as the existing intersection and access spacings.

Table 76: Minimum intersection and access spacing requirements.

DEVELOPMENT ENVIRONMENT	ROAD CLASS	MINIMUM SPACING		
		FROM	TO	DISTANCE (M)
Rural	Class R2 – Rural major arterial	Public road / access	Public road / access	5 000 m

Table 77: Existing intersection and access spacing requirements.

FROM		TO		EXISTING SPACING (M)
R385 (CLASS R2 – RURAL MAJOR ARTERIAL)				
1	Access to Ptn 0 of the farm Metseatsididi No 666	2	Proposed access to the Makganyane Mine	2 500 m
2	Proposed access to the Makganyane Mine	3	Ptn 0 of the Farm No 432	2 400 m

Figure 118: Existing intersection and access spacing (BVI).

13.1.2 Sight Distance Assessment

Sight distance is a critical component of safe road design, particularly where new access points are introduced on high-speed rural routes such as the R385. Adequate sight distance ensures that drivers have sufficient visibility to detect and respond to hazards in time to avoid collisions.

The R385 in the vicinity of the proposed access is classified as a rural Class 3 minor arterial road, typically associated with high mobility and limited access. Based on the prevailing road geometry, surrounding land use, and speed environment, a design speed of 100 km/h has been adopted for the assessment. This is consistent with the typical operating speeds observed on similar rural corridors in the Northern Cape.

The TIA notes that the relevant minimum sight distance criteria applicable to the R385 at the proposed access location should be:

- Stopping Sight Distance (SSD) - At 100 km/h: 180 m
- Passing Sight Distance (PSD) - At 100 km/h: 600 m (not required at access points, but relevant for route continuity)

The TIA study found the available sight distance along the R385 to be:

- δ Northbound direction (towards Postmasburg): Approximately 320 m of sight distance available.
- δ Southbound direction (away from Postmasburg): Approximately 280 m of sight distance available.

Both measurements exceed the minimum SSD requirement of 180 m at a design speed of 100 km/h. There are no significant vertical curves or obstructions in the vicinity that would impede a driver's line of sight to and from the access.

Therefore, the available sight distance at the proposed access to the Makganyane Mine is deemed sufficient in both directions. The existing geometry supports safe ingress and egress for both light and heavy vehicles associated with the mining operation. No sight distance-related mitigation measures are required at this stage.

13.1.3 Traffic Conditions

According to the TIA, the historic (2023) traffic volumes of the R385 (obtained from a permanent counting station ±19 km south of the proposed MIOM) for both directions are:

- δ Average Daily Traffic (ADT): 3 705 vehicles/day; and
- δ Average Daily Truck Traffic (ADTT): 546 heavy vehicles/day

These volumes reflect a moderately trafficked rural arterial route with a significant proportion of heavy vehicles, typical of regions supporting agricultural and mining activities.

The above figures were escalated to estimate the current traffic conditions for the year 2025 and projected as follows:

- δ ADT (2025): ~3 932 vehicles/day; and
- δ ADTT (2025): ~580 heavy vehicles/day

These projected volumes represent the estimated background traffic conditions on the R385 near the proposed access point to the MIOM. The TIA concludes that the R385 north-west of Postmasburg currently accommodates moderate traffic volumes, with a substantial share of heavy vehicle movements.

13.1.4 Road Network Description

The table below outlines the main roads in the vicinity of the proposed MIOM. The R385 is the most significant route, acting as a key connector between Postmasburg and the mines, including the Makganyane site. Other roads, such as the R31, and the R325, serve various levels of access, with some being more directly involved in mining logistics and local access.

Table 78: External road network near the proposed MIOM (BVI)

ROAD NAME	ROAD TYPE	ROAD CLASSIFICATION	ROUTE DESCRIPTION	PRIMARY FUNCTION	CONDITION
N14	National Route	Class R1 – Rural principal arterial	A major route connecting the Northern Cape to the rest of South Africa.	Vital for inter-provincial connections, though not directly near the proposed Makganyane Mine.	Paved, well-maintained, handles heavy inter-city and mining traffic.
R325	Regional Route	Class R2 – Rural major arterial	Connects Griekwastad to Postmasburg and continues northwards to Kathu via the N14.	Regional connector between towns.	Postmasburg to Kathu (northwards): Segment is paved and generally maintained in good condition. Postmasburg to Griekwastad (southwards): Section is primarily a gravel road. Potential challenges in its condition.
R31	Regional Route	Class R2 – Rural major arterial	Connects Postmasburg to Kuruman and the broader Northern Cape region.	Serves as a regional link to other mining areas and commercial centres.	Paved and in good condition, though high traffic volumes can cause wear.
R385	Regional Route	Class R3 – Rural minor arterial	Main road connecting Postmasburg to the surrounding area, including access to various mines, including the Makganyane Mine	Key transport route for mining traffic. Local travel, and goods transportation.	The R385, beyond the paved section approximately 12 km north-west of Postmasburg, transitions into a gravel road that is generally in a fair condition.

13.1.5 Capacity Analysis and Level of Service (LOS)

For a typical two-lane rural road, the practical daily capacity is influenced by surface type, vehicle mix, terrain, and road geometry. For gravel-surfaced rural roads, the effective capacity is lower than for paved roads due to reduced travel speeds and increased following distances. Based on prevailing standards and engineering practice the estimated daily capacity of the R385 gravel segment is estimate at ±680 vehicles per hour (vph).

The following table compares projected traffic volumes against available capacity in each assessment year.

Table 79: Projected traffic volumes versus available capacity (TIA).

YEAR	PHASE	TOTAL PEAK HOUR VOLUME (veh/ h)	AVAILABLE CAPACITY (GRAVEL SECTION) *	VOLUME-TO-CAPACITY RATIO (v/c)
2028	Construction	455	800	0,57
2038	Operational	673	800	0,84
2043	Decommissioning	685	800	0,86

The TIA notes that the volume-to-capacity (v/c) ratio corresponds to a Level of Service B, indicating stable traffic flow with some restriction on manoeuvrability, particularly during peak hours or in the presence of multiple heavy vehicles. LOS B is considered acceptable for rural roads and aligns with national and provincial standards for road performance in low-density areas. A cumulative traffic analysis identified that mine-related traffic, when added to background growth, may result in LOS C and volume-to-capacity ratios below 0.9 (Table 79) during later phases.

Table 80: LOS summary (TIA).

YEAR	PHASE	PEAK HOUR VOLUME (veh/ h)	ESTIMATED LOS *	INTERPRETATION
2028	Construction	455	LOS B	Stable flow, minimal delay, good manoeuvrability
2038	Operational	673	LOS C	Stable flow but with noticeable delay; limited overtaking
2043	Decommissioning	685	LOS C	Stable flow but with noticeable delay; limited overtaking

In conclusion, the R385 in the vicinity of the proposed mine access is expected to continue operating within acceptable capacity limits in the short to medium term. No immediate capacity upgrades are required; however, ongoing monitoring is recommended once mining operations commence, particularly to detect deterioration in LOS or increased safety risks linked to heavy vehicle operations.

13.1.6 Access to Transportation Corridors

The proposed MIOM is strategically located ±25 km north-northeast of Postmasburg. This region is well known for its extensive mining activities, particularly in iron ore and manganese, and benefits from established transportation infrastructure. Access to key transportation corridors is critical for the efficient movement of extracted ore to domestic and international markets.

One of the primary roadways serving the area is the R325, which connects Postmasburg to the N14, a major national route running east-west. The N14 links Upington, Kathu, and Kuruman, providing a critical corridor for transporting goods to and from the

region. Additionally, the R385, another regional route, facilitates connectivity between Postmasburg, Olifantshoek, and Douglas, enhancing logistical flexibility for the mining sector. These roads ensure that ore from the MIOM can be transported efficiently by truck to processing facilities and distribution points.

Given the mine's location and access to existing road infrastructure, it is well positioned to leverage existing transportation corridors for efficient ore distribution.

13.1.7 Public Transport and Pedestrian Infrastructure

Public transport infrastructure along the R385 and in the vicinity of the proposed MIOM is relatively limited due to the region's rural and mining-focused nature. The R385, which connects Postmasburg to Olifantshoek and Douglas, primarily serves as a regional transport corridor for private vehicles, mining related freight, and occasional public transport services. While small passenger transport services such as minibus-taxis and private shuttle operators are available in Postmasburg, dedicated public transport infrastructure such as bus stops, formal taxi ranks, or scheduled bus services is scarce along this route.

In the immediate vicinity of the propose MIOM, there is no established public transport system. Employees and contractors that will be working at the mine are likely to rely on private vehicles, company-arranged transport, or informal taxi services from nearby towns like Postmasburg.

Pedestrian infrastructure along the R385 and in the vicinity of the proposed MIOM near Postmasburg is minimal and there are no dedicated pedestrian walkways or crossings.

13.1.8 Projected Traffic Volumes

The TIA calculates that the total estimated daily traffic, during the construction phase will be ±172 trips/day (for 2 – 3 years). This will increase to ±642 trips/day during the operational phase. It is expected that the estimated daily traffic will be significantly less during the decommissioning phase and is projected to be ±106 trips/day.

13.1.9 Type and Frequency of Traffic

The MIOM will follow a delivery and transportation schedule aligned with its 24-hour, 3-shift operation. The traffic generated by the mine will primarily consist of iron ore transport (haul trucks), workforce transport (buses and private vehicles), and logistics (supply trucks, equipment).

The typical delivery schedule is expected to be along the following lines:

- **Ore delivery:** The mine will operate 24/7 in 3 shifts, typically lasting 8 hours per shift. The delivery schedule for the transport of ore will depend on production targets, but typically iron ore mines operate at a steady flow of ore shipments to ensure continuous output and avoid stockpile buildup at the mine.

- **Ore production and haulage:** Given the 3 million tonnes per annum production capacity, with a truck capacity of 36 tonnes per trip, the mine will need to move 278 trips per day (or 556 roundtrips) to meet its targets. This would be spread over the 24-hour operational period.

- **Shift times and ore haulage schedule:**
  - First shift (06:00 to 14:00): This peak period for ore haulage in the morning is expected as trucks begin hauling ore early in the shift.
  - Second shift (14:00 to 22:00): Ore transport continues with fewer trucks during off peak hours, although there may still be some congestion during shift changes or peak delivery times.
  - Third shift (22:00 to 06:00): This shift may have reduced ore transport volume, but it will still contribute significantly to the overall haulage demand. The reduced number of deliveries during this shift could help ease congestion during peak daytime hours.

  Ore will typically be transported in daylight hours (06:00 to 18:00) to minimize safety risks. However, night-time transport may still occur for operations running 24/7.

- **Logistics deliveries:** Apart from ore haulage, the mine will need to receive a continuous supply of materials, fuel, and equipment. These deliveries may occur at specific times.

- **Fuel and materials:** Logistics trucks will typically arrive early in the morning or late in the evening likely between 04:00 to 07:00 and 18:00 to 22:00, to avoid congestion and ensure that the mine's operations are uninterrupted during the day.

- **Equipment transport:** Heavy equipment delivery is less frequent but will usually occur during non-peak times or planned intervals, often requiring special permits or routes.

- **Workforce transport:** Workers will be transported to and from the mine in shift rotations. The workforce schedule will include:

- Shift change times: Workers arriving for or leaving their shifts, typically at the beginning and end of each shift. These times will influence traffic flow significantly:
  - Arrival: Workers will arrive ±30-60 minutes before the start of their shift (i.e., 05:00 for the first shift, 13:00 for the second, and 21:00 for the third).
  - Departure: Workers will leave the mine at the end of their shift, typically 30-60 minutes after the shift finishes (i.e., 14:30, 22:30, and 06:30).

Transportation will likely be organized via buses to reduce the number of vehicles on the road, but private vehicles may also be used.

During peak periods, particularly around shift changes and ore haulage windows, there will be noticeable traffic congestion along the R385 and surrounding roads. The concentration of heavy trucks, workforce buses, and other logistics vehicles may cause delays, especially in areas near the mine entrance and along key intersections.

13.1.10 Vehicle Routing Plan

The TIA proposes a Vehicle Routeing Plan (VRP), for the proposed MIOM (refer to Appendix S), for the safe and efficient transport of ore, logistics supplies, and workers.

The following key locations have been identified for the VRP:

- **Makganyane Iron Ore Mine:** The mine site, located just off the R385 between Postmasburg and Sishen, will be the origin and destination for the trucks.

- **Main access roads:** The primary road that will be used by trucks are the R385, which serves the main access road to and from the mine.

- **Postmasburg:** The nearby town is the most likely source for logistics supply deliveries.
- **Japies Rus Mine, Beeshoek Mine and other local mines:** As these mines are in the vicinity, routes may overlap or require special coordination with local road authorities.

Ore transport will be the main traffic flow from the mine, with trucks making regular trips to the Beeshoek Mine for processing. Supply vehicles (fuel, maintenance, food deliveries, etc.) will also use the same roads as ore trucks but with less frequent and more specific delivery times. Workforce buses will be a critical component of the transportation plan, helping to minimize the number of private vehicles on the road.

The following table provides the detailed routing plan for each of the mentioned groups.

Table 81: Vehicle routing plan (TIA).

TYPE OF VEHICLE	ROUTE DESCRIPTION	ROUTE LENGTH	TYPICAL TRAFFIC VOLUME	PEAK PERIOD
Ore transport trucks	From Makganyane Mine → R385 → Beeshoek Mine	30 – 50 km	High (556 trips/ day, round trips)	06:00 – 09:00 and 16:00 – 18:00 (shift change)
Logistics trucks	From Postmasburg → R385 → Makganyane Mine	30 – 40 km	Medium (40 trucks/ day, round trips)	04:00 – 07:00 (morning) and 18:00 – 20:00 (evening)
Workforce buses	From Postmasburg → R385 → Makganyane Mine	20 – 30 km	Low (4 buses/ day, peak during shift changes)	05:00 (morning), 14:00 (afternoon), 22:30 (night)

TYPE OF VEHICLE	ROUTE DESCRIPTION	ROUTE LENGTH	TYPICAL TRAFFIC VOLUME	PEAK PERIOD
Private worker vehicles	From Postmasburg → R385 → Makganyane Mine	20 – 30 km	Low (32 vehicles/ day, peak during shift changes)	05:00, 13:00, 21:00

The VRP, for the proposed MIOM, provides a comprehensive plan for the safe and efficient transport of ore, logistics supplies, and workers. With proper coordination of truck routes, workforce shuttle schedules, and necessary infrastructure improvements, traffic congestion and safety risks can be minimized while ensuring the smooth operation of the mine.

13.1.11 Road Network Adequacy and Improvement Requirements

During the construction phase, traffic volumes on the R385 are expected to increase temporarily due to:

- δ Delivery of construction materials and equipment;
- δ Earthmoving operations and infrastructure development; and
- δ Commuting by construction personnel.

This will result in short-term spikes in both light and heavy vehicle traffic, particularly during peak construction periods. While the total volumes are expected to remain below the adjusted capacity of ±680 vehicles/ day, the unpaved section of the R385 may experience increased wear.

Once the mine is operation, traffic will stabilise and primarily consist of:

- δ Regular heavy vehicle movements for material haulage,
- δ Light vehicle trips by mine employees and service personnel, and
- δ Periodic deliveries and contractor access.

With the projected 2025 background volume of ±393 vehicles/hour, and considering anticipated mine traffic, the R385 is expected to continue operating at an acceptable Level of Service (LOS C or better). The daily demand will remain below the road's effective capacity.

The decommissioning phase will involve:

- Removal of infrastructure and equipment,
- Rehabilitation of the mining site, and
- Movement of decommissioning personnel and materials.

This phase will again introduce short-term, construction-like traffic patterns, with moderate to high heavy vehicle volumes over a limited duration. Traffic impacts will likely be less intense than during initial construction, but more variable and dependent on rehabilitation methods.

Throughout all project phases, the R385 is expected to have sufficient capacity to accommodate the additional mine-related traffic without the need for major upgrades or widening. However, the gravel surface condition and high proportion of heavy vehicles warrant targeted improvements and ongoing maintenance.

13.1.12 Peak Traffic Analysis

The TIA confirms that the R385 is expected to maintain adequate operational performance under the projected traffic conditions for all mine phases, subject to appropriate access control, signage, and ongoing monitoring.

13.1.13 Cumulative Analysis

To assess the cumulative trip generation associated with the proposed MIOM, alongside the existing operations at Kolomela, Beeshoek, Japie's Rus, and Heuningkranz mines, the combined traffic impact from these mining activities needs to be considered. Unfortunately, specific production data for Japie's Rus and

Heuningkranz mines are not readily available, so their contributions will be estimated based on typical small to medium-sized mining operations.

The following table provides a summary of the final cumulative trip generation associated with the mines in the vicinity of Postmasburg.

Table 82: Vehicle routeing plan (TIA).

TRIP CATEGORY	TOTAL ROUND TRIPS PER DAY
Ore transport	3 328
Employee commuting	236
Supply and equipment deliveries	200
GRAND TOTAL (ALL MINES)	3 764 TRIPS/ DAY

The TIA concludes the following regarding the cumulative impact:

- **Environmental concerns:**
  - Dust and emissions: High levels of diesel exhaust, CO_2, and road dust worsen air quality and affect nearby residential areas.
  - Road runoff and erosion: Truck-induced Road damage increases soil erosion and water contamination.
  - Wildlife disruption: Increased Road traffic poses threats to animal movement, leading to habitat fragmentation and roadkill incidents.

- **Road infrastructure and safety:**
  - Higher risk of accidents: More interactions between trucks and smaller vehicles raise collision risks, especially at mine entrances and local roads.
  - Accelerated road deterioration: Frequent heavy truckloads (36 t capacity) will increase potholes, cracks, and maintenance costs.

- **Social and community impact:**
  - Shift changes cause traffic peaks: Local roads near employee drop-off points and settlements will see congestion surges at 6 AM, 2 PM, and 10 PM.
  - Noise and light pollution: Truck operations 24/7 will increase road noise and artificial lighting, affecting residents and local businesses.

The following recommendations can be considered to reduce traffic impacts as a result of the mining operations in the area.

- **Ore transport (heavy trucks)**
  - Shift some ore transport to rail: Reduces truck traffic by 30 – 50%,
  - Dedicated truck bypass roads: Keeps mining traffic away from town centres, and
  - Weight restrictions and road reinforcements: Prevents premature road deterioration.

- **Employee commuting**
  - Increase bus usage: Fewer personal vehicles, reduced congestion at shift changes,
  - Stagger shifts start times: Avoids major traffic spikes, and
  - Carpool incentives: Encourages shared transport, lowering emissions and vehicle volume.

- **Supply and equipment deliveries**
  - Limit daytime deliveries: Prioritize off-peak hours for supply vehicles,
  - Use local suppliers where possible: Reduces long-haul truck trips, and
  - Smart scheduling: Deliveries spaced out to avoid traffic surges.

- **Environmental protection**
  - Dust control measures: Regular water spraying on roads to reduce airborne dust,
  - Lower emission standards: Encourage Euro 6 diesel trucks or electric fleets, and
  - Wildlife corridors and fencing: Protect biodiversity and prevent roadkill incidents.

13.1.14 Conclusion and Recommendations

The TIA examined a wide range of components, beginning with a project description, followed by an analysis of existing traffic conditions, which revealed a 2023 ADT of 3 705 vehicles per day and 546 heavy vehicles.

The proposed mine development was analysed across three lifecycle phases – construction, operational, and decommissioning – with detailed projections of

generated trips during each phase. The traffic operations assessment, including capacity and LOS analyses confirmed that the gravel section of the R385 may experience capacity constraints during peak operations.

A cumulative traffic analysis identified that mine-related traffic, when added to background growth, may result in LOS C and volume-to-capacity ratios of 0.84 and 0.86 suggest that the road will operate near capacity. The safety impact assessment, while limited by the absence of crash data, identified potential safety risks associated with increased heavy vehicle activity and gravel road conditions.

Environmental considerations, including dust, noise, and road surface degradation from increased truck movements, were highlighted as potential concerns. Mitigation measures were proposed to address capacity and safety risks, including selective

paving, signage, and geometric improvements at the access point.

Based on the findings of the assessment, the following recommendations are proposed to manage the traffic impact of the MIOM responsibly and sustainably:

- Routine maintenance of the R385 should be carried out throughout the lifecycle of the mine to ensure the continued safe and efficient operation of the road, particularly given the anticipated increase in heavy vehicle usage.

- Implement access road enhancements at the proposed mine access point including:
  - Widening of the access road to at least 7.5 m to allow two 36-ton trucks to pass safely in opposing directions without encroaching onto road shoulders,
  - Designing bell mouth radii of a least 15 m to accommodate turning movements by large vehicles, ensuring smooth and safe entry/ exit at the mine,
  - Installing appropriate signage and road markings such as advance warning signs (e.g., “Trucks Turning”, “Reduce Speed Ahead”), stop/ yield control signage at the access point, edge line markings and chevron signs for improved visibility, and
  - Ensuring adequate sight distance in both directions based on design speeds, with vegetation clearance and grading adjustments as needed.

- Establish a traffic monitoring programme, particularly during peak operational years, to evaluate performance against projected conditions.
- Engage with local stakeholders regularly to address community concerns and incorporate feedback into ongoing planning.

- δ Ensure compliance with regulatory requirements, including those set out in *TMH 16, the Highway Capacity Manual*, and provincial road agency guidelines.

- δ Incorporate environmental controls, such as dust suppression and surface maintenance, to minimize the impact of mining traffic on surrounding areas.

- δ Review mitigation measures periodically, adjusting interventions as needed based on actual traffic volumes, safety performance, and road conditions.

The TIA concludes that these actions, if implemented in line with the phased development of the mine, will help to ensure safe, efficient, and sustainable transport outcomes for the broader Postmasburg region.

13.2 Other Structures

Apart from farm roads and fences, Makganyene RE/667 contains a farmyard with a house and outbuildings. Several dams are present in the study area, and ruins remain at the old diamond pit (Portion 2 of Makganyene No. 667) that was abandoned. A power line is located within the R385 road reserve, and the IOEC railway line passes through the south-westernmost corner of the proposed mining footprint.

The proposed development of the MIOM is planned within a greenfield area with no built structures and is therefore not expected to negatively impact any existing structures within the footprint. However, certain sections of farm fencing will need to be realigned, and as noted earlier, the active mining area will be enclosed with a game-style fence.

(d) Environmental and current land use map.

The environmental and current land use maps are attached as Appendix B.

v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts.

The following potential impacts were identified for the site establishment/construction phase, operational phase, and decommissioning phase of the proposed project. The significance of each impact was determined in accordance with the methodology outlined in *Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks*. The impacts presented below reflect the assessment **prior** to consideration of the proposed mitigation measures. The degree of mitigation indicates the potential for partial, full, or no mitigation of the identified impacts.

1. SITE ESTABLISHMENT AND CONSTRUCTION PHASE

The site establishment and construction phases will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase*. This section outlines the potential impacts applicable to these phases, incorporating all impacts identified by the specialists.

1.1 Visual Characteristics

Altered landscape and sense of place during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	4	3.7	4	5	4.5	**16.5**

Visibility of the facility to residents during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	4	3.7	4	5	4.5	**16.5**

Dust and construction impact during construction

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	4	4	4	5	4.5	**18**

Impact on local infrastructure and traffic during construction

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	2	2.6	4	5	4.5	**11.7**

1.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**SCENARIO 1**			**Degree of Mitigation: Partial**	
3	4	4	3.7	5	5	5	**18.5**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**SCENARIO 1**			**Degree of Mitigation: Partial**	
2	4	2	2.6	5	5	5	**13**

Noise nuisance caused by site establishment / construction phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	5	4	**9.2**

1.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	4	3.3	3	3	3	**10**

Soil erosion

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	4	3.3	4	3	3.5	**11.7**

Soil compaction

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	2	3	2.5	**7.5**

Soil contamination

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	4	4	4.3	4	5	4.5	**19.5**

1.4 Geohydrology

Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Full**	
+1	2	5	20%	8	32	6.4
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

1.5 Hydrology

Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	5	4.5	**19.4**

Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	4	4.3	4	5	4.5	**19.4**

As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	4	3.7	5	4	4.5	**16.6**

During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	4	4	4	**12**

During the construction period it is anticipated that hazardous chemicals and/or materials may be stored and utilized on site. These could pose a risk to the surface water resources.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	4	4	4	**12**

The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	2	4	4	5	4.5	**18**

1.6 Freshwater Ecosystems

Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	2	2.7	2	5	3.5	**9.5**

Erection and fencing of mining-related infrastructure (stockpile area) within and adjacent to (within the GN 4167 100m ZoR) of the northern EDL, in preparation for mining operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**(C)2 LAYOUT OPTION 1**			**Degree of Mitigation: Full**	
5	4	2	3.7	5	4	4.5	**16.7**

Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	1	2	**4.6**

Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	4	1	2.5	**7.5**

Creation of the stockpile within the immediate catchment of the northern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	2	3.3	4	1	2.5	**8.3**

Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	2	1	2.6	3	5	4	**10.4**

1.7 Terrestrial Biodiversity, Conservation Areas, Groundcover and Fauna

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	5	2	3.5	**9.3**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	2	3.5	**8.2**

Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	5	2	3.5	**9.3**

Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	3	2	2	**4.7**

Potential impact on the ESA during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	4	1	2.5	**5.8**

Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	3	3.3	5	2	3.5	**11.7**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	5	2	3.5	**9.3**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	5	2	3.5	**9.3**

Potential infestation of the footprint area by invasive plant species.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	5	2	3	4	5	4.5	**13.5**

1.8 Heritage, Culture and Palaeontological Environment

Potential physical disturbance of the low-density scatters and exploration trenches and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: N/A**	
1	5	1	2.3	4	1	2.5	**5.8**

Potential physical disturbance of the burial sites and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	5	5	2	1	1.5	**7.5**

Potential physical disturbance of the historical farmhouse

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	5	5	2	1	1.5	**7.5**

Potential impact to fossil heritage

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	5	1	2.3	2	1	1.5	**3.4**

1.9 Socio-Economic Environment

Employment opportunities and skills development (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	4	5	3.7	3	5	4	**14.7**

Economic multiplier effects (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	4	5	3.7	3	4	3.5	**12.9**

Influx of jobseekers and change in population

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	5	4	4	4	4	**16**

Safety and security impacts

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			FINAL PROJECT PROPOSAL			Degree of Mitigation: Partial	
3	4	4	3.7	4	3	3.5	12.9

Increased pressure on local services/resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			FINAL PROJECT PROPOSAL			Degree of Mitigation: Partial	
3	4	4	3.7	4	3	3.5	12.9

Nuisance impacts (noise & dust)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			FINAL PROJECT PROPOSAL			Degree of Mitigation: Partial	
3	4	4	3.7	5	4	4.5	16.5

1.10 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			FINAL PROJECT PROPOSAL			Degree of Mitigation: Full	
1	2	2	1.7	2	1	1.5	2.5

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			FINAL PROJECT PROPOSAL			Degree of Mitigation: Full	
1	2	1	1.3	2	1	1.5	2

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

2. OPERATIONAL PHASE

The operational phase will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operational Phase*. This section outlines the potential impacts applicable to this phase, incorporating all impacts identified by the specialists.

2.1 Visual Characteristics

Altered landscape and sense of place during operation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	4	4	4	5	4.5	**18**

Visibility of the facility to residents during operation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	4	4	4	5	4.5	**18**

Potential visual impact of operational, safety and security lighting during operation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	4	4	3	5	4	**16**

2.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**SCENARIO 1**			**Degree of Mitigation: Partial**	
4	4	4	4	5	5	5	**20**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**SCENARIO 1**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Noise nuisance caused by mining machinery and operations (excluding blasting)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	2	3.3	4	5	4.5	**14.9**

Potential blasting noise and vibration nuisance to neighbouring properties.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	5	2	3	3	5	4	**12**

2.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	3	3.7	4	4	4	**14.7**

Soil erosion

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	4	4	4	3	3.5	**14**

Soil compaction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	2	3	2.5	**7.5**

Soil contamination

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	4	4	4	5	4.5	**18**

Increased fire risk.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	3	3.3	4	5	4.5	**14.8**

2.4 Geohydrology

Negative Impact: Potential impact on the water availability in some of the user boreholes to the north; and

Positive Impact: The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Medium			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Partial**	
+2 -2	3	5	100%	8	32	32
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

Waste water from ablutions potentially impacting the groundwater quality.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Full**	
+1	1	2	40%	4	16	6.4
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

2.5 Hydrology

Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	3	3.7	5	4	4.5	**16.7**

Potential for dirty water to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	3	4	4	5	4.5	**18**

Potential for domestic waste to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	2	3.3	4	4	4	**13.2**

Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	2	3.3	4	4	4	**13.2**

Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	3	3.7	5	4	4.5	**16.7**

2.6 Freshwater Ecosystems

Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	2	3.7	5	4	4.5	**16.7**

Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation (ZoR) of the southern EDL

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	4	1	2.5	**7.5**

Transport of product from Pit 2 to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	3	1	2	**6**

Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	1	2	3	1	2	**4**

Operation and maintenance of the upgraded road crossings within the EDLs.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	1	2	3	1	2	**4**

2.7 Terrestrial Biodiversity, Conservation Areas, Groundcover and Fauna

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	2	3.7	5	5	5	**18.3**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	2	3.3	5	5	5	**16.7**

Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	4	4.5	**10.5**

Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Potential impact on the ESA during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	3	3.3	5	4	4.5	**15**

Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	4	4	5	5	5	**20**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	3	3.3	5	5	5	**16.7**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	3	3.3	5	5	5	**16.7**

Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	4	4.3	5	5	5	**21.7**

Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	3	3.7	5	5	5	**18.3**

Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	3	3.7	5	5	5	**18.3**

Potential infestation of the mining footprint with invasive plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	2	3.3	4	5	4.5	**14.9**

2.8 Heritage, Culture and Palaeontological Environment

Potential physical disturbance of the low-density scatters and exploration trenches and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: N/A**	
1	5	1	2.3	4	1	2.5	**5.8**

Potential physical disturbance of the burial sites and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	5	5	2	1	1.5	**7.5**

Potential physical disturbance of the historical farmhouse

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	5	5	2	1	1.5	**7.5**

Potential negative impact on fossil heritage

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	5	1	2.3	2	1	1.5	**3.4**

2.9 Socio-economic Environment

Direct and indirect employment opportunities **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	5	5	4	3	5	4	**16**

Economic multiplier effect **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	5	5	4	3	4	3.5	**14**

Contribution to local economic development and socio-economic upliftment **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	5	5	4	5	1	3	**12**

Nuisance impacts (noise and dust)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	5	4	4.7	5	5	5	**23.3**

2.10 Health Impact Assessment

Air quality impact on health: all-cause (natural) mortality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 1 & 2**			**Degree of Mitigation: N/A**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: cardiovascular hospital admissions.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 1 & 2**			**Degree of Mitigation: N/A**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: chronic bronchitis.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**SCENARIO 1**			**Degree of Mitigation: Full**	
2	5	2	3	3	2	2.5	**7.5**

Air quality impact on health: acute bronchitis in children.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**SCENARIO 1**			**Degree of Mitigation: Full**	
2	4	2	2.7	3	1	2	**5.4**

Air quality impact on health: lung cancer in adults.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**SCENARIO 1**			**Degree of Mitigation: Full**	
2	4	2	2.7	3	1	2	**5.4**

Water quality impact on health.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	2	2	3	2	2.5	**5**

2.11 Road Network and Traffic Assessment

Traffic congestion on the R385 due to mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	3	3.7	5	4	4.5	**16.5**

Road wear and tear of the R385 due to mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	5	4.7	5	5	5	**23.4**

Safety concerns and accidents on R385 due to mining activities

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	3	4	4	4	4	**16**

Increased air pollution due to increased traffic on the R385

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	5	5	4.7	5	5	5	**23.4**

Increased noise pollution due to increased traffic on the R385

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	3	3.6	4	4	4	**14.4**

Community disruption due to increased traffic on the R385

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	5	4.7	4	4	4	**18.7**

Wildlife disruption due to increased traffic on the R385

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	5	5	4.7	4	4	4	**18.7**

2.12 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

3. DECOMMISSIONING PHASE

The decommissioning phase will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase*. This section outlines the potential impacts applicable to this phase, incorporating all impacts identified by the specialists.

3.1 Visual Characteristics

Landscape character and visual amenity during decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	4	3	4	5	4.5	**13.5**

Site restoration during decommissioning **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	2	2.3	3	5	4	**9.3**

3.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High			**SCENARIO 1**			**Degree of Mitigation: Partial**	
4	4	4	4	5	5	5	**20**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**SCENARIO 1**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Noise nuisance caused during the decommissioning phase.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	5	4	**9.2**

3.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	4	3.3	3	3	3	**10**

Soil erosion

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	4	4	4	3	3.5	**14**

Soil compaction

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	3	3	3	**9**

Soil contamination

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	4	4	4	5	4.5	**18**

3.4 Geohydrology

Negative Impact: Potential impact on the water availability in some of the user boreholes to the north; and

Positive Impact: The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Medium			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Partial**	
+2 -2	3	5	100%	8	32	32
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

3.5 Freshwater Ecosystems

Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	5	2	3	2	4	3	**9**

Post-closure management activities.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	5	2	2.7	2	4	3	**8.1**

3.6 Terrestrial Biodiversity, Conservation Areas, Groundcover and Fauna

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	4	3	3.5	**9.3**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	4	3	3.5	**9.3**

Potential impact on the Freshwater Habitat: EDL and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	2	3	2.5	**5.8**

Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	3	3	3	**7**

Potential impact on the ESA during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	3	3	3	**8**

Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	4	4	4	**12**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	4	4	4	**10.7**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	4	4	4	**10.7**

Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	4	4	4	**10.7**

Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	3	4	3.5	**8.2**

Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	3	4	3.5	**8.2**

Potential infestation of the rehabilitated areas with invasive plant species.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	2	3.3	4	5	4.5	**14.9**

3.7 Socio-economic Environment

Loss of employment opportunities and economic changes

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	5	3.3	5	5	5	**16.7**

Environmental restoration and land use changes (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	2	1	1.7	3	5	4	**6.7**

Infrastructure decommissioning and waste management

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	2	2.5	4	5	4.5	**11.3**

3.8 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

3.9 Potential Residual and/or Latent Environmental Risk

(Refer to Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks – Residual and/or Latent Environmental Risk.)

Veld fires affecting sensitive areas such as the nursery and/or revegetated areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	3	4	4	3	1	2	**8**

Possible development of subsided areas after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	1	3	4	2	3	**9**

Potential for crack development after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	1	2.7	4	2	3	**8**

Insufficient topsoil and subsoil available for rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	1	3.3	5	5	5	**16.5**

Potential of topsoil being diluted and chemically deficient to be used during rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	4	1	3	5	5	5	**15**

Potential contamination of soils

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	1	2.3	4	5	4.5	**10.4**

Potential chemical changes in topsoil and subsoil leading to toxicity

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	1	2.7	4	5	4.5	**12.2**

Dust pollution during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	2	2.7	5	5	5	**13.5**

Potential for wind and water erosion of the denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	1	2.7	4	4	4	**10.8**

Sedimentation of EDL's and PFPs due to water erosion from denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	4	4	4	**12**

Potential of surface water pollution flowing into the mining area.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	2	2.7	3	3	3	**8**

Potential groundwater depletion and/or pollution due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	4	3.7	4	5	4.5	**16.7**

Invasive plant species establishing in the rehabilitated areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	4	2	3.7	4	5	4.5	**16.7**

Potential failure of the nursery that may threaten the rehabilitation process

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	1	3.3	4	5	4.5	**14.9**

Potential impact of livestock browsing/grazing on revegetated areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	1	2.7	4	3	3.5	**9.5**

Potential failure of revegetation of the mined areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	1	3.7	4	5	4.5	**16.7**

Potential hunting, trapping, trafficking and plant harvesting.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	2	2.7	4	3	3.5	**9.5**

Potential degradation of the surrounding areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	2	3	4	3	3.5	**10.5**

Potential failure of rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	1	3.7	4	1	2.5	**9.3**

4. CUMULATIVE IMPACTS

Refer to *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity – 3. Cumulative Impacts.*

vi) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

1. LIST OF POSITIVE IMPACTS ASSOCIATED WITH THE PROJECT PROPOSAL

The following table lists the potential positive impacts associated with the final project proposal.

Table 83: List of potential positive impacts associated with the final project proposal.

PHASE	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE ENHANCEMENT)	SIGNIFICANCE (AFTER ENHANCEMENT)
Site Establishement and Construction Phase	Employement oppertunities and skills development.	Medium	Medium-High
	Economic multiplier effect	Medium	Medium-High
Operational Phase	The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.	Medium	Medium
	Direct and indirect employment opportunties.	Medium-High	Medium-High
	Economic multiplier effect.	Medium	Medium-High
	Contribution to local economic development and socio-economic upliftment.	Medium	Medium
Cumulative Impacts	An increase in employment opportunities, skills development, and business opportunities of the project in isolation.	Medium	N/A
	An increase in employment opportunities, skills development, and business opportunities of the project and other projects in the area.	High	N/A
Decommissioning Phase	Site restoration during decommissioning.	Low-Medium	Medium

PHASE	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE ENHANCEMENT)	SIGNIFICANCE (AFTER ENHANCEMENT)
	The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.	Medium	Medium
	Environmental restoration and land use changes.	Low-Medium	Low-Medium

2. LIST OF NEGATIVE IMPACTS ASSOCIATED WITH THE PROJECT PROPOSAL

The following table lists the potential negative impacts associated with the present project proposal.

Table 84: List of potential negative impacts associated with the final project proposal.

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
Visual Impact Assesment	1. Altered landscape and sense of place during construction. 2. Visibility of the facility to residents during construction. 3. Dust and construction impact during construction. 4. Impact on local infrastructure and traffic during construction.	1. Medium-High 2. Medium-High 3. Medium-High 4. Medium	1. Medium 2. Medium 3. Medium 4. Low-Medium
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$.	1. Medium-High 2. Medium 3. Low-Medium	1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2)

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
	3. Noise nuisance caused by site establishment / construction phase.		3. Low
Geology, soils and agricultural sensitivity	1. Loss of land capability 2. Soil erosion 3. Soil compaction 4. Soil contamination	1. Medium 2. Medium 3. Low-Medium 4. Medium-High	1. Low 2. Low 3. Low 4. Low-Medium
Geohydrology Impact Assessment	1. Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.	1. Low	1. Low
Hydrology Impact Assessment	1. Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality. 2. Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses. 3. As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse. 4. During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality. 5. During the construction period it is anticipated that hazardous chemicals and/or materials may be stored and utilized on site. These could pose a risk to the surface water resources.	1. Medium-High 2. Medium-High 3. Medium-High 4. Medium 5. Medium 6. Medium-High	1. Medium 2. Medium 3. Low-Medium 4. Low 5. Low 6. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
	6. The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.		
Freshwater Ecosystems Impact Assessment	1. Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs. 2. Erection and fencing of mining-related infrastructure (stockpile area) within and adjacent to (within the GN 4167 100m ZoR) of the northern EDL, in preparation for mining operations. 3. Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL. 4. Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining. 5. Creation of the stockpile within the immediate catchment of the northern EDL. 6. Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).	1. Low-Medium 2. Medium-High 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Medium	1. Low-Medium 2. Impact Avoided 3. Low 4. Low-Medium 5. Low-Medium 6. Low-Medium
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase.	1. Low-Medium 2. Low-Medium 3. Low-Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
	2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase. 5. Potential impact on the ESA during the pre-construction and planning phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase. 9. Potential infestation of the footprint area by invasive plant species.	4. Low 5. Low-Medium 6. Medium 7. Low-Medium 8. Low-Medium 9. Medium	4. Low 5. Low 6. Low-Medium 7. Low-Medium 8. Low-Medium 9. Low
Heritage, Culture, and Palaeontological Impact Assessment	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. 2. Potential physical disturbance of the burial sites and/or its context. 3. Potential physical disturbance of the historical farmhouse. 4. Potential impact to fossil heritage.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
Socio-economic Impact Assessment	1. Influx of jobseekers and change in population. 2. Safety and security impacts. 3. Increased pressure on local services/resources. 4. Nuisance impacts (noise & dust).	1. Medium-High 2. Medium 3. Medium 4. Medium-High	1. Medium 2. Low-Medium 3. Low-Medium 4. Medium
Waste Management	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater. 3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).	1. Low 2. Low 3. Low 4. Low	1. Low 2. Low 3. Low 4. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
Visual Impact Assesment	1. Altered landscape and sense of place during operation. 2. Visibility of the facility to residents during operation. 3. Potential visual impact of operational, safety and security lighting during operation.	1. Medium-High 2. Medium-High 3. Medium-High	1. Medium 2. Medium 3. Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. 3. Noise nuisance caused by mining machinery and operations (excluding blasting). 4. Potential blasting noise and vibration nuisance to neighbouring properties.	1. High 2. Medium-High 3. Medium 4. Medium	1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2) 3. Low-Medium 4. Low-Medium
Geology, soils and agricultural sensitivity	1. Loss of land capability 2. Soil erosion 3. Soil compaction 4. Soil contamination 5. Increased fire risk	1. Medium 2. Medium 3. Low-Medium 4. Medium-High 5. Medium	1. Low 2. Low-Medium 3. Low 4. Low-Medium 5. Low
Geohydrology Impact Assessment	1. Potential impact on the water availability in some of the user boreholes to the north. 2. Waste water from ablutions potentially impacting the groundwater quality.	1. Medium 2. Low	1. Low 2. Low
Hydrology Impact Assessment	1. Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality. 2. Potential for dirty water to enter the surrounding watercourses as a result of operations.	1. Medium-High 2. Medium-High 3. Medium 4. Medium	1. Low-Medium 2. Low 3. Low 4. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
	3. Potential for domestic waste to enter the surrounding watercourses as a result of operations. 4. Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations. 5. Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses.	5. Medium-High	5. Low-Medium
Freshwater Ecosystems Impact Assessment	1. Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2). 2. Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation (ZoR) of the southern EDL. 3. Transport of product from Pit 2 to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR. 4. Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL. 5. Operation and maintenance of the upgraded road crossings within the EDLs.	1. Medium-High 2. Low-Medium 3. Low-Medium 4. Low 5. Low	1. Medium 2. Low 3. Low 4. Low 5. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase. 5. Potential impact on the ESA during the mining phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase. 9. Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase. 10. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase. 11. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase.	1. Medium-High 2. Medium-High 3. Medium 4. Medium-High 5. Medium-High 6. High 7. Medium-High 8. Medium-High 9. Medium 10. Medium-High 11. Medium-High 12. Medium	1. Medium-High 2. Medium 3. Low-Medium 4. Medium 5. Medium 6. Medium-High 7. Medium-High 8. Medium-High 9. Medium-High 10. Medium-High 11. Medium-High 12. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
	12. Potential infestation of the mining footprint with invasive plant species.		
Heritage, Culture, and Palaeontological Impact Assessment	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. 2. Potential physical disturbance of the burial sites and/or its context. 3. Potential physical disturbance of the historical farmhouse. 4. Potential impact to fossil heritage.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low
Socio-economic Impact Assessment	1. Nuisance impacts (noise & dust).	1. High	1. Low
Health Impact Assessment	1. Air quality impact on health: all-cause (natural) mortality. 2. Air quality impact on health: cardiovascular hospital admissions. 3. Air quality impact on health: chronic bronchitis. 4. Air quality impact on health: acute bronchitis in children. 5. Air quality impact on health: lung cancer in adults. 6. Water quality impact on health.	1. Low (Scenario 1 & 2) 2. Low (Scenario 1 & 2) 3. Low-Medium (Scenario 1) 4. Low-Medium (Scenario 1) 5. Low-Medium (Scenario 1) 6. Low-Medium	1. Low (Scenario 1 & 2) 2. Low (Scenario 1 & 2) 3. Low (Scenario 2) 4. Low (Scenario 2) 5. Low (Scenario 2) 6. Low
Road Network and Traffic Impact Assessment	1. Traffic congestion on the R385 due to mining activities. 2. Road wear and tear of the R385 due to mining activities.	1. Medium-High 2. High 3. Medium-High 4. High	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
	3. Safety concerns and accidents on R385 due to mining activities. 4. Increased air pollution due to increased traffic on the R385. 5. Increased noise pollution due to increased traffic on the R385. 6. Community disruption due to increased traffic on the R385. 7. Wildlife disruption due to increased traffic on the R385.	5. Medium 6. Medium-High 7. Medium-High	5. Low-Medium 6. Low-Medium 7. Low-Medium
Waste Management	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater. 3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).	1. Low 2. Low 3. Low 4. Low	1. Low 2. Low 3. Low 4. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
CUMULATIVE IMPACTS			
Visual Impact Assesment	1. Overall visual impact of the proposed project considered in isolation. 2. Overall visual impact of the proposed project and other projects within the area.	N/A	1. Medium 2. Medium-High

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
CUMULATIVE IMPACTS			
Socio-economic Impact Assessment	1. Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project in isolation). 2. Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project and other projects in the area).	N/A	1. Medium 2. Medium-High

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
Visual Impact Assesment	1. Landscape character and visual amenity during decommissioning phase.	Medium	1. Medium 2.
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. 3. Noise nuisance caused during the decommissioning phase.	1. High 2. Medium-High 3. Medium	1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2) 3. Low
Geology, soils and agricultural sensitivity	1. Loss of land capability 2. Soil erosion 3. Soil compaction	1. Medium 2. Medium 3. Low-Medium	1. Low 2. Low-Medium 3. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
	4. Soil contamination	4. Medium-High	4. Low
Geohydrology Impact Assessment	1. Potential impact on the water availability in some of the user boreholes to the north.	1. Medium	1. Low
Freshwater Ecosystems Impact Assessment	1. Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs. 2. Post-closure management activities.	1. Low-Medium 2. Low-Medium	1. Low 2. Low
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the decommissioning phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase. 5. Potential impact on the ESA during the decommissioning phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Medium 7. Medium 8. Medium 9. Medium 10. Low-Medium 11. Low-Medium 12. Medium	1. Low-Medium 2. Low-Medium 3. Low 4. Low-Medium 5. Low 6. Low-Medium 7. Low-Medium 8. Low-Medium 9. Low-Medium 10. Low-Medium 11. Low-Medium 12. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
	9. Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase. 10. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase. 11. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase. 12. Potential infestation of the rehabilitated areas with invasive plant species.		
Socio-economic Impact Assessment	1. Loss of employment opportunities and economic changes. 2. Infrastructure decommissioning and waste management.	1. Medium-High 2. Medium	1. Medium 2. Low-Medium
Waste Managment	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater. 3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).	1. Low 2. Low 3. Low 4. Low	1. Low 2. Low 3. Low 4. Low

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
Refer to *Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks – Methodology that was used to assess the latent risk*			
Potential Residual and/or Latent Environmental Risk	1. Veld fires affecting sensitive areas such as the nursery and/or revegetated areas. 2. Possible development of subsided areas after rehabilitation. 3. Potential for crack development after rehabilitation. 4. Insufficient topsoil and subsoil available for rehabilitation. 5. Potential of topsoil being diluted and chemically deficient to be used during rehabilitation. 6. Potential contamination of soils. 7. Potential chemical changes in topsoil and subsoil leading to toxicity. 8. Dust pollution during the decommissioning phase. 9. Potential for wind and water erosion of the denuded areas. 10. Sedimentation of EDL's and PFPs due to water erosion from denuded areas. 11. Potential of surface water pollution flowing into the mining area. 12. Potential groundwater depletion and/or pollution due to mining activities. 13. Invasive plant species establishing in the rehabilitated areas.	1. Uncertain Risk 2. Uncertain Risk 3. Uncertain Risk 4. Potential Significant 5. Potential Significant 6. Potential Significant 7. Potential Significant 8. Potential Significant 9. Potential Significant 10. Potential Significant 11. Uncertain Risk 12. Potential Significant 13. Potential Significant 14. Potential Significant 15. Uncertain Risk	1. Uncertain Risk 2. Uncertain Risk 3. Uncertain Risk 4. Potential Significant 5. Uncertain Risk 6. Insignificant Risk 7. Insignificant Risk 8. Uncertain Risk 9. Uncertain Risk 10. Uncertain Risk 11. Insignificant Risk 12. Potential Significant 13. Insignificant Risk 14. Insignificant Risk 15. Insignificant Risk 16. Insignificant Risk 17. Insignificant Risk 18. Uncertain Risk 19. Insignificant Risk

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
	14. Potential failure of the nursery that may threaten the rehabilitation process. 15. Potential impact of livestock browsing/grazing on revegetated areas. 16. Potential failure of revegetation of the mined areas. 17. Potential hunting, trapping, trafficking and plant harvesting. 18. Potential degradation of the surrounding areas. 19. Potential failure of rehabilitation.	16. Potential Significant 17. Uncertain Risk 18. Potential Significant 19. Uncertain Risk	

vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

METHODOLOGY FOR THE ASSESSMENT OF THE POTENTIAL ENVIRONMENTAL, SOCIAL AND CULTURAL IMPACTS

1. DEFINITIONS AND CONCEPTS

1.1 Environmental significance

The concept of significance is at the core of impact identification, evaluation, and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognized from the various interpretations:

- δ Environmental significance is a value judgment
- δ The degree of environmental significance depends on the nature of the impact
- δ The importance is rated in terms of both biophysical and socio-economic values

- Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of consequences being realized (Environment Australia (1999) Environmental Risk Management).

1.2 Impact

The positive or negative effects on human well-being and / or the environment.

1.3 Consequence

The intermediate or outcome of an event or situation OR it is the result, on the environment, of an event.

1.4 Likelihood

A qualitative term covering both probability and frequency.

1.5 Frequency

The number of occurrences of a defined event in each time or rate.

1.6 Probability

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

1.7 Environment

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation (ISO 14004, 1996).

2. METHODOLOGY THAT WAS USED

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence X Overall Likelihood

2.1 Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information, and the outcome can be positive or negative. Several factors can be used to determine consequence. For determining the environmental significance in terms of consequence, the following factors were chosen ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

2.2 Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment. Table 85 will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 85: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

TYPE OF CRITERIA	RATING				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/	Low cost to mitigate	Substantial cost to mitigate/	High cost to mitigate	Prohibitive cost to mitigate/

TYPE OF CRITERIA	RATING				
	1	2	3	4	5
	High potential to mitigate impacts to level of insignificance/ Easily reversible		Potential to mitigate impacts/ Potential to reverse impact		Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna, and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

2.3 Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g., remedial action takes place.

Table 86: Criteria for the rating of duration.

RATING	DESCRIPTION
1	Up to one month
2	One month to three months (quarter)
3	Three months to one year
4	One to ten years
5	Beyond ten years

2.4 Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect, or impact.

Table 87: Criteria for the rating of extent / spatial scale.

RATING	DESCRIPTION
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area

RATING	DESCRIPTION
5	Regional, National, International

2.5 Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below and then dividing the sum by 3.

Table 88: Example of calculating overall consequence.

CONSEQUENCE	RATING
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	**10**
TOTAL CONSEQUENCE: (Subtotal divided by 3)	**3.3**

2.6 Determination of Likelihood

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

2.7 Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect, or impact, is undertaken.

Table 89: Criteria for the rating of frequency.

RATING	DESCRIPTION
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

2.8 Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 90: Criteria for the rating of probability.

RATING	DESCRIPTION
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

2.9 Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarized below and then dividing the sum by 2.

Table 91: Example of calculating overall likelihood.

CONSEQUENCE	RATING
Frequency	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD (Subtotal divided by 2)	**3**

2.10 Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH,** or **HIGH**, as shown in the table below.

Table 92: Determination of overall environmental significance.

SIGNIFICANCE OR RISK	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Overall Consequence x Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

2.11 Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritizations and decision-making process associated with this event, aspect or impact.

Table 93: Description of environmental significance and related action required.

SIGNIFICANCE	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

High — Of the highest order possible within the bounds of impacts, which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.

Medium-High — Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the

	case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
Medium	Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and easily possible. In case of positive impacts; other means of achieving these benefits would be about equal in time, cost, and effort.
Low-Medium	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved of little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or several ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

METHODOLOGY FOR THE ASSESSMENT OF THE RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS.

1. METHODOLOGY THAT WAS USED TO ASSESS THE LATENT RISK

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence x Overall Likelihood

1.1 Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information, and the outcome can be positive or negative. Several factors can be used to determine consequence. For the purpose of determining the environmental significance in terms of consequence, the following factors were chosen: ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

1.2 Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact on the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

Table 94 will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 94: Rating of severity used in the assessment of potential latent risks.

Type of criteria	Rating				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna, and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

1.3 Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk, or impact, if no intervention e.g. remedial action takes place.

Table 95: Rating of duration used in the assessment of potential latent risks.

RATING	DESCRIPTION
1	Up to one month
2	One month to three months (quarter)
3	Three months to one year
4	One to ten years
5	Beyond ten years

1.4 Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect, or impact.

Table 96: Rating of extent / spatial scale used in the assessment of potential latent risks.

RATING	DESCRIPTION
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighboring farm area
5	Regional, National, International

1.5 Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below and then dividing the sum by three.

Table 97: Example of calculating overall consequence in the assessment of potential latent risks.

CONSEQUENCE	RATING
Severity	Example 4
Duration	Example 2

CONSEQUENCE	RATING
Extent	Example 4
SUBTOTAL	**10**
TOTAL CONSEQUENCE: (Subtotal divided by 3)	**3.3**

1.6 Determination of Likelihood:

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

1.7 Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect, or impact, is undertaken.

Table 98: Rating of frequency used in the assessment of potential latent risks.

RATING	DESCRIPTION
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

1.8 Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 99: Rating of probability used in the assessment of potential latent risks.

RATING	DESCRIPTION
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

1.9 Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarised below and then dividing the sum by two.

Table 100: Example of calculating overall likelihood in the assessment of potential latent risks.

CONSEQUENCE	RATING
Frequency	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD (Subtotal divided by 2)	**3**

1.10 Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the significance of the risk, which is a number that will then fall into a range of **Insignificant risk, Uncertain Risk,** or **Significant Risk**, as shown in the table below.

Table 101: Determination of overall environmental significance in the assessment of potential latent risks.

SIGNIFICANCE OR RISK	INSIGNIFICANT RISK (CC)	UNCERTAIN RISK (BB)	POTENTIAL SIGNIFICANT RISK (AA)
Overall Consequence X Overall Likelihood	1 - 4.9	5 - 9.9	10 – 19.9

1.11 Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritisations and decision making process associated with this event, aspect, or impact.

Table 102: Description of environmental significance and related action required in the assessment of potential latent risks.

SIGNIFICANCE	AN INSIGNIFICANT RISK (CC)	AN UNCERTAIN RISK (BB)	A POTENTIAL SIGNIFICANT RISK (AA)
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable

SIGNIFICANCE	AN INSIGNIFICANT RISK (CC)	AN UNCERTAIN RISK (BB)	A POTENTIAL SIGNIFICANT RISK (AA)
	Acceptable.		
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Improve management measures to reduce risk.

Based on the above, the significance rating scale has been determined as follows:

A potential Risk (aa) — Risks of a substantial order. Mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these.

An uncertain risk (bb) — Risk would be negligible. Almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple.

An insignificant risk (cc) — There would be very small to no risk.

viii) The possible mitigation measures that could be applied and the level of risk.

The following mitigation measures were identified during the EIA, with input from specialists, to reduce or minimise the potential risks of the proposed MIOM development on the receiving environment. Each mitigation measure is presented alongside the corresponding impact and grouped according to the relevant environmental attribute.

1. VISUAL CHARACTERISTICS

1.1 Impact: Altered Landscape and Sense of Place

Possible Mitigation Measures: Construction Phase

δ Minimise Land Disturbance: Limit the construction footprint to the minimum necessary for the proposed development. Use only the required area to preserve the existing landscape and unique sense of place.

- δ Use of Natural Colours and Materials: Use materials and colours that blend with the existing landscape for any temporary structures or construction materials. Mimic the texture and colours of the natural environment.
- δ Vegetative Screens: At key points of sensitivity, indigenous vegetation may be planted around the construction site's perimeter to act as a natural screen.
- δ Localised Construction: Focus construction activities in smaller, localised areas rather than spreading out across the entire site simultaneously.
- δ Revegetation for Restoration: Post-construction, prioritise revegetation efforts, especially in areas where native vegetation was disturbed.
- δ Community Engagement: Engage with the local community and stakeholders in the surrounding area to understand their values and concerns related to the landscape and sense of place.
- δ Minimise Night-time Activities: Limit construction activities during the night to reduce light pollution, for nearby sensitive receptors.

Possible Mitigation Measures: Operational Phase

- δ Minimise Visual Impact: Use low-reflectivity materials and colours that blend with the natural landscape to reduce the visual impact of the structures where possible.
- δ Landscaping and Screening: Plant vegetation that blends with the existing landscape around the perimeter of the facility to screen views of the structures where required.
- δ Minimise Lighting: Use minimal lighting at the facility and ensure that any necessary lighting is directed downwards and shielded to reduce light pollution.
- δ Regular Maintenance: Regularly maintain the facility and the surrounding landscape to ensure that it remains in good condition and blends in with the natural environment.
- δ Community Engagement: Engage with the local community to understand their concerns and incorporate their feedback into the design and operation of the facility, where feasible.

1.2 Impact: Visibility of the Facility to Residents

Possible Mitigation Measures: Construction Phase

- δ Make use of landscaping techniques and visual screening to reduce the impact as best possible.
- δ Site Screening: Use natural topography, existing vegetation, or temporary screens to shield construction activities from viewers. Situate construction activities in lower-

lying areas or behind hills. Use screens made of materials that blend with the natural environment.

- δ Minimise Structure Heights: Keep temporary structure heights to a minimum to reduce their visibility, where possible. Use materials and colours that blend with the surrounding landscape.
- δ Lighting Control: Minimise light pollution by directing lights downwards, using shields to prevent light spill, and turning off lights when not in use.
- δ Strategic Placement: Where possible, prioritise the placement of taller construction equipment and initial mining structures in areas less visible to the majority of residents.

Possible Mitigation Measures: Operational Phase

- δ Enhanced Landscaping and Screening: Focus on implementing landscaping and natural screening methods only where practically feasible to reduce the visibility of the mining infrastructure from local residents, travellers along the R385, and key viewpoints.
- δ Vegetative Screening: At key points of sensitivity, native trees and shrubs may be planted to create natural screens that obscure the view from nearby residents and travellers along the R385.
- δ Regular Maintenance: Regular maintenance of the mining infrastructure and its surroundings can help to ensure that it remains as unobtrusive as possible. This would include keeping structures clean and in good repair and maintaining vegetative screening.
- δ Periodic Review: Conduct a periodic review of the effectiveness of the mitigation measures and make necessary adjustments. This is particularly important given the long operational phase of the project.

1.3 Impact: Dust and Construction

Possible Mitigation Measures: Construction Phase

- δ Dust Suppression: Regularly water down the construction site, especially during dry and windy conditions, to minimise dust generation.
- δ Vehicle Speed Limits: Implement strict speed limits for construction vehicles within the site to reduce dust kick-up.
- δ Use of Dust Screens: Install dust screens or barriers around the construction site, particularly in areas close to sensitive receptors, to contain dust within the site.

- δ Rehabilitation of Disturbed Areas: Promptly rehabilitate areas where construction activities have ceased. Re-vegetate with native species or suitable ground cover to stabilise the soil and reduce dust generation.
- δ Machinery Maintenance: Ensure construction machinery is well-maintained to minimise excessive noise and vibrations.
- δ Work Hours: Where possible, restrict the noisiest construction activities to daytime hours and avoid work during early mornings, late evenings, or weekends when residents are more likely to be at home, where feasible.
- δ Community Communication: Keep the local community informed about construction schedules, especially during particularly disruptive activities. This allows residents to prepare or adjust their schedules accordingly.

1.4 Impact: On Local Infrastructure and Traffic

Possible Mitigation Measures: Construction Phase

- δ Construction Traffic Management Plan: Develop and implement a plan to manage the movement of construction vehicles and minimise disruption to local traffic. Schedule deliveries and heavy vehicle movements outside of peak traffic times.
- δ Traffic Control Measures: Implement traffic control measures, such as flaggers, temporary traffic signals, and signage, to ensure safe and efficient traffic flow around the construction site.
- δ Infrastructure Protection Measures: Implement measures to protect local infrastructure from damage. Use appropriate vehicles and equipment to minimise wear and tear on local roads.
- δ Post-Construction Rehabilitation: Repair any damage caused to local infrastructure after construction. Restore the area to its pre-construction condition by repairing roads, replacing damaged vegetation, and removing temporary structures or equipment.

1.5 Impact: Potential Visual Impact of Operational, Safety, and Security Lighting

Possible Mitigation Measures: Operational Phase

- δ Downward-facing Lights: Use fixtures that direct light downwards to minimise upward light spill, preserving the night sky.
- δ Motion Sensors: Install motion sensors so that lights are only activated when necessary, reducing the duration of light emissions.
- δ Low-intensity Lighting: Opt for low-intensity lighting that provides sufficient illumination for safety without being overly bright.

- δ Shielding: Use shields on lights to direct illumination to the intended areas and prevent light spill into unintended areas.
- δ Educate Staff: Ensure that staff are aware of the importance of minimising light pollution and are trained to use lighting efficiently.
- δ Periodic Reviews: Conduct periodic reviews of lighting practices to identify and rectify any unnecessary light emissions.

1.6 Impact: Landscape Character and Visual Amenity during Decommissioning

Possible Mitigation Measures: Decommissioning Phase

- δ Gradual Dismantling: Instead of removing all infrastructure at once, consider a phased approach.
- δ Re-use of Infrastructure: Where possible, consider re-using some of the infrastructure for other purposes. For example, access roads could be left in place for use by local landowners, if appropriate and agreed upon.
- δ Site Restoration: Prioritise immediate restoration of areas once the infrastructure is removed, including re-vegetation with native species.
- δ Minimise Ground Disturbance: Use techniques that minimise ground disturbance during the removal of infrastructure.
- δ Waste Management: Ensure all materials, especially non-biodegradable ones, are properly disposed of or recycled, leaving no remnants behind.
- δ Monitoring: Post-decommissioning, monitor the site's recovery and implement any necessary interventions to ensure successful landscape restoration.

1.7 Impact: Site Restoration during Decommissioning

Possible Enhancement Measures: Decommissioning Phase

- δ Native Vegetation: Use native and local plant species for re-vegetation to ensure ecological compatibility and enhance biodiversity.
- δ Soil Conservation: Employ techniques to prevent soil erosion and promote soil health during and after restoration.
- δ Water Management: Ensure proper drainage and water management to prevent waterlogging or erosion.
- δ Regular Monitoring: Conduct regular site inspections to assess the success of restoration efforts and intervene where necessary.
- δ Community Engagement: Engage with the local community to gather feedback on restoration efforts and address any concerns.

- δ Waste Management: Ensure all decommissioned materials are properly disposed of or recycled, leaving no remnants behind.

2. AIR QUALITY AND NOISE AMBIANCE

2.1 Impact: Potential impact of the proposed mining and materials handling activities on ambient air quality.

Possible Mitigation Measures: Site Establishment/Construction, Operational and Decommissioning Phase

- δ Dust must be effectively suppressed on all exposed surfaces using water spraying and/or environmentally friendly dust-allaying agents that do not contain PCBs (e.g., DAS products). The application frequency must be increased during dry or windy periods.
- δ Haul roads between the pit and stockpiles, as well as stockpile areas, must be treated with chemical suppressants. Suppressants must be approved products and applied according to the manufacturer's guidelines to maintain dust levels below acceptable thresholds.
- δ Windbreaks or three-sided enclosures must be installed around the ore stockpile, waste rock dump, and open pits to minimize wind-blown dust. Control efficiencies must align with those recommended in the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook.
- δ Topsoil stockpiles must be seeded with indigenous grass species within 30 days of formation to stabilize the surface and capture windblown dust. Areas devoid of vegetation must be minimized, and vegetation clearing may only occur immediately before mining commences.
- δ Operational water sprayers must be installed and maintained on the crusher plant and conveyor transfer points to minimize dust.
- δ Strips of used conveyor belts could be affixed to the discharge ends of conveyor belts to limit fines escaping into the air.
- δ Compacted dust and spillage must be removed from the crusher plant on a weekly basis to prevent accumulation and secondary dust emissions.
- δ The Mine Right Holder must implement and maintain a site-specific Dust Management Plan. Fall-out dust monitoring must be conducted in accordance with ASTM D1739 (SANS 1137:2012) and the National Dust Control Regulations, GN R827 of 2013. Monitoring reports must be compiled monthly and retained for auditing.

- δ Vehicle speeds on all internal access roads must be limited to <30 km/h, with signage in place, to reduce dust generation.
- δ Transport loads must be flattened and securely covered to prevent spillage and windblown dust during haulage.
- δ Weather conditions must be considered before starting daily operations. Dust-generating activities must be paused or rescheduled during strong winds to reduce airborne dust.
- δ The mine manager must ensure that all dust suppression equipment is inspected monthly and maintained to ensure functionality. An effectiveness review of the suppression measures must be undertaken bi-annually, and adjustments made as needed.

2.2 Impact: Noise Nuisance caused by mining (including blasting)

Possible Mitigation Measures: Site Establishment/Construction, Operational and Decommissioning Phase

- δ Employees and visitors must comply with site rules prohibiting unnecessary shouting, hooting, and other noise disturbances.
- δ No loud music may be permitted at the mining area.
- δ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- δ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.
- δ The monitoring of noise pollution during night shift must be part of the noise monitoring regime of the mine. If the noise pollution exceed acceptable limits (according to the monitoring specialist) implement corrective actions within one month.
- δ Drilling and blasting may only take place from Monday to Friday during daylight hours (08:00–17:00), unless otherwise authorised by the relevant authority. Other mining activities may continue on a 24-hour basis.
- δ The type, duration, and timing of the blasting procedures must be planned with due cognizance of other land users and structures in the vicinity. The surrounding landowners must be notified in writing prior to each blasting occasion.
- δ All blasts must be designed in accordance with the United States Bureau of Mines (USBM) criteria for ground vibration and airblast. Airblast and ground vibration

monitoring must continually be implemented at sensitive receptors, and if monitoring results indicate exceedance of the USBM criteria, the blast design must immediately be reviewed and amended to ensure compliance.

3. GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY

3.1 Impact: Loss of Land Capability

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- δ Direct surface disturbance of the identified arable soils must be avoided where possible to minimise loss of arable soils.
- δ The proposed development and associated surface infrastructure must be limited to within the demarcated footprint area.
- δ Soils of different characteristics must be stockpiled separately and clearly demarcated.
- δ The dumping of waste materials next to or on the stockpiles must be prohibited.
- δ Construction of surface infrastructure must preferably be limited to areas of the footprint or on already significantly disturbed soils.

3.2 Impact: Stockpile and Stripping Management

Possible Mitigation Measures: Site Establishment/Construction, and Operational Phase

- δ Excavation and long-term stockpiling of soil must be limited within the demarcated areas.
- δ Ensure all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined “no-go areas”.
- δ Restrict the amount of mechanical handling, as each handling event increases the compaction level and the changes to the soil structure. Wherever possible, the ‘cut and cover’ technique (where the stripped soils is immediately placed in an area already prepared for rehabilitation, thus avoiding stockpiling) should be used.
- δ Separate stockpiles of different soils to achieve the highest post-development land capability and thus reduce the residual loss of agricultural potential.
- δ Stockpile height must be restricted to that which can be deposited without additional traversing by machinery. A maximum height of 4-5 m is therefore proposed, and the stockpile must be treated with temporary soil stabilisation methods, such as the application of organic matter to promote soil aggregate formation, leading to

increased infiltration rate, thereby reducing soil erosion. Also, the use of agricultural lime to stabilise soil pH levels.

- δ The topsoil stockpile must be vegetated and while vegetating, measures will be needed to contain erosion of the stockpile during rain events.
- δ Temporary berms can be installed, around stockpile areas whilst vegetation cover has not established to avoid soil loss through erosion.

3.3 Impact: Soil Compaction Management

Possible Mitigation Measures: Site Establishment/Construction, Operational and Decommissioning Phase

- δ Soil compaction is usually greatest when soils are moist, so soils must ideally be stripped when moisture content is as low as possible. If they have to be moved when wet, truck and shovel should be used as bowl scrapers create excessive compaction when moving on wet soils;
- δ Minimise compaction during the stockpiling phase by keeping stockpile soil loose and limit stockpile height to 4-5 meters height, to limit internal soil compaction.
- δ Compaction must be minimised by use of appropriate equipment and replacing soil to the greatest possible thickness in single lifts.
- δ Heavy equipment movement over replaced soils should be minimized.
- δ Following placement, compacted soils should be ripped to full rooting depth (at least 60 cm or 30 cm as the bare minimum seedbed) to allow penetration of plant roots.

3.4 Impact: Soil Contamination Management

Possible Mitigation Measures: Site Establishment/Construction, Operational and Decommissioning Phase

- δ Contamination prevention measures must be addressed in the EMPR for the proposed development, and this must always be implemented and made available and accessible to the contractors and construction crew conducting the works on site for reference.
- δ A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans must also be compiled to guide the construction works.
- δ An emergency response contingency plan must be put in place to address clean-up measures should a spill and/or a leak occur, as well as preventative measures to prevent contamination.

- δ Burying of any waste including rubble, domestic waste, empty containers on the site must be strictly prohibited and all construction rubble waste must be removed to an approved disposal site.

3.5 Impact: Soil Erosion and Dust Emissions Management

Possible Mitigation Measures: Site Establishment/Construction, Operational and Decommissioning Phase

- δ The footprint of the proposed development and construction activities must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible.
- δ Bare soils within the access roads can be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast.
- δ All disturbed areas adjacent to the proposed development areas must be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission.
- δ Temporary erosion control measures must be used to protect the disturbed soils during the construction phase until adequate vegetation has established.

3.6 Impact: Increased Fire Risk

Possible Mitigation Measures: Operational Phase

- δ No open fires may be permitted in nature. Contained fires for heating and cooking (i.e. in a fire drum) but be restricted to designated areas at the site camp.
- δ Employees must be prevented from setting fires randomly outside designated areas.
- δ No fuel or chemicals may be stored under trees.
- δ Gas may not be stored in the same storage area as liquid fuel.
- δ Smoking may only occur at designated areas (>3 m from fuel or chemical storage areas) equipped with sand buckets for the disposal of cigarette buds.
- δ All work areas must be furnished with adequate firefighting equipment. This includes at least rubber beaters when working in veld areas, and at least one fire extinguisher of the appropriate type irrespective of the site.
- δ Specific fire safety precautions must be implemented during welding activities associated with construction work. Ensure a working fire extinguisher is immediately at hand if any “HOT WORK” is undertaken e.g. welding, grinding, gas cutting etc,

- δ Any fires noted on site must be reported to the responsible SHE rep and/or fire officer.
- δ The site must implement fire emergency procedures for the duration of the site establishment-, operational-, and decommissioning phases.
- δ In the event of large fires all personnel must assemble at a safe assembly point to be transported from site. The fire department or local fire watch must be informed of the fire to ensure that the fire is brought under control as soon as possible.

4. GEOHYDROLOGY

4.1 Impact: Generation of Stockpile Area and WRD affecting the Groundwater Recharge and/or Quality.

Possible Mitigation Measures: Site Establishment/Construction and Operational Phase

- δ The detailed design, construction, operation and closure of the WRD must be undertaken in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended).
- δ Quarterly groundwater monitoring (i.e. sampling and water level measurements) must be conducted to continuously assess the impacts of the MIOM activities on groundwater quality and quantity.
- δ The five areas identified by the specialist (Appendix E) must be monitored to emphasis different aspects of monitoring. Existing exploration boreholes located in advantageous positions should be used for monitoring purposes.
- δ The monitoring of some of the active user boreholes located within at least a 1 km radius (but preferably 2 km) of the planned mining activities must be considered.
- δ Groundwater samples must be analysed at a SANAS accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities.

4.2 Impact: Waste Water from Ablutions Potentially Impacting the Groundwater Quality.

Possible Mitigation Measures: Operational Phase

- δ Routine maintenance of the sewage system must be done to decrease the risk of failure and spillage.

5. HYDROLOGY

5.1 Impacts: Increased Risk of Erosion on Water Quality, Increased Surface Flow Entering Nearby Watercourses, Agitation and Dispersal of Soils due to Vegetation Clearance.

Possible Mitigation Measures: Site Establishment/Construction, Operational, and Decommissioning Phase

- δ A competent Environmental Control Officer (ECO) must oversee the construction, operation and rehabilitation phases of the project, with watercourse areas as a priority.
- δ An Erosion Risk Assessment and Management Plan must be completed before commencement and implemented to derive the areas at highest risk for erosion. These high-risk areas must then be key points for erosion management throughout the entirety of the project lifecycle.
- δ Areas where works are envisaged must (where practical) be limited to the extent of the footprint, and activities outside of the footprint must be kept to a minimum.
- δ Vegetation may only be removed where absolutely necessary and the areas which can be rehabilitated, must be rehabilitated in a timely manner.
- δ Vehicle movement must be kept to a minimum to reduce soil compaction and limited to existing or proposed roadways where practical.
- δ Any soil excavated during the works, must be appropriately stored in stockpiles which are protected from erosion.
- δ For the duration of the project, stormwater runoff must be directed away from active earthworks.
- δ Signs of erosion must be addressed immediately to prevent further erosion; Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching.
- δ Dust suppression must be implemented.
- δ The use of sediment traps and/or silt fences is encouraged.
- δ Surface run-off from the project area flowing down the embankments often scours the watercourse on the sides of the stormwater infrastructure causing sedimentation of the river channel. This must be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows.

- The MIOM must have and implement a Rehabilitation Plan that will be active during the life of mine, as well as post-decommissioning. To ensure that ecological integrity and ecosystem services can be restored in the event of degraded wetlands and aquatic habitats.

5.2 Impact: Water Quality affected by Domestic Waste and Hazardous Chemicals

Possible Mitigation Measures: Site Establishment/Construction, Operational, and Decommissioning Phase

- All contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping"
- No dumping of any waste or material on-site may take place.
- All domestic waste must be placed in predefined storage areas and removed from the workings area. These areas must lie outside the 100-year floodline.
- Staff must use ablution facilities, which must be located away from the flood plain.
- Staff must actively inspect the area for any domestic waste.
- All dangerous goods must be stored in bunded areas located outside the 100-year floodline.
- Safety Data Sheets must be easily accessible on site.
- All hazardous materials must be clearly marked, and appropriate PPE utilized.
- Vehicles and equipment must be stored in designated area outside the 100yr floodline.
- Spill prevention and response plans must be developed to address potential leaks or spills of fuels, oils, or other hazardous substances.
- The stormwater management plan must factor in the stockpile and waste dump areas, and any associated runoff must be captured and re-used.
- Trucks utilized for the transport of product must be covered to prevent fines from entering the surrounding environment.
- The MIOM must have and implement a Remediation Plan that encompasses all types of pollution events associated with a Mine.

5.3 Impact: Stream Diversions impact the Riverine Habitats

Possible Mitigation Measures: Site Establishment/Construction Phase

- δ The delineated water resources must be marked as no-go areas. In the event that this is unavoidable, all means necessary must be taken to limit impacts to these and restrict the impacts to the smallest footprint.
- δ Future mining activities must be located away from the water resources and associated floodlines.
- δ Instream activities must be considered as least favourable options.
- δ Should any instream activities be required such as the diversion of streams or channel modifications these must occur in the dry period to prevent any unforeseen risks of erosion or inundation of the site.
- δ Measures to prevent erosion of the area immediately downstream of the activity must be implemented. These could be the installation of gabions to prevent scour of the immediate downstream regions.

5.4 Impact: Potential of Dirty Water Entering the Surrounding Watercourses

Possible Mitigation Measures: Operational Phase

- δ A stormwater management plan (Appendix F) must be implemented.
- δ Mining methods should aim to minimise discharge and promote the re-use of water within the operations.
- δ Dirty water catchment areas must be bunded.
- δ Dirty water must be contained in storage facilities, such as wastewater control dams.
- δ This water must either be treated and discharged or re-used within the operations.
- δ Surface water quality sampling must be undertaken on a regular basis to ascertain whether impacts are detected and to what extent.

6. FRESHWATER ECOSYSTEMS

6.1 Impact: Potential Poor Planning of Stormwater Management and Pollution Control for the Project

Possible Mitigation Measures: Site Establishment/Construction Phase

- δ Stormwater generated from mining areas must not adversely affect downgradient freshwater ecosystems. Accordingly, a stormwater management plan must be developed for the proposed mine that ensures the separation of clean and dirty

water in line with GN704. Stormwater management must be implemented continuously in terms of both mining and rehabilitation activities.

- δ It is highly recommended that the clean and dirty water separation systems (including the evaporation pond/s) be located as far as practically and feasibly possible outside of the GN 4167 100m ZoR of the EDLs to minimise the potential risk of a spill and contamination.
- δ All dirty water channels that could carry contaminated water must be suitably lined.
- δ The evaporation pond/s must be appropriately lined to ensure no leakage of dirty / polluted water occurs and must be designed to have sufficient capacity to hold the full design capacity inflow. The evaporation pond/s must be designed according to the Department: Water Affairs and Forestry Best Practice Guideline A4: Pollution control dams (2007).

6.2 Impacts: Clearing of vegetation and earthworks associated with the dirty water channel and sump within the 48 m ecological buffer and 100 m ZoR of the southern EDL. Clearing of vegetation and topsoil in the Pit 2 area.

Possible Mitigation Measures: Site Establishment/Construction Phase

- δ Prior to the onset of any clearing, the approved works area must be demarcated (preferably as part of the proposed fencing of the mining footprint). It is critical that the reaches of the EDLs and the associated 48 m ecological buffer not located in the open cast or other mining infrastructure footprint be clearly demarcated as a no-access areas.
- δ All vegetation removed as part of the site clearing activities (specifically where large areas need to be cleared) must be transported from the construction site (if not being used for rehabilitation purposes (may not be stockpiled) and disposed of at a registered waste disposal facility.
- δ Stripping of topsoil and vegetation must by planned so that smaller areas (blocks) of vegetation are cleared systematically and only when excavation is immediately planned in that part of the footprint to avoid and minimise the area of exposed subsoils and time during which this is exposed.
- δ Stormwater controls must be put in place on the downgradient side of the area being excavated and along the boundaries of any development exclusion area located downgradient of the works area so that as construction takes place, dirty water runoff is appropriately managed.
- δ It is recommended that an AIP control plan is developed, and that AIP control is implemented for the duration of the construction and mining periods.

6.3 Impact: Creation of the stockpile area within the immediate catchment of the northern EDL.

Possible Mitigation Measures: Site Establishment/Construction Phase

- δ Stockpiling must be carefully monitored by the Environmental Officer (EO) and Environmental Control Officer (ECO) to ensure that all Environmental Management Programme (EMPR)-related control measures are implemented.
- δ Any topsoil stockpile/s must not be left to become naturally revegetated as this is associated with a significant risk of alien invasive plant proliferation as well as erosion development; rather the stockpile must either be covered with tarpaulins or similar durable covering that will last for the duration of the works period, or be revegetated by means of hydroseeding with a suitable indigenous plant mix to prevent these from becoming eroded by rainfall and associated runoff or to prevent the stockpile from generating significant volumes of dust into surrounding areas.
- δ Silt and stormwater controls that are durable must be installed on the downgradient side of all stockpile area. It is recommended that a dirty water management system be installed around the stockpile boundaries to ensure that silt-laden water is properly managed.

6.4 Impact: Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m ZoR.

Possible Mitigation Measures: Site Establishment/Construction Phase

- δ The construction footprint must be limited to a construction Right of Way (RoW) that comprises a 5 m construction buffer (upstream and downstream of the freshwater ecosystem crossing) only to prevent indiscriminate movement of mining equipment in the system;
- δ Upgrading of the informal roads must take cognisance of the delineated extent of the freshwater ecosystem traversed by the existing informal access road. Should the road be increased in width, the road must be expanded on the side opposite of a freshwater feature (where applicable), to ensure that the remaining natural buffer between the access road and the freshwater feature remains intact.
- δ Material to be used (gravel – if applicable) as part of the upgrading of the existing roads must be stockpiled outside the delineated extent of the freshwater ecosystems (preferably outside of the 48 m ecological buffer from the freshwater feature) to prevent sedimentation thereof and to avoid any other vegetation being

impacted by the construction activities. These stockpiles may not exceed a height of 2 m and must be protected from wind using tarpaulins.

- The disturbed area surrounding the road must be revegetated with suitable indigenous vegetation to prevent the establishment of alien vegetation species and to prevent erosion from occurring.
- The alien vegetation management plan as compiled by the terrestrial/botanical ecologist is highly recommended and supported by the freshwater specialist and must be implemented concurrently with the commencement of construction.
- All existing alien and invasive vegetation must be removed. All material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.
- **With regards to excavation and soil compaction activities within the freshwater ecosystems:**

  Although the proposed freshwater ecosystems crossings upgrades are associated with generally existing informal roads, and as such the most significant impacts have already occurred, the existing gravel roads are relatively small and are lacking formal through-flow structures (pipe culverts are considered suitable in this context). The following are applicable with regards to excavation works and any concrete related activities:

  - During the excavation activities, any soil/sediment or silt removed from the freshwater ecosystem may be temporarily stockpiled in the construction ROW but outside the delineated extent of the freshwater ecosystem. These stockpiles may not exceed 2 m in height, and their footprint must be kept to a minimum.
  - Stockpiling of removed materials may only be temporary (may only be stockpiled during the period of construction at a particular site) and must be suitably disposed of.
  - Excavated materials must not be contaminated, and it must be ensured that the minimum surface area is taken up. Mixture of the lower and upper layers of the excavated soil must be kept to a minimum, for later usage as backfill material or as part of rehabilitation activities.
  - Care must be taken to ensure that no scouring or erosion occurs as a result of the proposed crossing.
  - All construction material (with specific mention of prefabricated culvert structures) must be stockpiled in the laydown area and must only be imported to the construction site when required.

- δ Construction equipment/vehicles used to install culvert structures must be parked on the existing road surface and may not enter the freshwater ecosystems.

6.5 Impact: Undertaking of open cast mining (including blasting) adjacent to and within the 100 m ZoR of the southern EDL (Pit 2)

Possible Mitigation Measures: Operational Phase

- δ The portions of the 48 m non development (ecological) buffer around the EDL, not impacted by Pit 2, must be maintained to provide some form of residual protection to the system from spill-over and edge effects of the mining operations.
- δ Stormwater controls in the form of temporary berms and silt traps must be installed and maintained for the duration of the mining operations to prevent polluted sediment and other fines materials from being transported by stormwater into the downgradient reach of the system.
- δ A monitoring programme must be implemented to detect and prevent the pollution of soil, surface water and groundwater.
- δ Reduce airborne dust during blasting activities through damping dust generation areas with freshwater (although not in sufficient quantities to generate runoff).
- δ No dewatering operations from the pit must allow any discharge of such water into the natural environment, and all such water must be handled as part of the dirty water management system of the Pit 2.

6.6 Impact: Operational reshaping of Pit 2 and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m ZoR of the southern EDL.

Possible Mitigation Measures: Operational Phase

- δ The reshaping of the western side of Pit 2 within the 48 m buffer must ensure a natural gradient as possible, which fits into the overall landscape.
- δ Reinstatement of substrate must allow interflow that mimics the direction of the slope to be reinstated.
- δ Subsoil and topsoil restoration and revegetation, along with post-backfilling AIP control is recommended to be undertaken in the backfilled areas as soon as possible once backfilling is complete.
- δ Rehabilitated areas in the open cast pit footprint must be revegetated with a range of species that is similar to the current species assemblage in line with the recommendations from a suitably qualified specialist.

- δ Monitoring of erosion in the backfilled area must be undertaken, and any developing rills / gullies must be immediately rehabilitated.
- δ Follow up revegetation must be undertaken if bare areas develop or if seeding is unsuccessful to ensure that soils remain protected and not vulnerable to sheet and rill erosion.
- δ Sediment control measures must be installed for the backfilled area within 100 m of the boundary of the southern EDL.

6.7 Impact: Operation of the portion of the Pit 2 dirty water channel and sump within the GN 4167 100 m ZoR of the southern EDL.

Possible Mitigation Measures: Operational Phase

- δ All recommendations and mitigation measures as provided in the SWMP must be strictly adhered to.
- δ Regular inspection of the dirty water channel must be undertaken.
- δ The EDL may not be inundated as a result of leaks of the dirty water channel (tearing in the lining), an emergency plan must be compiled to ensure a quick response and attendance to the matter in case of tearing in the dirty water channel lining.
- δ Only existing roadways must be utilised during maintenance and monitoring activities to avoid indiscriminate movement of vehicles.

6.8 Impact: Transport of product from the open cast pit (Phase 2) to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR.

Possible Mitigation Measures: Operational Phase

- δ Only the approved haul route between blasting / extraction areas and screening / crushing plants must be used and must be strictly controlled through the compliance **monitoring** as associated with the EMPR.
- δ Vehicles transporting product must not be overloaded to avoid spillage of product.
- δ Vehicles transporting product must be maintained in a good working condition and no leaking vehicles and machinery must be allowed to travel on the haul road.
- δ Speed limits for vehicles transporting product must be strictly enforced.

6.9 Impact: Operation and maintenance of the upgraded road crossings within the EDLs.

Possible Mitigation Measures: Operational Phase

- δ No indiscriminate movement of maintenance equipment or vehicles through the freshwater ecosystems may be permitted during standard operational activities or maintenance activities. Use must be made of the existing road crossings only.
- δ Unnecessary disturbances surrounding the perimeter of the surface infrastructure must be avoided.
- δ Vehicles used in the development site must be regularly washed (on a non-permeable surface or off-site) to avoid the dispersal of seeds on any alien or invasive species into the freshwater ecosystems.
- δ Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to monitor any build-up of debris that will impact on structure integrity or lead to erosion and sedimentation. Furthermore, monitoring to determine the establishment of indigenous vegetation and the presence of any alien or invasive plant species.
- δ Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events.
- δ During periodic maintenance activities of the roads, monitoring for erosion must be undertaken.
- δ Should erosion be observed, caused by the road crossings, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation. Use can also be made of rocks collected from the surrounding area to infill any area prone to erosion (however, these must be sustainably sourced not taken from the surrounding freshwater ecosystems including rivers in the local area).

6.10 Impact: Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs.

Possible Mitigation Measures: Decommissioning Phase

- δ The topsoil along the roads and their immediate vicinity are likely to be contaminated by spilled material; all such material must be removed and disposed of in the waste material dumps of the mine or at a hazardous landfill site in the case

of spilled material such as oils or other hydrocarbons. This material must not be utilised for restoration.

- δ Should erosion gullies be noted, these areas must be rehabilitated by infilling them with suitable soil and ensuring the area is vegetated. The increased surface roughness will discourage concentrated flow paths to develop and ensure diffuse flow patterns.
- δ All bare areas must be ripped and be revegetated within suitable indigenous vegetation species.
- δ Follow up revegetation must take place where initial revegetation is not successful.
- δ Post-closure monitoring of the freshwater ecosystems (for a period of 3 years), with specific mention of the invasion of alien vegetation species) is recommended to be undertaken.

7. TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA

7.1 Impact: Floral Ecology of the Proposed Development

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ At all times, ensure that sound environmental management is in place during the planning phase.
- δ Stockpile height and slope angle / steepness must follow sound geotechnical design. Ensure that the slope ratio is not designed or planned to be excessively steep which may induce slope failure. Ensure mechanisms to improve slope stability are planned for. Stormwater management planning and erosion control must be stricter for all newly proposed stockpiles as the existing stockpiles have contributed to sedimentation of the adjacent natural habitat due to sub-par stormwater management.
- δ Prior to the commencement of vegetation clearing activities, 1) a rehabilitation plan and/or strategy must be developed (by suitably qualified individuals) for implementation throughout the project phases, 2) a rescue and relocation plan must be developed (by suitably qualified individuals), specifically targeting protected species, under the guidance of the relevant authorities (after walkdown was implemented), and 3) an AIP control plan must be developed and the AIP control must subsequently be implemented throughout all phases of the proposed project. The AIP control and management plan should be regularly updated by a suitably trained specialist. It is highly recommended that the AIP Management/ Control Plan should be monitored on a yearly basis (or as specified by an AIP professional).

- δ A thorough walkdown of all footprint areas (including a 15 m buffer around the footprint areas) must take place within the optimal flowering season of all (or most of) the anticipated provincially protected species prior to the project initiation. The appropriate permitting and authorisation processes must be followed as per the Northern Cape Environmental Department (for provincially protected species) and DFFE (for non-threatened TOPS and/or NFA species) requirements. A rescue and relocation plan, under the guidance of the DFFE and/or Northern Cape Environmental Department, must be developed based on the outcome of the site walkdowns.
- δ Based on the outcome of the walkdowns, the following permit application and/or authorisation will be necessary before project activities can commence. Where NCNCA -protected species will be impacted, permits from the Northern Cape Environmental Department will be required. Provincially protected species can be targeted for rescue and relocation attempts or destruction permits prior to the mining phase.
- δ Minimise loss of indigenous vegetation and natural habitat by considering the sensitivity of the biodiversity report as well as other specialist studies, i.e., optimise layouts within medium to very low SEI habitats, and avoid loss of high and very high SEI habitats as best possible, and avoid very high SEI habitats. At all times, ensure placement of infrastructure does not lead to increased habitat fragmentation (i.e., ensure temporary laydown areas and infrastructure placement occur within already disturbed areas or as close to existing disturbances as possible) or avoidable disruption to ecological processes.
- δ It is recommended that prior to the commencement of construction activities; the construction servitude be clearly demarcated to prevent footprint creep into areas beyond the authorised footprints.

Possible Mitigation Measures: Operational Phase

- δ No NCNCA-protected floral species may be removed during any mining phase activities without 1) permits from the DFFE and Northern Cape Environmental Department, and 2) all conditions of the permits being adhered to. It is recommended that propagules and/or seed of the NCNCA-protected species be harvested (depending on the permit conditions) and grown under nursery conditions to be used for 1) rehabilitation activities later down the line, and/or 2) to supplement unsuccessful relocation attempts.
- δ Removal of vegetation must be restricted to what is absolutely necessary and must remain within the approved project footprint. Footprints to be clearly demarcated to

avoid footprint creep into adjacent habitat. It must be ensured that, as far as possible, all proposed infrastructure, including temporary infrastructure, be placed outside of sensitive habitat units.

- δ As far as possible, vehicles must utilise the existing and planned roads and avoid the creation of unplanned / unauthorised roads.
- δ No vegetation cuttings from clearing activities may be left to accumulate in the Freshwater Habitat. Discard all construction related waste and material (including cleared vegetation) at a registered waste facility or in a secluded area designated by the mine. No waste or construction rubble may be dumped in the surrounding natural habitats, or any unauthorised areas.
- δ Current proposed infrastructure and future expansions during the mining phase (as material is deposited), must be kept within authorised footprints only. No additional habitat outside of the demarcated and approved footprints (being applied for) may to be disturbed during the operational phase of the project. Monthly (minimum requirement) monitoring and recording of the footprint areas must be done by the Mine Surveyor to ensure consistency of footprint areas and no footprint creep takes place.
- δ Initiating, and maintaining, an annual vegetation monitoring programme, therefore the biodiversity within the Focus Areas (remaining natural areas) can be protected and managed in terms of ecological function, which comprises the floral species composition associated with the reference vegetation types. Furthermore, continued monitoring of relocation of SCC until evident that the individuals have successfully established.
- δ All crossings must be constructed as per the recommendations of a freshwater specialist and engineer. Where crossings will be constructed, these must be adequately designed to prevent impacts on habitat, instream flow, pattern and timing of water and water quality. Ensure AIP vegetation cuttings and propagules do not enter the freshwater systems where crossings will be constructed.
- δ It must be ensured that stockpiled topsoil is not contaminated by AIP material and is considered a high priority for AIP control (stockpiled topsoil should be included in monitoring activities). Handling of topsoil must follow best-practice standards. Topsoil must be stockpiled in such a way as to limit soil compaction and erosion. No personnel and heavy vehicles to move over topsoil stockpiles. It is recommended that topsoil stockpiles be vegetated and while vegetating, measures will be needed to contain erosion of the stockpile during rain events.
- δ No collection of floral SCC or indigenous vegetation beyond the planned footprints must be allowed by construction or operational personnel.

- δ Open fires must be restricted to fire safe zone facilities and suitable fire control measures must be in place. However, harvesting of surrounding trees, shrubs or any indigenous vegetation for fire-making purposes must be strictly prohibited. A Fire Management Plan (FMP) must be in place to ensure that any fires that do originate can be managed and / or stopped before significant damage to the environment occurs.
- δ Care must be taken during the construction and operation of the proposed activities to limit edge effects to the surrounding natural habitat. This can be achieved by:
- δ Demarcating all footprint areas during construction activities.
- δ All soils compacted outside of the footprint areas because of construction activities must be ripped and profiled and reseeded.
- δ Suppress dust to mitigate the impact of dust on flora within a close proximity of construction activities, as well as to prevent sedimentation of the Freshwater Habitats surrounding the activities.
- δ Minimise the risk of erosion by limiting the extent of disturbed vegetation and exposed soil.
- δ Manage the spread of AIP species, which may affect natural habitat outside of planned footprints.
- δ Appropriate sanitary facilities must be provided during the construction of the development and must be removed to an appropriate waste disposal site. No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed because of the construction activities must be disposed of at an appropriate registered dump site or a safe area designated by the mine. No temporary dump sites should be allowed in areas with natural vegetation. It is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste.
- δ If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line.
- δ Appropriate fuel storage and distribution facilities need to be established.
- δ Rehabilitate areas that are no longer used for construction and operational activities. Any natural areas beyond the direct footprint, which have been affected by construction activities, must be rehabilitated using indigenous species. As part of rehabilitation activities, ensure that a vegetation layer is reinstated and maintained where natural areas beyond the direct footprint have been affected by construction and operational activities – i.e., to promote soil health and vegetation establishment, to reduced habitat fragmentation, and to provide resources for

fauna. In this regard, the use of indigenous plants from either the reference vegetation type or the general area is recommended for best biodiversity outcomes.

Possible Mitigation Measures: Decommissioning Phase

- δ All infrastructure and footprint areas must be rehabilitated in accordance with the rehabilitation plan. Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure, or until an acceptable level of habitat and biodiversity re-instatement has occurred, in such a way as to ensure that natural processes and veld succession will lead to the re-establishment of the natural wilderness conditions that are analogous with the desired post-closure land use.
- δ The post-closure rehabilitation land use must be used as guidance for the rehabilitation plan to be implemented. It is recommended that the post-closure land use be to natural vegetation that represents, as far as possible, the pre-mined vegetation communities, with ecological function and habitat connectivity enhanced as much as feasible. The rehabilitated areas must be able to sustain floral SCC, especially if such species were rescued and propagated for relocation into rehabilitated sites.
- δ Species selected for rehabilitation must meet the biodiversity and land end-use objectives. Only use species that are well adapted to local climatic conditions and post-establishment method of use (as provided by a suitably qualified individual).
- δ All temporary structures, waste, rubble, AIPs etc., must be removed from the site before re-vegetating can commence. Site levelling and preparation for rehabilitation activities must ensure no harm or disturbance come to the surrounding natural areas.
- δ Appropriate shaping of disturbed areas is essential. To promote successful establishment of vegetation, the slopes must resemble the natural surroundings. Where slopes are left steeper than what is recommended for whatever reason, additional measures must be implemented to prevent soil erosion and stormwater must be adequately managed.
- δ Shaping and backfilling recommendations include:
  - Areas that will be backfilled must be monitored for subsidence (as the backfill settles) and depressions filled using available material.
  - Replacement of topsoil that was removed and stored during site clearance activities must be to the original depth. Where topsoil is not enough for rehabilitation activities (or where topsoil has been severely contaminated by AIPs and regarded unsuitable for rehabilitation), provision must be made to

import enough soils that will be suitable for slope shaping and for the re-establishment of vegetation.

- The site must be monitored for signs of erosion and remedial action taken where there are problems.

δ Edge effects such as erosion and AIP proliferation, which may affect adjacent or sensitive habitat, need to be strictly managed adjacent to the footprint areas and as part of the rehabilitation phase continuing for at least 3 years post mine closure. Followed by ongoing AIP monitoring and control throughout the rehabilitation phase of the project.

δ Monitoring of rescued and relocated floral SCC must continue during the decommissioning and rehabilitation phase until it is evident that the species have successfully established.

δ Collection of floral SCC and protected flora by rehabilitation and decommissioning teams must be prohibited.

7.2 Impact: Potential Impact on Significant Biodiversity Features

Possible Mitigation Measures: Site Establishment / Construction, and Operational Phase

δ Edge effects must be managed to reduce cumulative loss of ESAs through 1) minimisation of habitat loss through reconsideration of layouts, especially with regards to habitats that support protected floral species and watercourses, 2) limiting of habitat fragmentation through utilisation of existing roads and keeping new construction activities within or close to existing disturbances, 3) ensure a rehabilitation plan is developed and approved by authorities prior to mining activities commencing, which must aim to incorporate concurrent rehabilitation through all phases of the project (preferred), and 4) Ensuring habitat degradation especially surrounding the authorised footprints are kept to a minimum (limit edge effects).

7.3 Impact: Alien Invasive Plants (AIP)

Possible Mitigation Measures: Site Establishment / Construction, Operational and Decommissioning Phase

δ AIP proliferation, which may affect adjacent natural areas, must be strictly managed. Specific mention in this regard is made of Category 1b and 2 AIP species (as listed in the NEMBA Alien species lists, 2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). Management of AIPs during the mining phase activities must be focused on limiting their introduction and preventing their spread.

- δ Ongoing AIP monitoring and clearing/control must take place throughout the mining (e.g., construction and operational) phase of the proposed activities; a 30 m buffer surrounding the proposed activities during the operational phase must regularly be monitored for AIP proliferation and instances thereof controlled appropriately. Disturbed areas and linear infrastructure must be regularly checked for AIP proliferation to prevent spread into surrounding natural areas (until successfully rehabilitated).
- δ All cleared alien vegetation must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards, or at a garden refuse site.
- δ The AIP Management/Control Plan must be implemented by a qualified professional (i.e., the person must have a good record of experience in AIP management and control). No chemical control of AIPs to occur within 32 m of a watercourse, unless registered as safe for use in watercourses by the Working for Water group.
- δ Yearly monitoring of alien vegetation control plan (as implemented by a qualified specialist), stormwater management, and general good housekeeping must be done by the mine Environmental Control Officer (ECO) and photographic records kept.
- δ Quarterly reporting on alien vegetation control to effectively monitor and manage the control and spread of AIPs.

7.4 Impact: Potential Impact on Faunal Habitat and Diversity

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ At all times, ensure that sound environmental management is in place during the planning phase.
- δ Site boundaries must be clearly demarcated to ensure that vegetation beyond the authorised footprint is not cleared.
- δ Where possible, and feasible, all access roads must be kept to existing roads and areas that have already been disturbed to reduce fragmentation of existing natural habitat.
- δ Ensure that a suitable relocation plan is in place to guide the effective and efficient relocation of species where necessary;
- δ Ensure that a suitable snake handler is on call, or a suitable staff member has been trained to carry out removal activities of snakes encountered;

- Prior to the commencement of construction activities, an authorised AIP Management/Control Plan must be compiled/implement; and
- Prior to the commencement of construction activities on site, a rehabilitation plan must be developed and regularly updated as needed.

Possible Mitigation Measures: Operational Phase

- Removal of vegetation must be restricted to what is absolutely necessary and must remain within the approved project footprint. Footprints to be clearly demarcated to avoid footprint creep into adjacent habitat.
- If snakes / scorpions / baboon spiders (or any other faunal species) are located within any buildings on site and pose a risk to operations staff and/or infrastructure, the species is to be carefully captured and moved to a safe space outside of the footprint. Where necessary, a trained snake catcher / competent staff member / ECO must affect the relocation.
- No collection or hunting of any fauna species is to be allowed by personnel.
- Night lighting must be kept to a minimum, as it attracts insects and disturbs their natural nocturnal activities and navigation senses. In this regard, lighting must be inward and downward facing to the footprint area. Lights should avoid the use of LEDs and other bright white globes. Soft yellow light emitting globes (sodium vapour) and red lights should be installed at all points as and where needed.
- No unauthorised fires are to be allowed on the site.
- No dumping of litter or human refuse/waste on site should be allowed.
- Edge effects must be monitored and managed, notably AIP proliferation.
- Existing roads are to be used for access purposes. No off-roading or driving through the surrounding veld is to be permitted.
- Any disturbed areas must be concurrently rehabilitated.
- Clearing activities within the various footprints must be undertaken in a phased approach. This will allow for faunal species to move out ahead of clearance activities. Where necessary, small/slow-moving species must be assisted / relocated out of harm's way.
- Suppress dust to mitigate the impact of dust on surrounding vegetation which will reduce its palatability for herbivores.
- Manage the spread of AIP species, which may affect natural habitat outside of planned footprints.
- Disturbed / bare areas no longer in use are to be rehabilitated using indigenous plant species.

Possible Mitigation Measures: Decommissioning Phase

- δ All infrastructure and footprint areas must be rehabilitated in accordance with the rehabilitation plan. Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure, or until an acceptable level of habitat and biodiversity re-instatement has occurred, in such a way as to ensure that natural processes and veld succession will lead to the re-establishment of the natural wilderness conditions which are analogous with the desired post-closure land use.
- δ The post-closure rehabilitation land use must be determined and agreed upon for the rehabilitation plan to be drafted. It is recommended that the post-closure land use be to natural vegetation that represents, as far as possible, the pre-mined vegetation communities, with ecological function prioritised.
- δ All temporary structures, waste, rubble, AIPs etc. must be removed from the site before re-vegetating can commence. Site levelling and preparation for rehabilitation activities must ensure no harm or disturbance comes to the surrounding natural areas.
- δ Appropriate shaping of disturbed areas is essential. Ideally, the pit is to be backfilled with the excavated waste rock material and the remaining areas sloped in accordance with the surrounding landscape. Topsoil is to be used to cover the disturbed areas to ensure suitable growth media is present in order to best facilitate rehabilitation measures.
- δ Edge effects such as erosion and AIP proliferation, which may affect adjacent or sensitive habitat, need to be strictly managed adjacent to the footprint areas and as part of the rehabilitation phase.
- δ Ongoing AIP monitoring and control should take place throughout the rehabilitation phase of the project.
- δ Any natural areas beyond the direct authorised footprint, which have been affected by the decommissioning activities, must be rehabilitated using indigenous species.
- δ All soils compacted because of construction activities falling outside of the Focus Areas must be ripped and profiled. Special attention must be paid to AIP control within these areas.

7.5 Impact: Potential Impact on Faunal SCC

Possible Mitigation Measures: Operational Phase

- δ Edge effect control needs to be implemented to prevent further degradation and potential loss of faunal SCC habitat outside of the proposed development footprint.

- δ No collection or hunting of SCC allowed by mining staff or associated contract workers, unless for the purpose of relocation.
- δ Before any vegetation clearing activities start the footprint and immediate surrounding areas must be inspected for the presence of *Smutsia temminckii* (Temminck's Ground Pangolin). Should individuals be found they must be safely captured and relocated to similar habitat outside of the footprint areas.
- δ It is recommended that prior to and during vegetation clearing activities in the natural vegetation units, the site must be inspected for the presence of protected burrowing scorpions and baboon spiders. If located, these species must be carefully excavated ensuring no harm to the specimens and relocated to similar surrounding habitat outside of the footprint area. A night-time survey utilising UV lights is recommended to aid in the collection of potentially protected scorpions. The survey must be undertaken in summer when these arachnids are more active.
- δ Should any SCC need to be removed from any footprint areas, it is to be done carefully by a trained professional/competent staff member. Where applicable permits must be obtained for such relocation. A biodiversity specialist must be contacted to advise in this regard, or alternatively the project ECO.
- δ If avian SCC nests are located, a qualified avifaunal specialist must be consulted to determine the best management options. If nests are known to have nestlings or eggs within, these must be allowed to fledge prior to the nest removal. It is important that no mining related activities take place adjacent to any active nest, ideally not within 200 m, in order to limit the risk of nest abandonment.

8. CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT

8.1 Impact: Potential Physical Distrubance of Low-Density Scatters, Exploration Trenches, Burial Sites, or the historical farmhouse.

Possible Mitigation Measures: Site Establishment / Construction, and Operational Phase

- δ The extent of the recorded cemeteries and burial sites must be avoided with a 30 m buffer zone with access provided to family members.
- δ A Heritage Management Plan must be compiled for the recorded cemeteries including an access protocol for the next of kin.
- δ Historical farmstead (MG003) must be added to the development plans and avoided with a 30 m buffer zone.
- δ Development activities must be confined to the approved development footprint only.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA.
- Work may only continue once the go-ahead was issued by SAHRA.

8.2 Impact: Potential Impact to Fossil Heritage

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- If fossils are found by the environmental officer, or other responsible person once excavations have commenced it must be rescued, and a palaeontologist must be called to assess and collect a representative sample.
- The following Fossil Chance Find Protocol is required if fossils are seen on the surface and when drilling/excavations/mining commence:
  - When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the project activities will not be interrupted.
  - Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures.
  - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
  - If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible.
  - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a

suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

- If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

9. SOCIO-ECONOMIC ENVIRONMENT

9.1 Impact: Employment Opportunities and Skills Development

Possible Enhancement Measures: Site Establishment / Construction Phase

- The developers must be committed to involving and benefiting the communities surrounding the development, contributing to their development and growth.
- Training and skills development programmes must be offered to employees of the development prior to the commencement of the construction phase.
- The communities which are most in need of employment on a local level must be considered for employment before outsourcing.
- Engage proactively with local stakeholders and implement transparent hiring practices to ensure equitable distribution of employment opportunities.

Possible Enhancement Measures: Operational Phase

- Local Hiring: Prioritise hiring from the local community for all available positions.
- Skills Transfer: In cases where highly skilled expertise is required, provide provisions for skills transfer.
- Support for Local Businesses: Encourage the involvement of local businesses in providing materials, goods, and services during the operational phase of the project.
- Community Engagement: Maintain open lines of communication with the local community through the development's existing community liaison officer.
- Fair Labour Practices: Align the project with the development's social labour plan to ensure fair labour practices and safe working conditions for all workers.

9.2 Impact: Multiplier effects

Possible Enhancement Measures: Site Establishment / Construction and Operational Phase

- δ Preference is given to suppliers that are local to the operation where the service will be consumed.
- δ Establishing liaison and communication structures with the district and local government structures.
- δ Liaise with the local governmental structures and municipal authorities in the labour - sending communities to ensure that group development initiatives are integrated into the economic and development plans of those areas.
- δ It is recommended that a local procurement policy be adopted by the developer to maximise the benefit to the local economy, where feasible.
- δ Create job opportunities, boost local economies by supporting business activities, and contribute to government tax revenues through the development of the Makganyane Mining Right.
- δ Prior to the start of the construction contractor procurement, a database of local companies, specifically Historically Disadvantaged (HD) companies, that qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies, etc) should be identified and informed about the tender process and invited to bid on project-related work, if applicable.
- δ Engage with local authorities and business organisations to investigate the feasibility of obtaining construction materials, goods, and products from local suppliers, where possible.
- δ The continuous review of the economic development of the project during the implementation process will ensure that the project does not become static but is revised in terms of changing needs and to ensure sustainability.

9.3 Impact: Influx of Jobseekers and Change in Population

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ The communities which are most in need of employment on a local level should be considered for employment before outsourcing.
- δ Making the surrounding landowners aware of the dangers associated with the influx of workers during the construction period.

- δ Encourage employees to stop working when a workplace is considered unsafe and/or to prevent unsafe actions.
- δ Education, Training and Development Services must be implemented for the local community.
- δ Access in and out of the construction area should be strictly controlled.
- δ A Community Liaison Officer should be appointed.

9.4 Impact: Safety and Security Impacts

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ Safety awareness and training as well as positive behaviour reinforcement.
- δ Improving system monitoring and analysis to improve risk management.
- δ Making the surrounding landowners aware of the dangers associated with the influx of workers during the construction period.
- δ Identifying abandoned buildings and utilising them or ensuring they cannot be used for malicious activities.
- δ Ensuring that access cannot be gained to surrounding properties.
- δ Encourage employees to stop working when a workplace is considered unsafe and/or to prevent unsafe actions.
- δ Access in and out of the construction area must be strictly controlled.
- δ The contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.
- δ Have clear rules and regulations for access to the proposed site to control loitering.
- δ A comprehensive employee induction programme would cover land access protocols; fire management and road safety must be prepared.
- δ A Community Liaison Officer must be appointed.
- δ A method of communication must be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

9.5 Impact: Increased Pressure on Local Services/Resources

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ It is necessary to appoint a Community Liaison Officer (CLO). A method of communication must be implemented, with procedures for filing complaints outlined, so that the local community can express any complaints or grievances about the construction process.

- δ Current procurement channels set up by the mine must be utilised to reduce any complications which may arise from the development, if required and cannot be supplied from local businesses.

9.6 Impact: Nuisance Impacts (Noise and Dust)

Possible Mitigation Measures: Site Establishment / Construction Phase

- δ During construction, care must be taken to ensure that noise from construction vehicles and plant equipment does not intrude on the nearby communities. Plant equipment such as generators, compressors, concrete mixers, and vehicles must be kept in good working order and, where possible, equipped with effective exhaust mufflers.
- δ The movement of construction vehicles on the site must be confined to agreed access road/s.
- δ Heavy vehicle movement during the construction phase must be timed (where possible) to avoid times of the week, such as weekends, when the volume of traffic on the access roads may be higher.
- δ Dust suppression measures must be implemented on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.

Possible Mitigation Measures: Operational Phase

- δ Implement regular dust suppression on haul roads and working areas using water trucks or equivalent suppressants.
- δ Ensure all vehicles transporting materials are covered with tarpaulins or equivalent.
- δ Maintain vehicles and equipment in good working order to minimise noise and emissions.
- δ Restrict operations with significant noise levels, such as blasting, drilling, and heavy machinery use, to daylight hours to minimise impacts on surrounding communities, where possible.
- δ Regularly monitor dust and noise levels to ensure compliance with regulatory guidelines and to enable timely interventions.
- δ Vegetative screens or acoustic barriers should be established in strategic locations around noise-generating activities, if feasible.
- δ Effective communication channels must be maintained with nearby communities to manage potential complaints proactively.

9.7 Impact: Contribution to Local Economic Development and Socio-economic Upliftment

Possible Enhancement Measures: Operational Phase

- δ Collaboration with Local Authorities: The project developers should engage in close collaboration with local authorities to identify and prioritise infrastructure improvements that align with community needs and future growth.
- δ Public-Private Partnerships: Explore opportunities for public-private partnerships to fund and implement infrastructure projects.

9.8 Impact: Loss of Employment Opportunities and Economic Changes

Possible Mitigation Measures: Decommissioning Phase

- δ Re-skilling Programs: Introduce re-skilling and training programs for employees to transition into other employment sectors, reducing the impact of job losses.
- δ Economic Diversification Programs: Facilitate workshops and funding for local businesses to explore new markets.

9.9 Impact: Environmental Restoration and Land Use Changes

Possible Enhancement Measures: Decommissioning Phase

- δ Comprehensive Rehabilitation Plan: Develop and implement a plan that includes soil restoration, replanting native vegetation, and monitoring ecological recovery.
- δ Community Involvement: Engage local communities in the restoration process to ensure alignment with local environmental and land use priorities.

9.10 Impact: Infrastructure Decommissioning and Waste Management

Possible Mitigation Measures: Decommissioning Phase

- δ Responsible Waste Disposal: Use certified contractors for waste disposal and recycling of materials.
- δ Site Safety Measures: Implement strict safety protocols to prevent accidents during dismantling.

10. HEALTH IMPACT ASPECTS

10.1 Impact: Air Quailty Impact on Health

Possible Mitigation Measures: Operational Phase

- δ All haul roads must be sprayed with water twice per day.
- δ A chemical dust suppressant must be applied on the haul road to the main gate.
- δ Windbreaks or three-sided enclosures must be installed around the ore stockpile, waste rock dump and open pits to reduce wind-blown dust.
- δ A chemical dust suppressant must be applied in addition to water spraying on the haul roads between the pits and the WRD.

10.2 Impact: Water Quality Impact on Health

Possible Mitigation Measures: Operational Phase

- δ Ongoing groundwater and surface water quality monitoring must be conducted downstream of the waste rock dump, as well as periodic updates of geochemical, surface- and groundwater models in line with monitoring data to proactively identify changes in environmental and potential health risks.
- δ Routine maintenance of the sewage system must be done to decrease the risk of failure and spillage.
- δ A sealing layer can be constructed beneath the stockpile and waste rock dumps in order to seal it off from groundwater. However, due to the expected inertness of the materials, this is not deemed necessary (Groundwater Complete 2025) and are thus not included as a compulsory mitigation measure.

11. EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT

11.1 Mitigation: Road Upgrades and Improvements

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- δ Widening of shoulders and access improvements at the proposed mine entrance to accommodate turning movements by heavy vehicles:
  - o Design the access road with a minimum carriageway width of 7,0 m to allow two 3,5 m wide 36-ton trucks to pass each other comfortably with adequate clearance,

- Provide bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off tracking, and
- Include shoulders of at least 1,5 m width on either side of the access road to accommodate vehicle recovery and enhance operational safety.

δ Installation of appropriate signage and markings to support visibility, especially at the mine access point.

δ Regular maintenance schedules should be implemented to repair road wear and tear and ensure the safe passage of all vehicles.

11.2 Mitigation: Traffic Management Measures

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

δ Detours and alternative routes: Designating specific haul routes for mining vehicles, ensuring temporary detours are clearly marked to guide traffic around construction areas and avoid residential or sensitive zones.

δ Signage and traffic control: Installing clear, consistent signage to warn drivers of construction activities, speed limits, and detours. Variable message signs can provide real-time updates on road conditions and traffic changes.

δ Working hours restrictions: Limiting construction traffic to off-peak hours, such as early mornings or late evenings, to reduce congestion. Nighttime operations should be minimized in noise-sensitive areas, and shifts can be used to spread traffic evenly throughout the day.

δ Traffic flow optimization: Employing traffic control personnel at critical points, staggering vehicle movements, and managing queues to ensure smooth traffic flow and minimize bottlenecks.

δ Public awareness and communication: Providing local residents and businesses with timely information about traffic patterns, detours, and road closures. Real-time updates via websites or mobile apps can help drivers plan alternative routes.

δ Monitoring and evaluation: Continuously monitoring traffic conditions, using cameras or personnel to adjust measures as needed, and setting up a feedback mechanism for the public to report issues.

δ Implementation of a comprehensive Traffic Management Plan (TMP): The TMP will coordinate all traffic-related mitigation measures, including designated haul routes, signage, scheduling of vehicle movements, and emergency response protocols to ensure the safe and efficient movement of all vehicles associated with mining operations.

11.3 Mitigation: Employee Transportation Solutions

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- δ Carpooling and ride-sharing programs: Encourage employees to carpool or use ride sharing services, reducing the number of vehicles on the road. This can be facilitated by providing ride-matching services or designated carpool parking areas.
- δ Shuttle services: Provide shuttle buses or vans to transport employees to and from the mining site, reducing the need for individual vehicles. These shuttles can be scheduled to align with shift changes and accommodate many workers at once.
- δ Flexible work hours: Implement staggered work shifts or flexible working hours to reduce peak-time congestion on roads. This can help minimize traffic bottlenecks and reduce the number of vehicles on the roads during busy times.
- δ Encourage use of public transportation: Promote the use of public transportation options where available, by providing subsidies or incentives for employees who use buses, or other public transport services to reach the mining site.
- δ Telecommuting and remote work: Where feasible, allow employees to work remotely for part of their shifts or complete administrative tasks off-site, reducing the need for daily commuting.

11.4 Mitigation: Safety Measures

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- δ Warning signs: Clear and visible warning signs should be placed at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. These signs can help prevent accidents by preparing drivers for specific road conditions.
- δ Pedestrian crossings: Designating safe pedestrian crossings near high-traffic areas or work zones ensures the safety of employees and visitors walking around the site. Marked crossings, with proper signage and barriers, help keep pedestrians separated from vehicles.
- δ Guardrails and barriers: Installing guardrails or barriers in high-risk areas, such as sharp bends, steep inclines, or near drop-offs, can prevent vehicles from leaving the road and help protect employees and vehicles from accidents.

- δ Speed limits and monitoring: Establishing speed limits tailored to the specific conditions of the mining site and enforcing them through speed bumps, radar signs, or speed monitoring systems can help reduce the likelihood of accidents caused by excessive speed.
- δ Adequate lighting: Ensuring proper lighting for roads, walkways, and work areas, particularly for night-time operations, improves visibility and reduces the risk of accidents in low-light conditions.
- δ Safety training for drivers: Ensure that both truck drivers and passenger vehicle drivers are trained in safe driving practices around large vehicles.
- δ Emergency access routes: Clearly marked emergency access routes should be established to ensure that emergency vehicles can quickly reach any part of the mining site in case of an accident or incident.

11.5 Mitigation: Environmental Mitigation Strategies

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

- δ Air quality and emissions:
  - o Use of cleaner technology: Transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) can reduce harmful emissions.
  - o Regular vehicle maintenance: Ensuring that mining vehicles are well-maintained can minimize emissions.
  - o Dust suppression: Using dust suppressants and water spraying on roads helps reduce airborne particulate matter.

- δ Noise impacts:
  - o Sound barriers and landscaping: Installing barriers or planting vegetation around mining sites can help reduce noise pollution.
  - o Time restrictions: Limiting mining operations to certain hours can minimize disruption to nearby communities.
  - o Quieter equipment: Employing quieter machinery or retrofitting existing equipment with noise-reduction technologies can help lessen noise levels.

- δ Dust generation:
  - o Paving roads: Paving roads or using dust control measures on unpaved roads can significantly reduce dust.

- Speed control: Implementing speed limits on mining roads can reduce dust created by vehicle movement.
- Vegetative cover: Planting vegetation or using soil stabilizers on disturbed areas helps reduce windblown dust.

δ Water quality:

- Stormwater management: Installing sediment traps, detention ponds, and proper drainage systems helps manage runoff and prevent contamination of water bodies.
- Regular road maintenance: Maintaining roads and controlling runoff can reduce the washing of pollutants into nearby water systems.
- Spill containment: Implementing systems for containing and cleaning up oil, fuel, and chemical spills can prevent water pollution.

δ Vegetation and wildlife impact:

- Habitat restoration: Rehabilitating disturbed areas by planting native vegetation can help restore habitats.
- Wildlife corridors: Creating wildlife corridors around mining sites can allow animals to move freely and avoid areas of heavy traffic.
- Traffic management: Restricting mining vehicle access to certain areas and using quieter vehicles can minimize disturbances to wildlife and vegetation.

12. WASTE MANAGEMENT

12.1 Impact: Development of the WRD Impacting the Surface and/or Groundwater

Possible Mitigation Measures: Site Establishment / Construction and Operational Phase

δ Monitoring of groundwater quality must be done down-gradient of the Waste Rock Dump.

δ Monitoring must be done of the water quality in the stream (when available).

δ The numerical and geochemical model need to be updated against monitoring data every 2-3 years to serve as early warning system for potential contamination.

12.2 Mitigation: Management of General- and Hazardous Waste Generated at the Mine

Possible Mitigation Measures: Site Establishment / Construction, Operational and Decommissioning Phase

- δ A waste management plan and emergency response plan must be compiled by site management and implemented during all the phases of the project. The plan must focus on the waste hierarchy of the NEM:WA.
- δ Hazardous- and general waste must be contained in separately marked, sealable, refuse bins placed at a designated area, to be removed when filled to a registered general- or hazardous waste landfill site whichever is applicable.
- δ No general waste (apart from inert waste of the WRD) may be buried or burned on the site.
- δ Vehicle maintenance, repairs and services may only take place at the workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. The waste products must be treated as hazardous waste and disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. Proof of safe disposal must be filed for auditing purposes.
- δ If a diesel bowser is used on site, it must always be equipped with a drip tray. Drip trays must be used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- δ Ablution facilities must be provided to all employees. The ablution facilities must not cause pollution or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage. Any pollution problems arising from the above are to be addressed immediately by the MR Holder.
- δ Site management must ensure drip trays are cleaned after use. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system.
- δ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.

- If a salvage yard is established, all hydrocarbons must be drained from the equipment/tools/vehicles to be placed within the yard. The salvage yard must be kept clean and unwanted materials must be removed from the mine as regular as possible.
- An oil spill kit must be present on site, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.
- Spills must be cleaned immediately, within two hours of occurrence by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a registered facility. Proof of safe disposal must be filed.
- No contaminated water may be discharged into the natural environment. Measures must be implemented to contain the wastewater and safely dispose thereof.
- Any significant spillage of chemicals, fuels etc. that occur during the lifespan of the mining activities must be reported to the Department of Water and Sanitation and other relevant authorities.
- All decommissioned / rehabilitated areas must be cleaned of all waste at the end of the project.

12.3 Mitigation: Storage and Handling of Hazardous Substances and/or Chemicals

Possible Mitigation Measures: Site Establishment / Construction, Operational and Decommissioning Phase

- All chemical stores must:
  - be situated on level, impermeable surfaces with secondary containment (bunding).
  - have a capacity to contain at least 110% of the largest stored volume, per SANS 10228.
  - have access to a spill kit and staff must be trained in the emergency response procedures.
- Access to the chemicals/substances must be controlled and prior notification of an appropriate staff member must be require.
- A Hazardous Substances Register must be maintained, and the Safety Data Sheets (SDS) must be kept current for all chemicals used on site.
- All fuel/used oil tanks and/or generators must have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised

above the floor, on plinths. The bund capacity must be sufficient to contain 110% of the tank's maximum capacity.

- δ The outlet valve/s of all bunded areas must be kept closed when not in use.
- δ A formal inspection routine must be established to check all equipment in the bund area, as well as the bunded area itself for malfunctions or leakages. The bund area must be inspected at least weekly and any accumulated rainwater removed and handled as contaminated water. All valves and outlets must be checked to ensure that its intact and closed securely.
- δ The bund base must slope towards an oil sump of sufficient size. Contaminated water may not be allowed to mix with clean water and must be contained until it is collected by a registered hazardous waste handling contractor or disposed of at a registered hazardous waste handling facility. Reuse of this water on site is only permitted if verified proof is available confirming that it is free of hydrocarbons.
- δ Drip trays must be used underneath all stationary equipment or vehicles. Used drip trays must be placed within a bunded area and may not be stored on bare soil. The waste water originating from the cleaning of drip trays must be discarded into the oil sump, alternatively removed by the hazardous waste handling contractor.
- δ No mining equipment and/or vehicles may be washed on the bare ground. Washing must be done in a formal wash bay with impermeable surface that drains to an operational oil sump. Reuse of the water from the sump is only permitted if verified proof is available confirming that it is free of hydrocarbons.

13. STORMWATER MANAGEMENT

13.1 Mitigation: SWMP Recommendation

Possible Mitigation Measures: Site Establishment / Construction, Operational and Decommissioning Phase

- δ The proposed containment facilities must be designed to incorporate a 0.8m freeboard.
- δ The SWMP must be revisited after any major changes to the current operations or design changes.
- δ It is recommended that stone pitching channels are used to transfer runoff. Stone pitching is recommended to reduce high runoff velocities in channels.
- δ To prevent clogging of the grated channel covers and maintain channel capacity, best practice and proper housekeeping practices must be ensured.
- δ All channels must be checked after any major rainfall events to ensure that there are no blockages and that the water flow will not be restricted in any way.

- δ Sediment that accumulates within channels and retention facilities needs to be removed directly after the storm events and appropriately disposed of to ensure design capacity is maintained.
- δ It is recommended that the stormwater attenuation facilities be operated empty or at a storage level low enough to accommodate stormwater inflows, whilst meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements.

14. DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS

14.1 Impact: Veld fires affecting sensitive areas such as the nursery and/or revegetated areas.

Possible Mitigation Measures: Decommissioning Phase

- δ The maintenance of sufficient fire-fighting capability to control and extinguish any fires rapidly, together with regular monitoring and evaluation to determine the possible increase in potential risk must be undertaken by the mine manager.
- δ Should the risk increase, additional mitigation will be necessary by the mine manager to reduce the risk, which will include retaining a reserve of nursery plants in the nursery for revegetation and the creation of effective firebreaks.

14.2 Impact: Possible development of subsided areas after rehabilitation.

14.3 Impact: Potential for crack development after rehabilitation.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the geotechnical/rock engineer and rehabilitation specialist after rehabilitation of Pit 1 and 2 and development of the waste rock dump are regular monitoring and evaluation to assess the risk and determine when final shaping of the waste rock and subsequent replacement of subsoils and topsoil should take place.
- δ Should land subsidence occur, reserve overburden, subsoils, topsoil, mulch and nursery vegetation should be retained to remedy the situation so as to maintain free-draining rehabilitated areas and conserve land capability.

14.4 Impact: Insufficient topsoil and subsoil available for rehabilitation.

Possible Mitigation Measures: Decommissioning Phase

- δ The rehabilitation specialist must ensure that monitoring and management of soil stripping, stockpiling and replacement take place so that topsoil and subsoils are available for restoring the whole mining footprint.

14.5 Impact: Potential of topsoil being diluted and chemically deficient to be used during rehabilitation.

Possible Mitigation Measures: Decommissioning Phase

- δ Determination of topsoil bulk density, ripping of the topsoil, assessment in terms of target bulk density, analysis of topsoil nutrient status, assessment in terms of target nutrient content and application of fertilisers will help ameliorate the topsoil physically and chemically.

14.6 Impact: Potential contamination of soils.

14.11 Impact: Potential of surface water pollution flowing into the mining area.

Possible Mitigation Measures: Decommissioning Phase

- δ Mitigation involves creating awareness of the spillage procedure to be strictly followed, immediate reporting of the spillage to the rehabilitation specialist and thereafter immediate remediation by removing the polluted soil and placing it in a dedicated area for disposal at a registered landfill site.

14.7 Impact: Potential chemical changes in topsoil and subsoil leading to toxicity.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist involves mitigatory chemical testing of the topsoil and subsoils before revegetation of the rehabilitation area takes place to ensure that they are suitable for plant growth. Appropriate remediation will be necessary for affected areas.

14.8 Impact: Dust pollution during the decommissioning phase.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist involves daily dust suppression mitigation using water tanker vehicles and the spraying of the exposed substrate.

14.9 Impact: Potential for wind and water erosion of the denuded areas.

14.10 Impact: Sedimentation of EDL's and PFPs due to water erosion from denuded areas.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist involves the implementation of suitable mitigation measures to minimise wind and water erosion including:
  - δ Concave slopes rather than linear slopes;
  - δ Mimicking natural slopes using the geomorphic approach;
  - δ Determining the best slope angle for soils in the rehabilitation area;
  - δ Minimising slope length;
  - δ Minimising runoff velocities;
  - δ Planting of stabilising grasses from the nursery without delay;
  - δ Protecting and conserving the minimal topsoil and subsoils in the stockpile area by planting grasses from the nursery without delay;
  - δ Ensuring that topsoil and subsoil stockpiles and the overburden stockpile are located outside of drainage lines and are placed in free-draining areas so as to minimise waterlogging and soil erosion losses;
  - δ Prevention of livestock in the rehabilitation area until revegetation is well established;
  - δ Ongoing monitoring of the erosion status of the mining footprint and rehabilitated land with areas of excessive erosion being identified for remedial action.

14.12 Impact: Potential groundwater depletion and/or pollution due to mining activities.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist involves mitigatory chemical and volume testing of the groundwater in the mining right area boreholes and neighbouring farm boreholes.

14.13 Impact: Invasive plant species establishing in the rehabilitated areas.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist and nursery manager involves regular frequent monitoring of the revegetated areas for all 16 recorded AIPs and any others which will ensure that AIPS are at the seedling stage and can be easily hand-pulled using protective gloves.

14.14 Impact: Potential failure of the nursery that may threaten the rehabilitation process.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the mine manager and rehabilitation specialist is the contracting of an experienced nursery manager with extensive expertise who will be responsible for the training of nursery staff, establishment and management of the nursery, and propagation of plant species found in the pre-mining footprint.

14.15 Impact: Potential impact of livestock browsing/grazing on revegetated areas.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the mine manager is liaising with the farmers who own the land to ensure that a shepherd is present with the livestock to prevent grazing and browsing in revegetated areas. These areas can also be fenced temporarily to protect the developing plants. Shrubs and tree seedlings can be protected with metal protectors.

14.16 Impact: Potential failure of revegetation of the mined areas.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist and nursery manager involves ensuring the following intensive measures:
  - δ Successful nursery propagation of plants found in the pre-mining footprint;
  - δ Promotion of healthy plant growth by physical and chemical properties of the soil;
  - δ Successful planting of the nursery plants in the rehabilitation area;
  - δ Daily watering of revegetated areas;
  - δ Removal of alien and invasive plant species regularly and frequently; and

- δ Prevention of livestock damaging the plants.

14.17 Impact: Potential hunting, trapping, trafficking and plant harvesting.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the mine manager and rehabilitation specialist involves providing stern warnings to all mining staff and contractors about these illegal activities and their dire consequences.

14.18 Impact: Potential degradation of the surrounding areas.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the mine manager and rehabilitation specialist involves ensuring that the mining footprint is clearly demarcated and that mining staff and contractors operate within the demarcated areas.
- δ In addition, minimising exposed soil and substrate and daily dust suppression of exposed soil and substrate will limit the dust fallout on and stomatal clogging of indigenous vegetation in the surrounding area.
- δ Progressive intensive rehabilitation of areas where mining will also reduce dust pollution.

14.19 Impact: Potential failure of rehabilitation.

Possible Mitigation Measures: Decommissioning Phase

- δ Required action by the rehabilitation specialist involves management, organising and problem-solving abilities to ensure sustained intensive rehabilitation in a difficult semi-arid environment.

ix) Motivation where no alternative sites were considered.

Not applicable.

x) Statement motivating the alternative development location within the overall site.

Refer to *Part A(1)(g)(i) Details of the development footprint alternatives considered – (a) The Property on which, or Location where, it is Proposed to Undertake the Activity* for a discussion regarding the matters that were considered when determining the preferred development location option within the overall site.

In light of the listed considerations, including the need for long-term resource planning, operational flexibility, integrated environmental management, and the absence of any anticipated development or impact in the foreseeable future, it was decided to proceed with the preferred project location. This proposal entails the development of the MIOM over ±1 550 ha of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1, and Portion 3 of the farm Makganyene No. 667. The development falls within the boundaries of the GPS coordinates listed in Table 4 and depicted in Figure 3.

h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

The following potential impacts were identified for the site establishment/construction phase, operational phase, and decommissioning phase of the proposed project. An initial significance was assigned to each potential impact, assuming that the mitigation measures proposed in this document were not yet implemented. Refer to *Part A(1)(g)(v) Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree to which these impacts*.

The impact assessment process then continued in identifying mitigation measures to address the potential impacts of the proposed mining activity on the surrounding environment. The significance rating was reassessed for each impact associated with the identified alternatives using the methodology as explained in *Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks*. The impacts presented below reflect the assessment **after** consideration of the proposed mitigation measures. The degree of mitigation indicates the potential for partial, full, or no mitigation of the identified impacts.

1. SITE ESTABLISHMENT AND CONSTRUCTION PHASE

The site establishment and construction phases will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase*. This section outlines the potential impacts applicable to these phases, incorporating all impacts identified by the specialists.

1.1 Visual Characteristics

Altered landscape and sense of place during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	3	5	4	**13.3**

Visibility of the facility to residents during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	3	5	4	**13.3**

Dust and construction impact during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	3	3.3	3	5	4	**13.3**

Impact on local infrastructure and traffic during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	3	3	3	3	3	**9**

1.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**SCENARIO 1**			**Degree of Mitigation: Partial**	
2	4	3	3	4	5	4.5	**13.5**
Rating: Low-Medium			**SCENARIO 2**			**Degree of Mitigation: Full**	
2	4	2	2.6	3	4	3.5	**9.1**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**SCENARIO 1**			**Degree of Mitigation: Partial**	
2	4	3	3	4	4	4	**12**
Rating: Low			**SCENARIO 2**			**Degree of Mitigation: Full**	
1	4	2	2.3	3	1	2	**4.6**

Noise nuisance caused by site establishment / construction phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	2	1	1.5	**3.5**

1.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	1	2	2	2	2	**4**

Soil erosion

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	3	2.3	2	2	2	**4.7**

Soil compaction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	2	2	2	2	2	**4**

Soil contamination

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	3	3	3	**9**

1.4 Geohydrology

Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Full**	
+1	1	5	20%	6	24	4.8
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

1.5 Hydrology

Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	5	3	3.3	3	5	4	**13.2**

Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	5	3	3.3	3	5	4	**13.2**

As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	2	2	3	2	2.5	**5**

During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	1	1.3	2	2	2	**2.6**

During the construction period it is anticipated that hazardous chemicals and/or materials may be stored and utilized on site. These could pose a risk to the surface water resources.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	1	1.6	2	2	2	**3.2**

The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	5	2	3.3	1	5	3	**9.9**

1.6 Freshwater Ecosystems

Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	3	2	2.3	1	5	3	**6.9**

Erection and fencing of mining-related infrastructure (stockpile area) within and adjacent to (within the GN 4167 100m ZoR) of the northern EDL, in preparation for mining operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: IMPACT AVOIDED			**(C)2 LAYOUT OPTION 2 = FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
If Layout Option 2 if implemented as proposed in this document, this impact can be fully avoided and there will be no development with the 100 m ZoR of the northern EDL. This impact is therefore omitted in the remaining impact related sections of this report.							

Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	2	1	1.5	**3**

Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	3	1	2	**4.6**

Creation of the stockpile within the immediate catchment of the northern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	3	1	2	**6**

Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	1	2	2	5	3.5	**7**

1.7 Terrestrial Biodiversity, Conservation Areas, Groundcover and Fauna

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	1	3	**7**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	5	1	3	**7**

Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	4	1	2.5	**5**

Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	2	1	1.5	**3**

Potential impact on the ESA during the pre-construction and planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	2	2.3	2	1	1.5	**3.5**

Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	5	2	3.5	**9.3**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	5	2	3.5	**7**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	5	2	3.5	**7**

Potential infestation of the footprint area by invasive plant species.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	2	2.5	**2.5**

1.8 Heritage, Culture and Palaeontological Environment

Potential physical disturbance of the low-density scatters and exploration trenches and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: N/A**	
1	5	1	2.3	4	1	2.5	**5.8**

Potential physical disturbance of the burial sites and/or its context

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	4	4.7	2	1	1.5	**7.1**

Potential physical disturbance of the historical farmhouse

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	1	3.3	2	1	1.5	**5**

Potential impact to fossil heritage

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	1	1	1	**1**

1.9 Socio-Economic Environment

Employment opportunities and skills development (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
3	4	5	4	4	5	4.5	**18**

Economic multiplier effects (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
3	4	5	4	4	4	4	**16**

Influx of jobseekers and change in population

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	5	3.7	3	4	3.5	**12.9**

Safety and security impacts

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	3	2	2.5	**8.3**

Increased pressure on local services/resources

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	3	3	3	**9.9**

Nuisance impacts (noise & dust)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	4	4	4	**13.3**
Note: When the mitigation measures proposed by the AIR and RAHIA is implemented this impact is further reduced to a Low Significance.							

1.10 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	2	1.7	2	1	1.5	**2.5**

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	1	1.3	2	1	1.5	**2**

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

2. OPERATIONAL PHASE

The operational phase will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operational Phase*. This section outlines the potential impacts applicable to this phase, incorporating all impacts identified by the specialists.

2.1 Visual Characteristics

Altered landscape and sense of place during construction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	5	4	3.7	3	5	4	**14.7**

Visibility of the facility to residents during operation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	5	4	3.7	3	5	4	**14.7**

Potential visual impact of operational, safety and security lighting during operation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	5	4	3.7	2	5	3.5	**13**

2.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**SCENARIO 1**			**Degree of Mitigation: Partial**	
3	4	3	3.3	4	5	4.5	**14.9**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**SCENARIO 2**			**Degree of Mitigation: Full**	
2	4	2	2.6	3	4	3.5	**9.1**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**SCENARIO 1**			**Degree of Mitigation: Partial**	
3	4	3	3.3	4	4	4	**13.2**
Rating: Low			**SCENARIO 2**			**Degree of Mitigation: Full**	
1	4	2	2.3	3	1	2	**4.6**

Noise nuisance caused by mining machinery and operations (excluding blasting)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	3	4	3.5	**9.5**

Potential blasting noise and vibration nuisance to neighbouring properties

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	5	2	2.7	2	5	3.5	**9.5**

2.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	2	3	2.3	2	2	2	**4.6**

Soil erosion

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	2	2.3	2	3	2.5	**5.8**

Soil compaction

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	2	1.7	2	1	1.5	**2.5**

Soil contamination

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	2	2.7	2	2	2	**5.3**

Increased fire risk.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	1	1.7	2	2	2	**3.4**

2.4 Geohydrology

Negative Impact: Potential impact on the water availability in some of the user boreholes to the north; and

Positive Impact: The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Partial**	
+1 -2	3	5	80%	7	28	22.4
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

Waste water from ablutions potentially impacting the groundwater quality.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Full**	
+1	1	2	20%	4	16	3.2
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

2.5 Hydrology

Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	2	2	3	2	2.5	**5**

Potential for dirty water to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	3	1	2	2	2	2	**4**

Potential for domestic waste to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	1	1.3	2	2	2	**2.6**

Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	1	1.3	2	2	2	**2.6**

Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	5	2	3	3	3	3	**9**

2.6 Freshwater Ecosystem

Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	5	3	4	**12**

Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation of the southern EDL

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	3	1	2	**4.6**

Transport of product from Pit 2 to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	2	2.7	2	1	1.5	**4.1**

Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	1	1.3	2	1	1.5	**2**

Operation and maintenance of the upgraded road crossings within the EDLs.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	1	1.7	2	1	1.5	**2.6**

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	1	3.3	5	5	5	**16.7**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	1	2.7	5	5	5	**13.3**

Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	4	3.5	**8.2**

Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	1	2.7	5	5	5	**13.3**

Potential impact on the ESA during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	4	4	4	**12**

Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	3	3.7	5	5	5	**18.3**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	4	2	3	5	5	5	**15**

Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
5	4	3	4	5	4	4.5	**18**

Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	2	3.3	5	4	4.5	**15**

Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	2	3.3	5	4	4.5	**15**

Potential infestation of the mining footprint with invasive plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	2	2.5	**2.5**

2.8 Heritage, Culture and Palaeontological Environment

Potential physical disturbance of the low-density scatters and exploration trenches and/or its context

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: N/A**	
1	5	1	2.3	4	1	2.5	**5.8**

Potential physical disturbance of the burial sites and/or its context

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
5	5	4	4.7	2	1	1.5	**7.1**

Potential physical disturbance of the historical farmhouse

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	5	1	3.3	2	1	1.5	**5**

Potential negative impact on fossil heritage

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	1	1	1	**1**

2.9 Socio-economic Environment

Direct and indirect employment opportunities **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
3	5	5	4.3	4	5	4.5	**19.5**

Economic multiplier effect **(Positive Impact)**

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
3	5	5	4.3	4	4	4	**17.3**

Contribution to local economic development and socio-economic upliftment **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
4	5	5	4.7	5	1	3	**14**

Nuisance impacts (noise and dust)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	5	4	4.7	4	4	4	**16**
Note: When the mitigation measures proposed by the AIR and RAHIA is implemented this impact is further reduced to a Low Significance.							

2.10 Health Impact Assessment

Air quality impact on health: all-cause (natural) mortality.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 1 & 2**			**Degree of Mitigation: N/A**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: cardiovascular hospital admissions.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 1 & 2**			**Degree of Mitigation: N/A**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: chronic bronchitis.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 2**			**Degree of Mitigation: Full**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: acute bronchitis in children.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 2**			**Degree of Mitigation: Full**	
1	1	1	1	1	1	1	**1**

Air quality impact on health: lung cancer in adults.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**SCENARIO 2**			**Degree of Mitigation: Full**	
1	1	1	1	1	1	1	**1**

Water quality impact on health.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	2	1.3	1	2	1.5	**2**

2.11 Road Network and Traffic Assessment

Traffic congestion on the R385 due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	3	2	2.3	3	2	2.5	**5.8**

Road wear and tear of the R385 due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	3	3	3	**9**

Safety concerns and accidents on R385 due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	2	2.7	3	3	3	**8**

Increased air pollution due to increased traffic on the R385

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	3	3	3	3	3	**9**

Increased noise pollution due to increased traffic on the R385

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	3	2	2.3	3	2	2.5	**5.8**

Community disruption due to increased traffic on the R385

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	3	3	3	3	3	**9**

Wildlife disruption due to increased traffic on the R385

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	3	3	3	3	3	3	**9**

2.12 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

3. CUMULATIVE IMPACTS (OPERATIONAL PHASE)

3.1 Visual Characteristics

Overall visual impact of the proposed project considered in isolation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	4	3.3	3	5	4	**13.3**

Overall visual impact of the proposed project and other projects within the area

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Only Best Practice Measures**	
4	4	4	4	4	5	4.5	**18**

3.2 Geology, Soils and Agricultural Sensitivity

The cumulative loss from a soil and land capability point of view is anticipated to be low for the proposed MIOM. This can be attributed to the dominance of Glenrosa and Mispah soil forms within the focus area which account for ±85% of the focus area. Additionally, the existence of other currently operating mines and the proposed MIOM may have incremental effects on the environment over time; however, the cumulative impacts within the context of local and regional setting are not anticipated to be significant given the low land capability associated with the identified soils as well as the low grazing capacity potential regionally.

3.3 Geohydrology

The specialist concluded that the proposed MIOM is not expected to contribute to any cumulative adverse groundwater quality and/or quantity impacts because of the following main reasons:

- δ The hydraulic groundwater flow parameters are too low; and
- δ The short life-of-mine proposed for Makganyane will cause flow or mass transport impacts to reach a steady state well before they reach the surrounding mining operations such as Assmang's

Beeshoek to the east, Anglo American's Kolomela to the south-east, Glosam to the north-east and Khumani and Sishen to the north.

3.4 Heritage, Culture and Palaeontological Environment

Cumulative impacts in the area are increasing as developments take place within an archaeologically sensitive landscape. The cumulative impact of this project area on heritage resources is low with adherence to the recommendations within this report.

3.5 Socio-economic Environment

An increase in employment opportunities, skills development, and business opportunities for the project in isolation (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
3	5	5	4.3	4	5	4.5	**19.5**

An increase in employment opportunities, skills development, and business opportunities for the project and other projects in the area **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: High (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
4	5	5	4.7	5	5	5	**23.3**

Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project in isolation)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	5	3.7	3	5	4	**14.7**

Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project and other projects in the area)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium-High			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
4	4	5	4.3	4	5	4.5	**19.5**

3.6 Health Impact Assessment

The cumulative health impact is assessed as the accumulated impact of the proposed project and the current (existing) baseline health status, which is impacted by all relevant background factors, such as:

- δ General ambient pollution sources, e.g., veld fires, burning of wood and coal for household energy needs.
- δ Lifestyle factors such as smoking and lack of exercise.
- δ Other pre-existing health conditions, such as asthma or tuberculosis ("TB").

The health effect impacts of the modelled incremental increases in ambient $PM_{2.5}$ concentrations in the receptor populations are negligible at all except the most proximate receptor to the north of the proposed mine. Therefore, the cumulative impact on health is generally insignificantly different from the current impact on health.

Regarding cumulative health effects due to cumulative effects on surface- and groundwater quality, it is noted that active operations at other mine(s) in the broader study area occur at remote sites not close enough for any cumulative impacts to apply.

The health status of the largest section of the receptor communities will not be changed after the implementation of the envisioned project

4. DECOMMISSIONING PHASE

The decommissioning phase will comprise all activities described in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase*. This section outlines the potential impacts applicable to this phase, incorporating all impacts identified by the specialists.

4.1 Visual Characteristics

Landscape character and visual amenity during decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	2	4	2.6	3	5	4	**10.7**

Site restoration during decommissioning **(Positive Impact)**

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
4	2	2	2.6	4	5	4.5	**12**

4.2 Air Quality and Noise Ambiance

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Scenario 1**			**Degree of Mitigation: Partial**	
2	4	3	3	4	5	4.5	**13.5**
Rating: Low-Medium			**Scenario 2**			**Degree of Mitigation: Full**	
2	4	2	2.6	3	4	3.5	**9.1**

Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium			**Scenario 1**			**Degree of Mitigation: Partial**	
2	4	3	3	4	4	4	**12**
Rating: Low			**Scenario 2**			**Degree of Mitigation: Full**	
1	4	2	2.3	3	1	2	**4.6**

Noise nuisance caused by during the decommissioning phase.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	2	1	1.5	**3.5**

4.3 Geology, Soils and Agricultural Sensitivity

Loss of land capability

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	1	2	2	2	2	**4**

Soil erosion

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	2	2	2.3	2	3	2.5	**5.8**

Soil compaction

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	2	2	1.7	2	1	1.5	**2.5**

Soil contamination

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	3	2.3	2	2	2	**4.7**

4.4 Geohydrology

Negative Impact: Potential impact on the water availability in some of the user boreholes to the north; and

Positive Impact: The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.

						Significance
Intensity	Extent	Duration	Probability	Severity	Consequence	
Rating: Low			**FINAL PROJECT PROPOSAL**		**Degree of Mitigation: Partial**	
+1 -2	3	5	80%	7	28	22.4
Note: Refer to Section 5.4 of the Geohydrological Investigation for the methodology used to assess the impacts.						

4.5 Freshwater Ecology

Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	3	2	**4**

Post-closure management activities.

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	3	2	**4**

4.6 Terrestrial Biodiversity, Conservation Areas, Groundcover and Fauna

Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	2	2.7	3	3	3	**8**

Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	3	3	**7**

Potential impact on the Freshwater Habitat: EDL and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	1	3	2	**4**

Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	2	3	2.5	**5**

Potential impact on the ESA during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	2	2	2	**4.6**

Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	4	3.5	**8.2**

Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	4	3.5	**8.2**

Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
2	4	1	2.3	3	4	3.5	**8.2**

Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	3	4	3.5	**7**

Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	2	4	3	**6**

Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
1	4	1	2	2	4	3	**6**

Potential infestation of the rehabilitated areas with invasive plant species

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	2	2.5	**2.5**

4.7 Socio-economic Environment

Loss of employment opportunities and economic changes

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Medium (+)			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Partial**	
3	2	5	2	5	5	5	**10**

Environmental restoration and land use changes (Positive Impact)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Enhanced**	
2	2	1	1.7	3	5	4	**6.7**

Infrastructure decommissioning and waste management

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low-Medium			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	2	2	2	3	5	4	**8**

4.8 Waste Management

Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Leaching of contaminants from the WRD into groundwater

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	2	1	1.5	**3.5**

Ingestion/use of contaminated groundwater (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

Ingestion/use of contaminated surface water (that originated from the WRD)

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Low			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	3	2	2	1	1	1	**2**

4.9 Potential Residual and/or Latent Environmental Risk

(Refer to Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks – Residual and/or Latent Environmental Risk.)

Veld fires affecting sensitive areas such as the nursery and/or revegetated areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	2	2.7	3	1	2	**5.4**

Possible development of subsided areas after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	3	1	2	3	2	2.5	**5**

Potential for crack development after rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	3	1	2	3	2	2.5	**5**

Insufficient topsoil and subsoil available for rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	4	1	2.7	4	5	4.5	**12.2**

Potential of topsoil being diluted and chemically deficient to be used during rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
3	3	1	2.3	4	4	4	**9.2**

Potential contamination of soils

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	3	3	**3**

Potential chemical changes in topsoil and subsoil leading to toxicity

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	1	2	**2**

Dust pollution during the decommissioning phase

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	2	2.3	4	3	3.5	**8.1**

Potential for wind and water erosion of the denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	1	2.3	4	3	3.5	**8.1**

Sedimentation of EDL's and PFPs due to water erosion from denuded areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	1	2.3	4	3	3.5	**8.1**

Potential of surface water pollution flowing into the mining area.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	2	2.5	**2.5**

Potential groundwater depletion and/or pollution due to mining activities

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Potential Significant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	4	3.3	3	5	4	**13.2**

Invasive plant species establishing in the rehabilitated areas

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	1	2	**2**

Potential failure of the nursery that may threaten the rehabilitation process

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	1	2	**2**

Potential impact of livestock browsing/grazing on revegetated areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	2	2.5	**2.5**

Potential failure of revegetation of the mined areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	1	1	3	1	2	**2**

Potential hunting, trapping, trafficking and plant harvesting.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	1	2	1.3	3	2	2.5	**3.3**

Potential degradation of the surrounding areas.

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Uncertain Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
2	4	2	2.7	4	2	3	**8.1**

Potential failure of rehabilitation

			Consequence			Likelihood	**Significance**
Severity	Duration	Extent		Probability	Frequency		
Rating: Insignificant Risk			**FINAL PROJECT PROPOSAL**			**Degree of Mitigation: Full**	
1	4	1	2	3	1	2	**4**

i) Assessment of each identified potentially significant impact and risk

Table 103: Assessment of each identified potentially significant impact and risk.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
VISUAL IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Altered landscape and sense of place during construction. 2. Visibility of the facility to residents during construction. 3. Dust and construction impact during construction. 4. Impact on local infrastructure and traffic during construction.	The introduction of construction activities and infrastructure for the proposed MIOM will temporarily alter the visual character of the landscape. The current landscape will be interspersed with construction equipment, temporary storage, and initial mining structures.	Site Establishment- & Construction Phase	1. Medium-High 2. Medium-High 3. Medium-High 4. Medium	<u>Control:</u> Implementing proper housekeeping and the proposed mitigation measures.	1. Medium 2. Medium 3. Medium 4. Low-Medium
Operational Phase.	1. Altered landscape and sense of place during operation. 2. Visibility of the facility to residents during operation.	The operational phase of the MIOM will introduce a new visual element to the landscape, characterised by the presence of large industrial structures	Operational Phase	1. Medium-High 2. Medium-High 3. Medium-High		1. Medium 2. Medium 3. Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	3. Potential visual impact of operational, safety and secruirty ligthgin during operation.	and infrastructure. The presence of these structures can alter the visual harmony and the intrinsic sense of place that residents, workers and visitors associate with the region.				
Cumulative Impacts.	1. Overall visual impact of the proposed project considered in isolation. 2. Overall visual impact of the proposed project and other projects within the area.		Operational Phase	N/A		1. Medium 2. Medium-High
Decommissioning Phase.	1. Landscape character and visual amenity during decommissioning phase. 2. Site restoration during decommissioning **(Positive Impact)**	The decommissioning phase involves the removal of the proposed MIOM infrastructure, and any other related structures from the site. This process will temporarily disrupt the landscape, potentially leading to a transient alteration in the	Decommissioning Phase	1. Medium 2. Low-Medium (+)		1. Medium 2. Medium (+)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
		visual character of the area. The removal process might expose previously covered or altered grounds, leading to a temporary visual contrast in the landscape.				
AIR QUALITY AND NOISE IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$.	**Potential environmental aspects:** δ Air quality degradation; δ Vegetation impacts; δ Soil changes; δ Surface water contamination. **Potential HHA aspects:**	Site Establishment- & Construction Phase	1. Medium-High 2. Medium 3. Low-Medium	<u>Control:</u> Dust suppression methods, monitoring and proper housekeeping. <u>Control, Remedy and Modify:</u> Noise suppression methods, monitoring and proper housekeeping.	1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2) 3. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	3. Noise nuisance caused by site establishment / construction phase.	δ Respiratory irritation; δ Chronic respiratory disease; δ Community nuisance; δ Property and infrastructure soiling; δ Agricultural Impacts.				
Operational Phase.	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. 3. Noise nuisance caused by mining machienry and operations (excluding blasting). 4. Potential blasting noise and vibration nuisance to neighbouring properties.		Operational Phase	1. High 2. Medium-High 3. Medium 4. Medium		1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2) 3. Low-Medium 4. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
Decommissioning Phase.	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. 3. Noise nuisance caused during the decommissioning phase.		Decommissioning Phase	1. High 2. Medium-High 3. Medium		1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Medium (Scenario 1) Low (Scenario 2) 3. Low
GEOLOGY, SOILS AND AGRICULTURAL IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Loss of land capability 2. Soil erosion 3. Soil compaction 4. Soil contamination	**Potential environmental aspects:** δ Geology; δ Soil;	Site Establishment- & Construction Phase	1. Medium 2. Medium 3. Low-Medium 4. Medium-High	Control: Implementation of the mitigation measures proposed in this report and rehabilitation of the mining area upon closure.	1. Low 2. Low 3. Low 4. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
Operational Phase.	1. Loss of land capability 2. Soil erosion 3. Soil compaction 4. Soil contamination 5. Increased fire risk	δ Agriculture. **Potential social & economic aspects:** δ Livelihood impacts; δ Food security risks; δ Displacement or land-use conflicts.	Operational Phase	1. Medium 2. Medium 3. Low-Medium 4. Medium-High 5. Medium		1. Low 2. Low-Medium 3. Low 4. Low-Medium 5. Low
Decommissioning Phase.	1. Loss of land capability 2. Soil erosion 3. Soil compaction 4. Soil contamination		Decommissioning Phase	1. Medium 2. Medium 3. Low-Medium 4. Medium-High		1. Low 2. Low-Medium 3. Low 4. Low
GEOHYDROLOGY IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.	**Potential environmental aspects:** δ Groundwater table changes; δ Flow pattern alteration; δ Aquifer depletion;	Site Establishment- & Construction Phase	1. Low	<u>Control, Remedy and Modify:</u> Implementation of the mitigation measures proposed in this report and monitoring of groundwater until closure.	1. Low
Operational Phase.	1. Potential impact on the water availability in some of the user boreholes to the north.		Operational Phase	1. Medium 2. Low		1. Low 2. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD. **(Positive Impact).** 2. Waste water from ablutions potentially impacting the groundwater quality.	δ Groundwater contamination; δ Surface water impacts. **Potential human health & social aspects:** δ Water supply risks; δ Water quality risks; δ Livelihood impacts; δ Community conflict.				
Decommissioning Phase.	1. Potential impact on the water availability in some of the user boreholes to the north. The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD. (Positive Impact).		Decommissioning Phase	1. Medium		1. Low
HYDROLOGY IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Increased risk of erosion resulting in increased sediments entering the	**Potential environmental aspects:**	Site Establishment- & Operational Phase	1. Medium-High 2. Medium-High	<u>Control:</u> Consideration of specialist recommendations	1. Medium 2. Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	watercourses resulting in changes to water quality. 2. Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses. 3. As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse. 4. During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality. 5. During the construction period it is anticipated that hazardous chemicals and/or materials may be	δ Flow regime alteration; δ Reduced downstream flow; δ Increased flooding or erosion; δ Sedimentation; δ Water quality degradation; δ Habitat alteration. **Potential human health & social aspects:** δ Reduced water availability; δ Contaminated water supply; δ Loss of ecosystem services.		3. Medium-High 4. Medium 5. Medium 6. Medium-High	and implementation of the SWMP. <u>Stop:</u> Demarcation of buffer areas.	3. Low-Medium 4. Low 5. Low 6. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	stored and utilized on site. These could pose a risk to the surface water resources. 6. The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.					
Operational Phase.	1. Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality. 2. Potential for dirty water to enter the surrounding watercourses as a result of operations. 3. Potential for domestic waste to enter the surrounding		Operational Phase	1. Medium-High 2. Medium-High 3. Medium 4. Medium 5. Medium-High		1. Low-Medium 2. Low 3. Low 4. Low 5. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	watercourses as a result of operations. 4. Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations. 5. Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses.					
FRESHWATER ECOSYSTEMS IMPACT ASSESSMENT						
Site Establishment and Construction Phase.	1. Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs.	**Potential environmental aspects:** δ Flow regime alteration;	Site Establishment- and Construction Phase	1. Low-Medium 2. Medium-High 3. Low-Medium 4. Low-Medium	Control: Consideration of specialist recommendations and implementation of the SWMP.	1. Low-Medium 2. Impact Avoided 3. Low 4. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	2. Erection and fencing of mining-related infrastructure (stockpile area) within and adjacent to (within the GN 4167 100m ZoR) of the northern EDL, in preparation for mining operations. 3. Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL. 4. Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining. 5. Creation of the stockpile within the immediate catchment of the northern EDL.	δ Habitat degradation; δ Water quality deterioration; δ Biodiversity reduction. **Potential social & livelihood aspects:** δ Loss of ecosystem services; δ Economic impacts.		5. Low-Medium 6. Medium	<u>Stop:</u> Demarcation of buffer areas.	5. Low-Medium 6. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	6. Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).					
Operational Phase	1. Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2). 2. Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation (ZoR) of the southern EDL. 3. Transport of product from Pit 2 to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is		Operational Phase	1. Medium-High 2. Low-Medium 3. Low-Medium 4. Low 5. Low		1. Medium 2. Low 3. Low 4. Low 5. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	located within the associated 100 m ZoR. 4. Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL. 5. Operation and maintenance of the upgraded road crossings within the EDLs.					
Decomissioning Phase	1. Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs. 2. Post-closure management activities.		Decommissioning Phase	1. Low-Medium 2. Low-Medium		1. Low 2. Low
TERRESTRIAL BIODIVERSITY, CONSERVATION AREA, GROUNDCOVER AND FAUNA IMPACT ASSESSMENT						
Site establishment and Construction Phase	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase.	**Potential environmental aspects:** δ Habitat loss and fragmentation;	Site Establishment & Operational Phase	1. Low-Medium 2. Low-Medium 3. Low-Medium	<u>Control:</u> Consideration of specialist recommendations, demarcation of buffer areas,	1. Low-Medium 2. Low-Medium 3. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase. 5. Potential impact on the ESA during the pre-construction and planning phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase.	δ Altered species composition; δ Soil and microclimate changes; δ Reduced infiltration; δ Loss of soil fertility; δ Loss of keystone species. **Potential social & livelihood aspects:** δ Loss of ecosystem services; δ Reduced grazing potential; δ Lower agricultural productivity.		4. Low 5. Low-Medium 6. Medium 7. Low-Medium 8. Low-Medium 9. Medium	monitoring and the control of AIP.	4. Low 5. Low 6. Low-Medium 7. Low-Medium 8. Low-Medium 9. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase. 9. Potential infestation of the footprint area by invasive plant species.					
Operational Phase	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase. 3. Potential impact on the Freshwater Habitat: EDL		Operational Phase	1. Medium-High 2. Medium-High 3. Medium 4. Medium-High 5. Medium-High 6. High 7. Medium-High 8. Medium-High		1. Medium-High 2. Medium 3. Low-Medium 4. Medium 5. Medium 6. Medium-High 7. Medium-High 8. Medium-High

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	and diversity during the mining phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase. 5. Potential impact on the ESA during the mining phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase. 9. Potential impact on the Kuruman Mountain			9. High 10. Medium-High 11. Medium-High 12. Medium		9. Medium-High 10. Medium-High 11. Medium-High 12. Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	Bushveld faunal SCC during the mining phase. 10. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase. 11. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase. 12. Potential infestation of the mining footprint with invasive plant species.					
Decommissioning Phase	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase. 3. Potential impact on the Freshwater Habitat: EDL		Decommissioning Phase	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Medium 7. Medium 8. Medium		1. Low-Medium 2. Low-Medium 3. Low 4. Low-Medium 5. Low 6. Low-Medium 7. Low-Medium 8. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	and diversity during the decommissioning phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase. 5. Potential impact on the ESA during the decommissioning phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase. 9. Potential impact on the Kuruman Mountain			9. Medium 10. Low-Medium 11. Low-Medium 12. Medium		9. Low-Medium 10. Low-Medium 11. Low-Medium 12. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	Bushveld faunal SCC during the decommissioning phase. 10. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase. 11. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase. 12. Potential infestation of the rehabilitated areas with invasive plant species.					
HERITAGE, CULTURE, AND PALAEONTOLOGICAL IMPACT ASSESSMENT						
Site Establishment and Construction Phase	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context.	**Potential environmental aspects:** δ Loss or damage to physical	Site Establishment- and Construction Phase	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low	<u>Control:</u> Consideration of specialist recommendations. <u>Stop & Modify:</u> Demarcation of no-go areas and chance find procedures.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	2. Potential physical disturbance of the burial sites and/or its context. 3. Potential physical disturbance of the historical farmhouse. 4. Potential impact to fossil heritage.	heritage resources; δ Contextual alteration; δ Disturbance or loss of culturally significant sites; δ Loss of fossil resources. **Potential social & livelihood aspects:** δ Loss of cultural traditions; δ Community conflict.				
Operational Phase	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. 2. Potential physical disturbance of the burial sites and/or its context. 3. Potential physical disturbance of the historical farmhouse. 4. Potential impact to fossil heritage.		Operational Phase	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low		1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
SOCIO-ECONOMIC IMPACT ASSESSMENT						
Site Etablishment and Construction Phase	1. Employment opportunities and skills development **(Positive Impact).** 2. Economic multiplier effects **(Positive Impact).** 3. Influx of jobseekers and change in population. 4. Safety and security impacts. 5. Increased pressure on local services/resources. 6. Nuisance impacts (noise & dust).	**Potential environmental aspects:** δ Indirect environmental pressure; δ Land use changes. **Potential social & livelihood aspects:** δ Employment opportunities; δ Skills development; δ Economic stimulation; δ Health and safety concerns.	Site Establishment- & Construction Phase	1. Medium (+) 2. Medium (+) 3. Medium-High 4. Medium 5. Medium 6. Medium-High	<u>Control & Stop:</u> Implementation of the proposed mitigation measures and proper human resources management.	1. Medium-High (+) 2. Medium-High (+) 3. Medium 4. Low-Medium 5. Low-Medium 6. Low
Operational Phase	1. Direct and indirect employment opportunities **(Positive Impact).** 2. Economic multiplier effect **(Positive Impact).**		Operational Phase	1. Medium-High (+) 2. Medium (+) 3. Medium (+)		1. Medium-High (+) 2. Medium-High (+) 3. Medium (+)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	3. Contribution to local economic development and socio-economic upliftment **(Positive Impact).** 4. Nuisance impacts (noise & dust).			4. High		4. Low
Cumulative Impacts	1. An increase in employment opportunities, skills development, and business opportunities of the project in isolation **(Positive Impact).** 2. An increase in employment opportunities, skills development, and business opportunities of the project and other projects in the area **(Positive Impact).** 3. Negative impacts and change to the local economy with an in-migration of labourers,		Operational Phase	N/A		1. Medium-High (+) 2. High (+) 3. Medium 4. Medium-High

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	businesses, and jobseekers to the area (proposed project in isolation). 4. Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project and other projects in the area).					
Decommissioning Phase	1. Loss of employment opportunities and economic changes. **2.** Environmental restoration and land use changes **(Positive Impact).** 3. Infrastructure decommissioning and waste management.		Decommissioning Phase	1. Medium-High 2. Low-Medium (+) 3. Medium		1. Medium 2. Low-Medium (+) 3. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
WASTE MANAGEMENT IMPACT ASSESSMENT						
Site Establishment and Construction Phase	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater. 3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).	**Potential environmental aspects:** δ Soil contamination; δ Water pollution; δ Air quality degradation; δ Ecosystem impacts; δ Visual intrusion. **Potential social & livelihood aspects:** δ Human health risks; δ Community nuisance; δ Reduced land usability/ δ Loss of property value.	Site Establishment-& Construction Phase	1. Low 2. Low 3. Low 4. Low	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	1. Low 2. Low 3. Low 4. Low
Operational Phase	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater.		Operational Phase	1. Low 2. Low 3. Low 4. Low		1. Low 2. Low 3. Low 4. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).					
Decommissioning Phase	1. Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. 2. Leaching of contaminants from the WRD into groundwater. 3. Ingestion/use of contaminated groundwater (that originated from the WRD). 4. Ingestion/use of contaminated surface water (that originated from the WRD).		Decommissioning Phase	1. Low 2. Low 3. Low 4. Low		1. Low 2. Low 3. Low 4. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
HEALTH IMPACT ASSESSMENT						
Operational Phase	1. Air quality impact on health: all-cause (natural) mortality. 2. Air quality impact on health: cardiovascular hospital admissions. 3. Air quality impact on health: chronic bronchitis. 4. Air quality impact on health: acute bronchitis in children. 5. Air quality impact on health: lung cancer in adults. 6. Water quality impact on health.	**Potential environmental aspects:** δ Airborne pollutants; δ Water contamination; δ Vector-borne diseases; δ Noise exposure; δ Chemical exposure. **Potential social & livelihood aspects:** δ Community health burden; δ Workforce health and safety; δ Economic consequences.	Operational Phase	1. Low (Scenario 1 & 2) 2. Low (Scenario 1 & 2) 3. Low-Medium (Scenario 1) 4. Low-Medium (Scenario 1) 5. Low-Medium (Scenario 1) 6. Low-Medium	Control: Implementation of the specialist recommendations and monitoring plans during the operational phase.	1. Low (Scenario 1 & 2) 2. Low (Scenario 1 & 2) 3. Low (Scenario 2) 4. Low (Scenario 2) 5. Low (Scenario 2) 6. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
ROAD NETWORK AND TRAFFIC IMPACT ASSESSMENT						
Operational Phase	1. Traffic congestion on the R385 due to mining activities. 2. Road wear and tear of the R385 due to mining activities. 3. Safety concerns and accidents on R385 due to mining activities. 4. Increased air pollution due to increased traffic on the R385. 5. Increased noise pollution due to increased traffic on the R385. 6. Community disruption due to increased traffic on the R385. 7. Wildlife disruption due to increased traffic on the R385.	**Potential environmental aspects:** δ Air quality degradation; δ Noise pollution; δ Soil erosion and runoff; δ Vegetation loss. **Potential social & livelihood aspects:** δ Traffic safety risks; δ Community nuisance; δ Access disruption; δ Economic impacts.	Operational Phase	1. Medium-High 2. High 3. Medium-High 4. High 5. Medium 6. Medium-High 7. Medium-High	Control: Implementing of the specialist recommendations and continuous road condition monitoring.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Low-Medium 7. Low-Medium

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
POTENTIAL RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK						
Decommissioning Phase	1. Veld fires affecting sensitive areas such as the nursery and/or revegetated areas. 2. Possible development of subsided areas after rehabilitation. 3. Potential for crack development after rehabilitation. 4. Insufficient topsoil and subsoil available for rehabilitation. 5. Potential of topsoil being diluted and chemically deficient to be used during rehabilitation. 6. Potential contamination of soils. 7. Potential chemical changes in topsoil and subsoil leading to toxicity.	**Potential environmental aspects:** δ Soil resources; δ Surface water resources; δ Groundwater resources; δ Air quality; δ Fauna and flora; δ Ecosystem processes. **Potential social & livelihood aspects:** δ Livelihood and land use; δ Community nuisance; δ Aesthetic and recreational value.	Decommissioning Phase	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Medium-High 5. Medium-High 6. Medium 7. Medium 8. Medium 9. Medium 10. Medium 11. Low-Medium 12. Medium-High 13. Medium-High 14. Medium 15. Low-Medium	Control: Implementing of the specialist recommendations and continuous monitoring of the rehabilitation activities.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Medium 5. Low-Medium 6. Low 7. Low 8. Low-Medium 9. Low-Medium 10. Low-Medium 11. Low 12. Medium 13. Low 14. Low 15. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	8. Dust pollution during the decommissioning phase. 9. Potential for wind and water erosion of the denuded areas. 10. Sedimentation of EDL's and PFPs due to water erosion from denuded areas. 11. Potential of surface water pollution flowing into the mining area. 12. Potential groundwater depletion and/or pollution due to mining activities. 13. Invasive plant species establishing in the rehabilitated areas. 14. Potential failure of the nursery that may threaten the rehabilitation process. 15. Potential impact of livestock browsing/grazing on revegetated areas.			16. Medium-High 17. Low-Medium 18. Medium 19. Low-Medium		16. Low 17. Low 18. Low-Medium 19. Low

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE (WITHOUT MITIGATION)	MITIGATION TYPE	SIGNIFICANCE (WITH MITIGATION)
	16. Potential failure of revegetation of the mined areas. 17. Potential hunting, trapping, trafficking and plant harvesting. 18. Potential degradation of the surrounding areas. 19. Potential failure of rehabilitation.					

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix V.

j) Summary of specialist reports.

Table 104: Summary of specialist reports.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Geohydrological Investigation July 2025 *(See Appendix E for a full copy of the document)*	**Proposed Mitigation Measures:** δ A sealing layer can be constructed beneath the dumps to seal it off from groundwater, however, due to the expected inertness of the materials, this is not deemed necessary. δ Routine maintenance of the sewage system may decrease the risk of failure and spillage. **Monitoring Recommendations:** δ Groundwater monitoring should be conducted to assess the impacts of the proposed new mining activities on groundwater quality and quantity. δ Groundwater monitoring (i.e. sampling and water level measurements) should be conducted at quarterly intervals. δ There are five areas that need to be monitored to focus on different aspects of monitoring. Existing exploration boreholes located in advantageous positions should be used for monitoring purposes. δ The mine should also consider including some active user boreholes located within at least a 1 km radius (but preferably 2 km) of the planned mining activities.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 5. Site Specific Geohydrology. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: 5. Geohydrology. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions,

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	Groundwater samples should be analysed at a SANAS accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities.		k) mechanisms for monitoring compliance.
Stormwater Management Plan July 2025 *(See Appendix F for a full copy of the document)*	**<u>Recommendations:</u>** δ The proposed containment facilities should be designed to incorporate a 0.8m freeboard. δ The SWMP should be revisited after any major changes to the current operations or design changes. δ It is recommended that stone pitching channels are used to transfer runoff. Stone pitching is recommended to reduce high runoff velocities in channels. δ To prevent clogging of the grated channel covers and maintain channel capacity, best practice and proper housekeeping practices must be ensured. δ All channels must be checked after any major rainfall events to ensure that there are no blockages and that the water flow will not be restricted in any way. δ Sediment that accumulates within channels and retention facilities needs to be removed directly after the storm events and appropriately disposed of to ensure design capacity is maintained. δ It is recommended that the stormwater attenuation facilities be operated empty or at a storage level low enough to accommodate stormwater inflows, whilst	The recommendations of the specialist were all incorporated into this document.	Part A(1)(d)(ii) Description of the activity to be undertaken: 2.2.1.3 Stormwater Management. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements.		
Waste Classification and Assessment of Expected Waste Rock July 2025 *(See Appendix G for a full copy of the document)*	**<u>Recommendations:</u>** δ Monitoring of groundwater quality down-gradient of the Waste Rock Dump; δ Monitoring of water quality in the stream if possible; and Numerical and geochemical model need to be updated against monitoring data every 2-3 years to serve as early warning system for potential contamination	The recommendations of the specialist were all incorporated into this document.	Part A(1)(d)(ii) Description of the activity to be undertaken: 2.2.2.2 Waste Classification and Assessment of Expected Waste Rock Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

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Hydrological Assessment July 2025 *(See Appendix I for a full copy of the document)*	**<u>Recommendations</u>** δ A competent Environmental Control Officer (ECO) must oversee the construction, operation and rehabilitation phases of the project, with watercourse areas as a priority; δ It is recommended that an Erosion Risk Assessment and Management Plan is completed and implemented to derive the areas at highest risk for erosion. These high-risk areas should then be key points for erosion management throughout the entirety of the project lifecycle. δ The Proposed Mine should have and implement a Rehabilitation Plan that will be active during the life of mine, as well as post-decommissioning. This is to ensure that ecological integrity and ecosystem services can be restored in the event of degraded wetlands and aquatic habitats. δ The Proposed Mine must have and implement a Remediation Plan that encompasses all types of pollution events associated with a Mine.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 6. Site Specific Hydrology. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Terrestrial Biodiversity Assessment May 2025 *(See Appendix J for a full copy of the document)*	**<u>Conclusion – Terrestrial Assessment and Floral Compliance Statement</u>** The highest impacts are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas, of varying SEI (mostly low SEI), being cleared. The anticipated impacts within the more sensitive habitat units namely Kuruman Mountain Bushveld and Freshwater Habitat (EDL and Recharge area) resulting in the highest impact scoring. However, based on the proposed layout the majority of the planned activities will be taking place in the less sensitive habitats and sensitive habitat are mostly avoided, with only minor activities taking place in the Freshwater Habitat (EDL). Based on the above, it is the floral specialists' opinion that the project may be approved, provided that a floral walkdown (of the footprint areas) is implemented to ensure all possibly occurring floral SCC are relocated before vegetation clearing commences, and that stringent mitigation measures are implemented including monitoring of the footprint extents (including edge effects management) to ensure no additional loss of ESA integrity and functioning.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 8. Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover and 9. Site Specific Fauna. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	Also refer to *Section 5.2 Floral Impact Assessment Results* of the study (Part B) that lists mitigation measures for each identified impact. **<u>Conclusion – Faunal Assessment</u>** The highest impacts on faunal ecology are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas (i.e., indigenous vegetation), of high and medium faunal SEI, being cleared. Medium-High and High impacts prior to mitigation can be anticipated within the Focus Areas. Following mitigation measures, impact scoring can be reduced for the most part although impact significance will mostly stay the same (Medium-High). Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a Medium-High significance at a local scale, it is unlikely that faunal species will be affected at a population level. With the implementation of stringent mitigation measures and environmental management including thorough rehabilitation plan, it is believed that the project can be considered for authorisation. Also refer to *Section 5.2 Faunal Impact Assessment Results* of the study (Part C) that lists mitigation measures for each identified impact.		

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Heritage Impact Assessment (HIA) April 2025 *(See Appendix K for a full copy of the document)*	The HIA proposed the following recommendations for condition of authorisation: δ The extent of the recorded cemeteries and burial sites (Feature 1- 3 and MG002) should be avoided with a 30 m buffer zone with access provided to family members; δ A Heritage Management plan must be compiled for the recorded cemeteries including an access protocol for the next of kin; δ Historical farmstead MG003 should also be added to development plans and avoided with a 30 m buffer zone; δ Development activities must be confined to the approved development footprint only; Monitoring of the Project area by the ECO during pre-construction and construction phases for heritage and palaeontological chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9 (of the HIA).	All the recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: 11. Culture, Heritage and Palaeontological Environment. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 10. Site Specific Cultural, Heritage and Palaeontological Environment. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons,

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
			j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Palaeontological Impact Assessment (PIA) August 2025 *(See Appendix L for a full copy of the document)*	The PIA proposed the following recommendations for condition of authorisation: δ A Fossil Chance Find Protocol should be added to the EMPR. If fossils are found by the environmental officer, or other responsible person once excavations have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: 11. Culture, Heritage and Palaeontological Environment. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 10. Site Specific Cultural, Heritage and Palaeontological Environment. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including:

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
			g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Socio-Economic Impact Assessment May 2025 *(See Appendix M for a full copy of the document)*	The following recommendations are made based on the SEIA: δ Local Employment: Prioritise the employment of local unskilled and semi-skilled workers to enhance positive socio-economic impacts and reduce external migration pressures. δ Local Procurement: Actively engage local suppliers for materials and services to boost the local economy and minimise transportation-related environmental impacts. δ Operational Impact Mitigation: Implement rigorous management plans to address operational impacts, including regular dust suppression, noise management, and effective traffic management. δ Safety and Security: Enhance safety measures and security protocols, particularly regarding access	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: 12. Socio-economic Environment. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 11. Socio-economic Environment. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management

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	control and traffic management around the mining site. Community Liaison: Maintain an effective communication channel through a community liaison officer to proactively manage stakeholder concerns and ensure transparency.		programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Visual Impact Assessment May 2025 *(See Appendix N for a full copy of the document)*	**<u>Environmental Impact Statement and Conclusion</u>** Mitigation measures have been proposed to address and reduce the visual impacts associated with the project. These include careful siting and design of infrastructure, retention and enhancement of vegetation buffers, use of visually sympathetic materials and colours where feasible, minimisation of night-time lighting impacts, and progressive rehabilitation of disturbed areas. Furthermore, final closure and rehabilitation measures, including the reshaping of landforms and re-vegetation with appropriate indigenous species, will assist in softening the long-term visual footprint of the mine and integrating it more naturally into the receiving environment.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: 3. Visual Characteristics. Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 2. Visual Characteristics. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the

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	Also refer to *Section 8.2 Impacts and Mitigation* of the study that lists mitigation measures for each identified impact.		environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Atmospheric Impact Assessment July 2025 *(See Appendix O for a full copy of the statement)*.	**<u>Specialist Recommendations:</u>** Based on the results of the dispersion modelling, the implementation of additional dust control measures, such as windbreaks and chemical suppressants, would significantly reduce the predicted ambient concentration of PM at the proposed site. However, it should be noted that these measures were assessed in isolation of operational, technical and economic feasibility considerations.	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 3. Site Specific Air Quality and Noise Ambiance. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
			programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Health Impact Assessment August 2025 *(See Appendix P for a full copy of the document)*	**<u>Specific Mitigation Measures to be Included:</u>** Specific mitigation measures applicable to the generation of dust, which are to be included in the EA and in the EMPR, are the baseline and enhanced dust mitigation measures proposed in the AIR and supported by the RAHIA: δ Spraying water on all haul roads twice per day. δ Application of a chemical dust suppressant on Route 3 (the haul road to the main gate). δ Windbreaks or three-sided enclosures around the ore stockpile, waste rock dump and open pits to reduce wind-blown dust. δ Application of a chemical dust suppressant in addition to water spraying on Route 2.	The mitigation measures proposed by the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 12. Health Impact Assessment. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including:

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	Mitigation and monitoring measures to protect ground- and surface water sources from contamination due to mining activities are proposed in the report on the assessment of expected waste rock, in the proposed SWMP, the hydrological surface water assessment and in the groundwater report: δ Ongoing groundwater and surface water quality monitoring downstream of the waste rock dump, as well as periodic updates of geochemical, surface- and groundwater models in line with monitoring data to proactively identify changes in environmental and potential health risks. δ Routine maintenance of the sewage system to decrease the risk of failure and spillage. A sealing layer can be constructed beneath the stockpile and waste rock dumps in order to seal it off from groundwater. However, due to the expected inertness of the materials, this is not deemed necessary (Groundwater Complete 2025) and are thus not included as a compulsory mitigation measure.		g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.
Soil, Land Use and Land Capability Assessment July 2025	**<u>Conclusion and Recommendations:</u>** The entire focus area is characterised by ±300 mm of mean annual rainfall per annum. This rainfall is deemed inadequate for a variety of cultivated crops and adjusting planting and/or an irrigation scheme may be necessary	All the recommendations of the specialist were incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 4. Site Specific Geology, Soils and Agricultural Sensitivity.

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(See Appendix Q for a full copy of the document)	for successful cultivation of crops. Additionally, the entire focus areas are characterised by mean annual evaporation of more than (>2400 mm) per annum. Moisture deficit and crop wilting may be a problem for non-irrigated crops. According to observations made during the site assessment, the footprint areas for the proposed MIOM is dominated by bushveld with shrubby and thorny vegetation, wilderness/wildlife, open grassland that is currently utilised for livestock grazing (cattle). No small scale and/or commercial agricultural cultivation activities were observed within the immediate surroundings (5 km radius) of the focus area. According to the DALRRD 2022 database on the proposed MIOM area is not located within any PAA. Therefore, the proposed mining project is not likely to have an impact on the protected agricultural areas and consequent food security. The Mispah/Glenrosa and Mispah soil formations are usually avoided for intensive agricultural use and thus left for grazing and wildlife land uses in this arid region since they do not present adequate soil depth for most cultivated crops. The Witbank (Transported Technosols) soil forms include areas with transported soil material which has been		Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

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	significantly transformed and heavily modified such that the diagnostic horizons could not be identified. As a result, these soils are not ideal for agricultural cultivation. The soils of Hutton formations have a good depth (±120 cm), which is considered sufficient to allow plants' roots to extract moisture and nutrients to sustain growth and development. In the absence of climatic constraints, the soils are suitable for arable cultivation. The cumulative loss from a soil and land capability point of view is anticipated to be low for the proposed MIOM. This can be attributed to the dominance of Glenrosa and Mispah soil forms within the focus area which account for approximately 85% of the focus area. The dominant soils have little bearing on agricultural productivity and their contribution towards local, regional, and national food security is highly minimal. Additionally, the existence of other currently operating mines and the proposed Makganyane Mine may have incremental effects on the environment over time; however, the cumulative impacts within the context of local and regional setting are not anticipated to be significant given the low land capability associated with the identified soils as well as the low grazing capacity potential regionally. The livestock grazing capacity potential is estimated to be ±14 hectares per livestock unit (ha/LSU) for the entire focus area. This grazing capacity potential associated		

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	with the focus area is considered insufficient to support both small scale and/or commercialised livestock farming. The field verified agricultural sensitivity revealed a low agricultural sensitivity due to factors such as poor soil quality (lack of soil medium and effective rooting depth) and climatic constraints that limit the potential for commercial agricultural production. Given the restrictive soil physical properties and unfavourable climatic conditions associated with the footprint area, the proposed development is not regarded as a significant threat towards regional, provincial, and national food production and security. It is therefore the opinion of the soil specialist that the proposed MIOM will not result in an unacceptable risk or loss of agricultural resources, and the proposed development is therefore deemed acceptable from a soil, land use, and land capability point of view, provided adequate and appropriate mitigation measures are put in place to minimise disturbances on the soil regime of the focus area. Also refer to *Section 6.2 Integrated Mitigation Measures* of the study.		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Freshwater Ecosystem Assessment July 2025 *(See Appendix R for a full copy of the document)*	**<u>Conclusion and Recommendations</u>** The site assessment confirmed the presence of two Episodic Drainage Lines (EDLs) without riparian vegetation, associated with the western portions of the focus and investigation areas. Numerous artificial features were also identified during the site assessment which included Preferential Flow Paths (PFPs), and a recharge zone. Neither the PFPs nor the recharge zone met the definition of a watercourse from an ecological perspective and were therefore excluded from further assessment. Form a legal perspective, however, a 1 in 100 year floodline has been modelled for the recharge zone and as such does enjoy protection under the NWA. The hydrological assessment (TBC, 2025) does not indicate any floodlines for the PFP's and therefore does not enjoy protection from a legal perspective. Following the freshwater ecosystem assessment, most of the activities associated with the proposed mining development have been assessed to be associated with a "low" degree of risk to the freshwater environment, due to the suitable placement of infrastructure and the reshaping and redesigning of disturbance areas in consultation with the freshwater specialist and in line with the mitigation hierarchy. The only exception is the construction and operation of the proposed Pit 2 which was assessed to have a moderate risk significance on the	The following recommendations were either omitted from the report or moved to a more appropriate phase: δ **Omitted:** No dewatering operations from the pit must allow any discharge of such water into the natural environment, and all such water must be handled as part of the dirty water management system of the Pit 2. **Reason for Omission:** The recommendations of the Geohydrological Impact Assessment took precedence over this recommendation of the specialist. The dewatering requirements will further be informed by DWS as part of the WULA. δ **Moved to Another Phase:** Mitigation measures proposed for the operational reshaping of Pit 2 and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m ZoR of the southern EDL.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 7. Site Specific Freshwater Ecosystems. Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	southern EDL. The moderate risk is ascribed to the fact that the Pit 2 area is located adjacent to and within in the 48 m ecological buffer of the southern EDL and would result in numerous indirect impacts which will need to be appropriately managed as per the recommendations set out in this report. SAS recommended that if the mitigation measures, as stipulated in this report and the mitigation measures contained within the SWMP are strictly adhered to, the proposed MIOM operation, from a water resource management point of view, can be considered acceptable for authorisation in terms of the EA and WUA processes. Also refer to *Section 8.3 Recommended Mitigation Measures* of the study that lists mitigation measures for each identified impact.	**Reason for Changed Phase:** Due to the nature of the project operational rehabilitation of Pit 2 will not be possible, and the recommendations were therefore moved to the Decommissioning Phase.	
Traffic Impact Assessment June 2025 *(See Appendix S for a full copy of the document)*	**<u>Recommendations:</u>** δ Routine maintenance of the R385 should be carried out throughout the lifecycle of the mine to ensure the continued safe and efficient operation of the road, particularly given the anticipated increase in heavy vehicle usage. δ Implement access road enhancements, including widening the entrance road to at least 7,5 m to allow	The recommendations of the specialist were all incorporated into this document.	Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: 13.1 Road Network and Traffic Assessment.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	two 36-ton trucks to pass comfortably, provision of 15 m bellmouth radii to accommodate turning movements, and installation of regulatory and warning signage to guide truck drivers and improve safety at the mine entrance. δ Establish monitoring protocols to evaluate traffic conditions and LOS throughout the mine's lifecycle. δ Engage with stakeholders and regulatory authorities continuously to address safety, community, and compliance concerns. δ Integrate environmental mitigation measures such as dust suppression and periodic surface maintenance.		Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk. Part B(1) Mechanisms for monitoring compliance with and performance assessment the environmental management programme and reporting thereon, including: g) monitoring of impact management actions, h) monitoring and reporting frequency, i) responsible persons, j) time for implementing impact management actions, k) mechanisms for monitoring compliance.

k) Environmental impact statement

i) Summary of the key findings of the environmental impact assessment.

The key findings of the environmental impact assessment regarding the proposed mining operation entail the following:

1. PROJECT PROPOSAL

The Applicant, Assmang (Pty) Ltd, applied for a mining right (MR), environmental authorisation (EA), and waste licence (WL) to mine Hematite, Magnetite, Goethite, Limonite, Siderite, Pyrolusite, Psilomelane, Rhodochrosite, Manganite, Braunite, Hausmannite, Manganese ore, Iron ore, and Diamonds (general) from 1 549.61 ha that extends over Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667 in the Tsantsabane Local Municipality of the Northern Cape.

The operational phase will entail opencast mining. The first phase will focus on pre-stripping the top layer material, of which the topsoil will be stored separately for rehabilitation. Then waste rock will be stripped to access the ore body followed by open cast mining of Pit 1 and Pit 2 (refer to Figure 9). The mining technology will include drilling and blasting with associated truck and shovel operations. Ore (RoM) from the open pit/s will report to a crusher situated on site and in the proposed stockpile area. Crushed ore will be stockpiled on-site from where ore will be transported via road (R385) to the Beeshoek Mine processing facility (off-site) using side tipper trucks. No processing will take place at the Makganyane Iron Ore Mine.

2. TOPOGRAPHY

The proposed excavations (Pit 1 and Pit 2) will unavoidably affect ±36 ha of the mining footprint due to the nature of the project. In addition, the Waste Rock Dump (WRD) will modify the topography over a further ±61 ha. Beyond these areas, the remaining ±1 452 ha of the mining area are not expected to be permanently affected, provided that the proposed mitigation measures and rehabilitation objectives are effectively implemented. By profiling the excavations and stabilising the soil with appropriate vegetation cover, the

potential impacts on the receiving environment's topography can be reduced to an acceptable level of significance.

3. VISUAL CHARACTERISTICS

The site is situated in an area already influenced by agricultural activities and mining infrastructure, which have altered the natural landscape to a moderate degree. While the proposed mine will introduce additional elements, these features will largely consolidate within an environment already characterised by human modification.

While cumulative visual impacts, in combination with other mining and agricultural activities in the region, were considered, the additional contribution from the proposed MIOM is not expected to fundamentally alter the broader landscape character.

The VIA concludes that, with the full implementation of the recommended mitigation measures and responsible visual management throughout the life of the project, no fatal flaws exist that would prevent the authorisation of the proposed MIOM from a visual perspective. The project is therefore supported on the basis that visual impacts will be effectively managed to remain within acceptable levels.

4. AIR QUALITY AND NOISE AMBIANCE

The proposed operation does not trigger an application in terms of the NEM:AQA.

According to the AIR the modelling results from Scenario 1 indicate that both the daily and annual NAAQS for PM_{10} and $PM_{2.5}$ would be exceeded at locations along the northern fence line of the site, particularly in the vicinity of the waste stockpile and ore stockpile. These exceedances highlight the need for additional dust control measures to ensure compliance during the operational phase of the mine. In Scenario 2, the implementation of additional dust mitigation measures results in notable improvement in predicted ambient PM concentrations. All $PM_{2.5}$ concentrations remain below both the daily and annual NAAQS, and the predicted annual PM_{10} concentrations also comply with the applicable standard. While the daily

PM_{10} NAAQS is still exceeded, the extent and magnitude of the daily exceedance is significantly reduced compared to Scenario 1.

Based on the results of the dispersion modelling, the implementation of additional dust control measures, as proposed in this document, would significantly reduce the predicted ambient concentration of PM at the proposed site to acceptable levels.

Ground vibrations and airblast are expected at the proposed MIOM as a result of blasting. Blasting operations will be managed to ensure compliance with applicable ground vibration and airblast criteria, while mitigation measures for noise and operational activities will be implemented as outlined in the EMPR. This will reduce the potential impact on noise ambiance to a Low-Medium significance.

5. GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY

The field verified agricultural sensitivity revealed a low agricultural sensitivity. Given the restrictive soil physical properties and unfavourable climatic conditions associated with the footprint area, the proposed development is not regarded as a significant threat towards regional, provincial, and national food production and security.

The cumulative loss from a soil and land capability point of view is anticipated to be low for the proposed MIOM. This can be attributed to the dominance of Glenrosa and Mispah soil forms within the focus area which account for ±85% of the focus area. The dominant soils have little bearing on agricultural productivity and their contribution towards local, regional, and national food security is highly minimal. Additionally, the existence of other currently operating mines and the proposed MIOM may have incremental effects on the environment over time; however, the cumulative impacts within the context of local and regional setting are not anticipated to be significant given the low land capability associated with the identified soils as well as the low grazing capacity potential regionally.

The grazing capacity potential associated with the focus area is considered insufficient to support both small scale and/or commercialised livestock farming.

It is the opinion of the soil specialist that the proposed MIOM will not result in an unacceptable risk or loss of agricultural resources, and the proposed development is therefore deemed acceptable from a soil, land use, and land capability point of view, provided adequate and appropriate mitigation measures are put in place to minimise disturbances on the soil regime of the focus area.

6. GEOHYDROLOGY

Pit 1 is expected to act as a significant hydraulic sink due to ongoing dewatering activities. This will draw any contaminated groundwater that may originate from the WRD or stockpile area in the direction of the pit where it can be contained.

A maximum groundwater level drawdown of ±110 m was simulated for Pit 1. An area of ±5.9 km^2 of the water table was simulated to be affected by the opencast mining of the two pits (i.e. area simulated to experience >5 m lowering of water levels). As the mining progresses, average influx volumes of between 20 and 40 m^3/h may be expected. No hydrocensus boreholes are located within the affected area, however, the “KR”-boreholes to the north will still be affected in terms of groundwater quantity due to the proximity to the cone of depression (1-5 m drawdown), for which some form of compensation will have to be planned. After mining has ceased, the pits will fill with water, allowing the surrounding groundwater levels to slowly recover. The water level of the mining area recovers to between 20 and 30 meters below the static or pre-mining level at around 25 years post closure (at Pit 1).

Current model results indicated that the expected groundwater inflow volumes per quarter are sufficiently low to be managed entirely by strategically placed sump pumps within the pits (Dewatering Technique 1).

The geohydrological investigation indicates that the MIOM is unlikely to result in significant long-term impacts on groundwater quality, provided that the recommended mitigation, monitoring, and management measures are diligently implemented and sustained throughout the project lifecycle. Considering the groundwater characteristics of the project area and the nature of the proposed activities, the Section 21(g) Water Use Licence

application is supportable from a groundwater perspective, as the associated risk to the groundwater environment is considered very low.

7. HYDROLOGY

A 1:100-year floodline was delineated for the watercourse identified in the east of the mining footprint. It is recommended that no activities be undertaken within the 1:100-year floodline extent and that the area be clearly marked. Based on the current site layout, no activities are envisaged within the 1:100 yr floodline extent.

8. FRESHWATER ECOSYSTEMS

The site assessment confirmed the presence of two EDLs without riparian vegetation, associated with the western portions of the focus and investigation areas. Numerous artificial features were also identified during the site assessment which included PFPs, and a recharge zone. Neither the PFPs nor the recharge zone met the definition of a watercourse from an ecological perspective.

Following the freshwater ecosystem assessment, most of the activities associated with the proposed mining development have been assessed to be associated with a “low” degree of risk to the freshwater environment, due to the suitable placement of infrastructure and the reshaping and redesigning of disturbance areas in consultation with the freshwater specialist and in line with the mitigation hierarchy. The only exception is the construction and operation of the proposed Pit 2 which was assessed to have a moderate risk significance on the southern EDL.

SAS (Freshwater Specialists) recommended that if the mitigation measures, as stipulated in this report and the mitigation measures contained within the SWMP are strictly adhered to, the proposed MIOM operation, from a water resource management point of view, can be considered acceptable for authorisation in terms of the EA and WUA processes.

9. TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, AND GROUNDCOVER

The highest impacts are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus

Areas, of varying SEI (mostly low SEI), being cleared. The anticipated impacts within the more sensitive habitat units namely Kuruman Mountain Bushveld and Freshwater Habitat (EDL and Recharge area) resulting in the highest impact scoring. However, based on the proposed layout the majority of the planned activities will be taking place in the less sensitive habitats and sensitive habitat are mostly avoided, with only minor activities taking place in the Freshwater Habitat (EDL).

Based on the above, it is the floral specialists' opinion that the project may be approved, provided that a floral walkdown (of the footprint areas) is implemented to ensure all possibly occurring floral SCC are relocated before vegetation clearing commences, and that stringent mitigation measures are implemented including monitoring of the footprint extents (including edge effects management) to ensure no additional loss of ESA integrity and functioning.

10. FAUNA

The site assessment indicated that the Focus Areas has the potential to host several faunal SCCs and protected species. Including nine avifaunal species, five mammal species, one amphibian and three invertebrate species. These species are all expected to be impacted upon through the current development either directly through displacement or through losing foraging and breeding habitat.

The highest impacts on faunal ecology are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas (i.e., indigenous vegetation), of high and medium faunal SEI, being cleared. Medium-High and High impacts prior to mitigation can be anticipated within the Focus Areas. Following mitigation measures, impact scoring can be reduced for the most part although impact significance will mostly stay the same (Medium-High).

Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a Medium-High significance at a local scale, it is unlikely that faunal species will be affected at a population level. With the implementation of stringent mitigation measures and environmental

management including thorough rehabilitation plan, it is believed that the project can be considered for authorisation.

11. CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT

The HIA identified a background scatter of isolated MSA artefacts. The stone tools are out of context and scattered too sparsely to be of significance. Two cemeteries, a stone cairn, exploration trenches, as well as a burial site and historical farmstead were recorded in the study area. Although these sites will not be impacted, they should be added to development plans along with the graves and avoided with a 30 m buffer zone.

The overall heritage impact of the project with the recommended mitigation measures is acceptable and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

The geological structures suggest that the target rocks are much too old and/or the wrong kind to contain fossils. Furthermore, the material to be mined is metamorphosed and this does not preserve fossils. Since there is a small chance that fossils from the Gordonia Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

12. SOCIO-ECONOMIC ENVIRONMENT

The proposed MIOM project represents an important development for the Northern Cape, particularly within the Tsantsabane Local Municipality, showcasing a balanced approach to economic development and environmental management. The project is poised to offer a potential boost to the local economy by creating direct and indirect job opportunities, predominantly sourced from nearby communities.

Furthermore, the project is aligned with national policies that support sustainable mining practices and economic empowerment, ensuring that its

implementation partially contributes to broader developmental goals. The strategic location of the project and its integration with local socio-economic structures are designed to optimise both environmental sustainability and economic viability. The SEIA supports the development of the proposed MIOM project provided that the recommended mitigation measures are implemented.

13. HEALTH IMPACT ASSESSMENT

Based on the RAHIA:

- δ Dust emissions health effects, assessed in terms of modelled $PM_{2.5}$ concentrations in air, are predicted to have at most a Low-Medium negative impact if only the mitigation measures of Scenario 1 is implemented.
- δ If additional dust suppression measures as proposed in the AIR (Scenario 2) are implemented, all impacts on health are rated as Low.
- δ Surface water streams are non-perennial (Eco-Thunder 2025), and it is thus unlikely that these are continuously used for household drinking water.
- δ Impacts on health via impacts on water quality are rated as low.

Therefore, the RAHIA specialist concluded that an EA may be issued for the proposed development of the MIOM, and proposed operations may commence, provided that the mitigation measures proposed in the report is implemented.

14. ROAD NETWORK AND TRAFFIC ASSESSMENT

The R385 is paved for the first 12 km north of Postmasburg and gravel thereafter, which poses capacity and safety concerns as traffic increases. Current traffic volumes are manageable, but by the operational and decommissioning phases, traffic demand is expected to approach the gravel road's capacity, with volume to-capacity (v/c) ratios of 0,84 and 0,86 respectively during peak hours, indicating constrained but not exceeded capacity conditions. Sight distances at the proposed access point are sufficient in both directions, but geometric improvements will be required to accommodate heavy vehicle movements.

Environmental considerations, including dust, noise, and road surface degradation from increased truck movements, were highlighted as potential concerns. Mitigation measures were proposed to address capacity and safety risks, including selective paving, signage, and geometric improvements at the access point. Should the proposed mitigation measures be implemented the potential road and traffic related impacts is expected to have a Low-Medium significance.

15. ASSESSMENT OF EXPECTED WASTE ROCK DUMP

The Waste Classification Study concluded that due to the low leachable concentrations of all constituents, the waste rock is assessed as a Type 4 waste and non-hazardous. No material impacts on the local aquifers and ecosystems are anticipated due to the proposed disposal of the Waste Rock.

ii) Finale Site Map

See the maps showing the site activities in relation to the specialist findings attached as Appendix C1-5.

iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives.

1. POSITIVE IMPACTS ASSOCIATED WITH THE FINAL PROJECT PROPOSAL

The following table lists the potential positive impacts associated with the final project proposal.

Table 105: List of potential positive impacts associated with the final project proposal.

PHASE	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE ENHANCEMENT)	SIGNIFICANCE (AFTER ENHANCEMENT)
Site Establishement and Construction Phase	Employement opportunities and skills development.	Medium	Medium-High
	Economic multiplier effect	Medium	Medium-High
Operational Phase	The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.	Medium	Medium

PHASE	POTENTIAL IMPACT	SIGNIFICANCE (BEFORE ENHANCEMENT)	SIGNIFICANCE (AFTER ENHANCEMENT)
	Direct and indirect employment opportunties.	Medium-High	Medium-High
	Economic multiplier effect.	Medium	Medium-High
	Contribution to local economic development and socio-economic upliftment.	Medium	Medium
Cumulative Impacts	An increase in employment opportunities, skills development, and business opportunities of the project in isolation.	Medium	N/A
	An increase in employment opportunities, skills development, and business opportunities of the project and other projects in the area.	High	N/A
Decommissioning Phase	Site restoration during decommissioning.	Low-Medium	Medium
	The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD.	Medium	Medium
	Environmental restoration and land use changes.	Low-Medium	Low-Medium

2. POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH THE FINAL PROJECT PROPOSAL

The following table shows the potential negative impacts associated with the proposed activity that were deemed to have a Low-Medium or higher significance/risk:

Table 106: List of potential negative impacts associated with the final project proposal with a Low-Medium or higher significance.

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
Visual Impact Assesment	1. Altered landscape and sense of place during construction.	1. Medium-High 2. Medium-High	1. Medium 2. Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
	2. Visibility of the facility to residents during construction. 3. Dust and construction impact during construction. 4. Impact on local infrastructure and traffic during construction.	3. Medium-High 4. Medium	3. Medium 4. Low-Medium
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$.	1. Medium-High	1. Low-Medium (Scenario 2)
Geology, soils and agricultural sensitivity	1. Soil contamination	1. Medium-High	1. Low-Medium
Hydrology Impact Assessment	1. Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality. 2. Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses. 3. As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse. 4. The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.	1. Medium-High 2. Medium-High 3. Medium-High 4. Medium-High	1. Medium 2. Medium 3. Low-Medium 4. Low-Medium
Freshwater Ecosystems Impact Assessment	1. Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs. 2. Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
	3. Creation of the stockpile within the immediate catchment of the northern EDL. 4. Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).		
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase. 4. Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase. 5. Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase. 6. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Medium 5. Low-Medium 6. Low-Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Low-Medium
Heritage, Culture, and Palaeontological Impact Assessment	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. 2. Potential physical disturbance of the burial sites and/or its context. 3. Potential physical disturbance of the historical farmhouse.	1. Low-Medium 2. Low-Medium 3. Low-Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium
Socio-economic Impact Assessment	1. Influx of jobseekers and change in population. 2. Safety and security impacts.	1. Medium-High 2. Medium-High 3. Medium	1. Medium 2. Medium 3. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
	3. Increased pressure on local services/resources.		
OPERATIONAL PHASE			
Visual Impact Assesment	1. Altered landscape and sense of place during operation. 2. Visibility of the facility to residents during operation. 3. Potential visual impact of operational, safety and security ligthgin during operation.	1. Medium-High 2. Medium-High 3. Medium-High	1. Medium 2. Medium 3. Medium
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. 2. Noise nuisance caused by mining machinery and operations (excluding blasting). 3. Potential blasting noise and vibration nuisance to neighbouring properties	1. High 2. Medium 3. Medium	1. Medium (Scenario 1) Low-Medium (Scenario 2) 2. Low-Medium 3. Low-Medium
Geology, soils and agricultural sensitivity	1. Soil erosion 2. Soil contamination	1. Medium 2. Medium-High	1. Low-Medium 2. Low-Medium
Hydrology Impact Assessment	1. Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality. 2. Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses.	1. Medium-High 2. Medium-High	1. Low-Medium 2. Low-Medium
Freshwater Ecosystems Impact Assessment	1. Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2).	1. Medium-High	1. Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase. 3. Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase. 4. Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase. 5. Potential impact on the ESA during the mining phase. 6. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase. 7. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase. 8. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase. 9. Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase. 10. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase. 11. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase.	1. Medium-High 2. Medium-High 3. Medium 4. Medium-High 5. Medium-High 6. High 7. Medium-High 8. Medium-High 9. High 10. Medium-High 11. Medium-High	1. Medium-High 2. Medium 3. Low-Medium 4. Medium 5. Medium 6. Medium-High 7. Medium-High 8. Medium-High 9. Medium-High 10. Medium-High 11. Medium-High
Heritage, Culture, and Palaeontological Impact Assessment	1. Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. 2. Potential physical disturbance of the burial sites and/or its context.	1. Low-Medium 2. Low-Medium 3. Low-Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
	3. Potential physical disturbance of the historical farmhouse.		
Road Network and Traffic Impact Assessment	1. Traffic congestion on the R385 due to mining activities. 2. Road wear and tear of the R385 due to mining activities. 3. Safety concerns and accidents on R385 due to mining activities. 4. Increased air pollution due to increased traffic on the R385. 5. Increased noise pollution due to increased traffic on the R385. 6. Community disruption due to increased traffic on the R385. 7. Wildlife disruption due to increased traffic on the R385.	1. Medium-High 2. High 3. Medium-High 4. High 5. Medium 6. Medium-High 7. Medium-High	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Low-Medium 7. Low-Medium
CUMULATIVE IMPACTS			
Visual Impact Assesment	1. Overall visual impact of the proposed project considered in isolation. 2. Overall visual impact of the proposed project and other projects within the area.	N/A	1. Medium 2. Medium-High
Socio-economic Impact Assessment	1. Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project in isolation). 2. Negative impacts and change to the local economy with an in-migration of labourers, businesses, and jobseekers to the area (proposed project and other projects in the area).	N/A	1. Medium 2. Medium-High

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
DECOMMISSIONING PHASE			
Visual Impact Assesment	1. Landscape character and visual amenity during decommissioning phase.	1. Medium	1. Medium
Air Quality and Noise Impact Assessment	1. Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$.	1. High	1. Medium (Scenario 1) Low-Medium (Scenario 2)
Geology, soils and agricultural sensitivity	1. Soil erosion	1. Medium	1. Low-Medium
Terrestrial Biodiversity, Conservation Area, Groundcover and Fauna Impact Assessment.	1. Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase. 2. Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase. 3. Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase. 4. Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase. 5. Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase. 6. Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase. 7. Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase. 8. Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase.	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Medium 5. Medium 6. Medium 7. Medium 8. Low-Medium 9. Low-Medium	1. Low-Medium 2. Low-Medium 3. Low-Medium 4. Low-Medium 5. Low-Medium 6. Low-Medium 7. Low-Medium 8. Low-Medium 9. Low-Medium

ASPECT	POTENTIAL IMPACT	SIGNIFICANCE (WITHOUT MITIGATION)	SIGNIFICANCE (WITH MITIGATION)
	9. Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase.		
Socio-economic Impact Assessment	1. Loss of employment opportunities and economic changes. 2. Infrastructure decommissioning and waste management.	1. Medium-High 2. Medium	1. Medium 2. Low-Medium
Refer to *Part A(1)(g)(vii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks – Methodology that was used to assess the latent risk*			
Potential Residual and/or Latent Environmental Risk	1. Veld fires affecting sensitive areas such as the nursery and/or revegetated areas. 2. Possible development of subsided areas after rehabilitation. 3. Potential for crack development after rehabilitation. 4. Insufficient topsoil and subsoil available for rehabilitation. 5. Potential of topsoil being diluted and chemically deficient to be used during rehabilitation. 6. Dust pollution during the decommissioning phase. 7. Potential for wind and water erosion of the denuded areas. 8. Sedimentation of EDL's and PFPs due to water erosion from denuded areas. 9. Potential groundwater depletion and/or pollution due to mining activities. 10. Potential degradation of the surrounding areas.	1. Uncertain Risk 2. Uncertain Risk 3. Uncertain Risk 4. Potential Significant 5. Potential Significant 6. Potential Significant 7. Potential Significant 8. Potential Signficant 9. Potential Signficant 10. Potential Significant	1. Uncertain Risk 2. Uncertain Risk 3. Uncertain Risk 4. Potential Significant 5. Uncertain Risk 6. Uncertain Risk 7. Uncertain Risk 8. Uncertain Risk 9. Potential Significant 10. Uncertain Risk

l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;

1. SITE ESTABLISHMENT / CONSTRUCTION PHASE

Table 107: Proposed site establishment / construction phase impact management objectives and the outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
MITIGATION OF VISUAL IMPACT **VISUAL CHARACTERISTICS** δ Altered landscape and sense of place. δ Visibility of the Facility to Residents.	**MITIGATION OF VISUAL IMPACT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MITIGATION OF VISUAL IMPACT** δ Restrict construction activities to the minimum footprint required for the development by confining work to localised areas. δ Minimise the height and visibility of temporary structures and use natural colours and materials that blend with the environment.	**MITIGATION OF VISUAL IMPACT** The mine and associated infrastructure are visually integrated into the surrounding environment through minimised disturbance, sensitive design, screening, revegetation, and lighting controls. Visual intrusion and light pollution are reduced to acceptable levels, maintaining landscape character, protecting the sense of place, and addressing community concerns.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Use natural topography, existing vegetation, landscaping, or planted vegetative screens to reduce visual intrusion at sensitive viewpoints. δ Post-construction, prioritise revegetation efforts, especially in areas that will not be used during the operational phase. δ Engage with the local community and stakeholders in the surrounding area to understand their values and concerns related to the landscape and sense of place. δ Reduce light pollution by limiting night-time construction activities where possible, and by using downward directed, shielded lighting.	
DUST MANAGEMENT **VISUAL CHARACTERISTICS** δ Dust and Construction	**DUST MANAGEMENT** Daily compliance monitoring by site management and ECO.	**DUST MANAGEMENT** δ Regularly suppress dust on exposed surfaces, haul roads, and stockpiles using water and/or approved environmentally friendly dust suppressants.	**DUST MANAGEMENT** Dust emissions from mining, haulage, stockpiling, crushing, and transport are maintained within regulated thresholds, ensuring protection of ambient air quality, community health, and ecological integrity.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
AIR QUALITY AND NOISE AMBIANCE δ Potential impact of the proposed mining and materials handling activities on ambient air quality. **SOCIO-ECONOMIC ENVIRONMENT** δ Nuisance impacts (dust). **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Environmental mitigation strategies.	Annual compliance monitoring by independent EAP.	Increase application frequency during dry or windy conditions. δ Enforce a maximum speed limit of 30 km/h on all internal roads. Install signage and ensure compliance to minimise dust kick-up. δ Install dust screens, windbreaks, or enclosures around crushers, stockpiles, waste rock dumps, and open pits to reduce wind-blown dust. Ensure control efficiencies align with those recommended in the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. δ Promptly rehabilitate inactive areas. Seed topsoil stockpiles with indigenous grass species within 30 days of formation and re-vegetate disturbed areas with indigenous plants to stabilise soil. δ Install and maintain water sprayers at crushers and conveyor transfer points. Fit conveyor belts with skirts or strips to reduce fine particle escape. Remove compacted dust and spillage weekly to prevent secondary emissions. δ Ensure all loads are levelled and securely covered during transport to prevent spillage and windblown dust.	Rehabilitation and cleaner technology adoption contribute to long-term reduction in fugitive dust and emissions.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Pause or reschedule dust-generating activities during strong winds or adverse weather conditions. δ Implement a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Inspect suppression equipment monthly and review effectiveness bi-annually, adjusting as needed. δ Transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) can reduce harmful emissions.	
NOISE MANAGEMENT **AIR QUALITY AND NOISE AMBIANCE** δ Noise nuisance caused by mining. **SOCIO-ECONOMIC ENVIRONMENT** δ Nuisance impacts (noise).	**NOISE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**NOISE MANAGEMENT** δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and construction machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004,	**NOISE MANAGEMENT** Noise from mining, construction, and associated activities is maintained within acceptable standards and reduced at source through equipment controls, operational scheduling, and on-site conduct. Effective communication and physical barriers ensure that surrounding communities experience minimal disturbance, while employee exposure remains within regulated occupational health limits.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT δ Environmental mitigation strategies.		NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict noisy construction activities to daytime hours where possible, and avoid early mornings, late evenings, or weekends when residents are more likely to be at home. δ Maintain open communication with the local community about construction schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Installing barriers or planting vegetation around mining sites to help reduce noise pollution.	
SOIL MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Loss of land capability. δ Stockpile and stripping management.	**SOIL MANAGEMENT** Daily compliance monitoring by site management, ECO and rehabilitation specialist/nursery staff.	**SOIL MANAGEMENT** δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land. δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed.	**SOIL MANAGEMENT** Soil resources are protected and managed to maintain their fertility, structure, and long-term land capability. Disturbance is minimised through careful planning, handling, and storage practices, while erosion and sedimentation are effectively controlled. Rehabilitation and stabilisation measures ensure that soils remain viable for future productive use and that downstream

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
δ Soil compaction management. δ Soil erosion management. **HYDROLOGY** δ Increased Risk of Erosion on Water Quality, Increased Surface Flow Entering Nearby Watercourses, Agitation and Dispersal of Soils due to Vegetation Clearance. **FRESHWATER ECOSYSTEMS** δ Creation of the stockpile area within the immediate catchment of the northern EDL.	Annual compliance monitoring by independent EAP.	δ Remove vegetation only where absolutely necessary and rehabilitate areas promptly where possible. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential. δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the ‘cut and cover’ technique when feasible to avoid unnecessary stockpiling. δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed).	watercourses are safeguarded against sediment pollution.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Keep monthly records of the volumes of topsoil and subsoils stripped and stockpiled. δ Test soil nutrient levels to establish baseline data for comparison during rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events and infestation with invasive plant species. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Strip soils when moisture content is as low as possible. If soils must be moved when wet, use trucks and shovels rather than bowl scrapers to reduce compaction. δ Appoint a competent ECO to oversee construction phase activities, with watercourse areas as a priority. δ Complete and implement an Erosion Risk Assessment and Management Plan prior to commencement. Focus erosion control on areas identified as highest risk.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately.	
WASTE MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Soil contamination management. **HYDROLOGY** δ Water quality affected by domestic waste and hazardous chemicals.	**WASTE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**WASTE MANAGEMENT** δ EMPR Implementation and Environmental Awareness: o Ensure the EMPR is accessible to all contractors and employees on site. o Conduct environmental awareness induction for all personnel, covering littering prevention, spill reporting, fire safety, and general housekeeping. δ Waste Management Plan: o Develop and implement a waste management plan and emergency response plan for all	**WASTE MANAGEMENT** Waste is managed in accordance with legal requirements, the waste hierarchy, and site-specific plans to prevent pollution, protect environmental quality, and safeguard community and worker health. Proper handling, storage, and disposal practices ensure that hazardous and general waste are effectively contained, recycled where possible, and disposed of responsibly. Site cleanliness is maintained throughout project phases, with all waste removed upon decommissioning to leave a rehabilitated and pollution-free environment.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
WASTE MANAGEMENT δ Management of General- and Hazardous Waste Generated at the Mine.		project phases, aligned with the waste hierarchy of the NEM:WA. o Prohibit burial or burning of general waste (except for inert WRD material). o Place hazardous and general waste in separately marked, sealable bins at designated areas. Remove and dispose of waste at registered waste facilities or landfill sites as applicable. o Place domestic waste in predefined storage areas located outside the 100-year floodline and ensure regular inspection and maintenance of cleanliness. δ Vehicle, Equipment, and Fuel Management o Conduct all vehicle maintenance, repairs, and services in the designated workshop or service area. Emergency repairs on site must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with proof filed for auditing purposes. o Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling to prevent drips. o Keep vehicles and equipment in designated areas outside the 100-year floodline.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Ablution Facilities: o Provide adequate ablution facilities for all employees. Ensure facilities do not cause pollution, health hazards, or secondary pollution from waste or sewage. o Locate facilities outside the floodplain and maintain cleanliness throughout project phases. δ Salvage Yard and Site Cleanliness: o Drain all hydrocarbons from equipment, tools, or vehicles before placement in a salvage yard. Maintain the yard's cleanliness and remove unwanted materials regularly. o At project completion, ensure all decommissioned and rehabilitated areas are cleared of waste. δ General Environmental Practices: o Ensure continuous monitoring of site housekeeping, waste management, and compliance with all environmental protocols.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
GROUNDWATER MANAGEMENT **GEOHYDROLOGY** δ Generation of stockpile area and WRD affecting the groundwater recharge and/or quality. **WASTE MANAGEMENT** δ Development of the WRD Impacting the Surface and/or Groundwater.	**GROUNDWATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Quarterly monitoring and reporting of groundwater level and quality by appropriately qualified specialist. Annual compliance monitoring by independent EAP.	**GROUNDWATER MANAGEMENT** δ Design and construct the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of groundwater monitoring. Use existing exploration boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities. δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities.	**GROUNDWATER MANAGEMENT** Groundwater quality and quantity are safeguarded through continuous monitoring, specialist oversight, and predictive modelling. Data from on-site and nearby user boreholes provides early warning of potential contamination or drawdown, ensuring that corrective actions can be implemented proactively. As a result, groundwater resources remain fit for use by downstream ecosystems and surrounding communities throughout the life of mine and beyond.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
SURFACE WATER MANAGEMENT **HYDROLOGY** δ Stream diversions impact the riverine habitats. **FRESHWATER ECOSYSTEMS** δ Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m ZoR	**SURFACE WATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Quarterly monitoring and reporting of surface water quality (if water available) by appropriately qualified specialist. Annual compliance monitoring by independent EAP.	**SURFACE WATER MANAGEMENT** δ Limit the construction footprint to a Right of Way (RoW) with a 5 m buffer upstream and downstream of any freshwater ecosystem crossing to prevent indiscriminate movement of mining equipment. δ Mark all delineated water resources as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint. δ Locate all future mining activities away from water resources and associated floodlines wherever possible. δ Treat instream activities, such as stream diversions or channel modifications, as least favourable options and avoid them unless essential. δ Conduct any required instream activities during the dry period to minimise erosion and inundation risks.	**SURFACE WATER MANAGEMENT** Surface water resources and associated ecosystems are safeguarded through careful planning of infrastructure placement, restricted activity footprints, and seasonal timing of instream work. Effective erosion and scour control, together with prompt rehabilitation and alien vegetation management, maintain natural hydrological processes and water quality. As a result, freshwater features remain ecologically functional and available for downstream users throughout the project lifecycle.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ When upgrading informal roads crossing freshwater ecosystems, ensure the delineated extent of the ecosystem is respected. Expand the road on the side opposite the freshwater feature to maintain the natural buffer. δ Stockpile any materials used for road upgrades (e.g., gravel) outside the delineated freshwater ecosystems and preferably outside the 48 m ecological buffer. Stockpiles may not exceed 2 m in height and must be protected from wind using tarpaulins. δ During excavation, any soil, sediment, or silt removed from the freshwater ecosystem may be temporarily stockpiled within the construction RoW but outside the delineated freshwater ecosystem. Stockpiles may not exceed 2 m in height, and their footprint must be minimised. Excavated materials must remain uncontaminated, with minimal mixing of lower and upper soil layers for later use as backfill or rehabilitation material. Temporary stockpiles must be disposed of or used promptly. δ Rehabilitate the disturbed area surrounding the road with suitable indigenous vegetation to prevent	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		erosion and the establishment of alien invasive species. δ Implement the alien vegetation management plan. Remove all existing alien and invasive vegetation and dispose of all material at a registered garden refuse site; burning or mulching on site is not permitted. δ Take care to ensure that no scouring or erosion occurs as a result of the crossing or excavation. δ Install measures such as gabions or other appropriate scour protection structures immediately downstream of activities to prevent erosion.	
STORMWATER MANAGEMENT **HYDROLOGY** δ Dirty water entering the surrounding watercourses. **FRESHWATER ECOSYSTEMS**	**STORMWATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**STORMWATER MANAGEMENT** δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes. δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater	**STORMWATER MANAGEMENT** Stormwater is effectively managed to maintain separation of clean and dirty water, ensuring that runoff from mining areas does not impact downstream freshwater resources. Evaporation dams, lined ponds, and engineered channels provide adequate containment, capacity, and resilience against extreme rainfall events. Regular monitoring and inspections ensure compliance with GN704 and best practice guidelines, while water reuse and efficiency measures

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
δ Potential poor planning of stormwater management and pollution control for the project. **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Environmental mitigation strategies. **WASTE MANAGEMENT** δ Development of the WRD Impacting the Surface and/or Groundwater.		ecosystems. Maintain strict separation of clean and dirty water in line with GN704. δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically feasible outside the GN 4167 100 m ZoR of EDLs to minimise spill and contamination risks. δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations. δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers. δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow.	minimise discharges. Overall, stormwater is controlled as part of an integrated water management system, protecting both ecological systems and surrounding land users.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL. **FRESHWATER ECOSYSTEMS** δ Clearing of vegetation and earthworks associated with the dirty water channel and	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** Daily compliance monitoring by site management and ECO. Quarterly monitoring and reporting of surface water quality (if water available) by	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL** δ Demarcate the approved works area prior to any clearing (preferably as part of proposed fencing of the mining footprint). Clearly mark the reaches of the EDLs and the associated 48 m ecological buffer as no-access areas outside the open-cast or other mining infrastructure footprint.	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** The ecological integrity and hydrological function of the Southern EDL and its 48 m buffer are maintained by restricting activities to demarcated works areas, minimising and carefully managing vegetation clearing, and preventing contaminated stormwater runoff. Alien invasive species are controlled throughout the project lifecycle, ensuring that the

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
sump within the 48 m ecological buffer and 100 m ZoR of the southern EDL. Clearing of vegetation and topsoil in the Pit 2 area.	appropriately qualified specialist. Annual compliance monitoring by independent EAP.	δ Transport all vegetation removed during site clearing (particularly from large areas) from the construction site, unless used for rehabilitation. Vegetation may not be stockpiled and must be disposed of at a registered waste disposal facility. δ Strip topsoil and vegetation in small, systematic blocks, clearing only the areas where excavation is immediately planned to minimise exposed subsoil and reduce the duration of exposure.	buffer continues to function as an ecological protection zone and supports long-term rehabilitation success.
VEGETATION MANAGEMENT **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Floral ecology of the proposed development. δ Potential impact on the ESA during the pre-construction and planning phase.	**VEGETATION MANAGEMENT** Daily compliance monitoring by site management and ECO. Weekly monitoring by the nursery manager, staff and/or rehabilitation specialist. Annual compliance monitoring by independent EAP.	**VEGETATION MANAGEMENT** δ Ensure that sound environmental management practices are in place at all times during the planning phase. δ Stockpile Design and Stability: o Stockpile height and slope angle must comply with sound geotechnical design principles. o Slopes must not be excessively steep to prevent failure. o Incorporate mechanisms to improve slope stability. o Apply strict stormwater management and erosion control measures for all newly	**VEGETATION MANAGEMENT** Indigenous vegetation, habitats, and ecological processes are conserved by confining disturbance to authorised areas, protecting and relocating species of conservation concern, and avoiding high-sensitivity habitats wherever possible. Sound stockpile, stormwater, and erosion management prevent sedimentation and habitat degradation, while alien invasive plants are controlled. Rehabilitation is progressively implemented to restore ecological function and ensure long-term biodiversity resilience beyond the life of mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		proposed stockpiles, as existing stockpiles have contributed to sedimentation of adjacent natural habitats. δ Establish the nursery two years before mining commences as prescribed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H1). δ Rehabilitation, Rescue and Relocation, and AIP Control Plans - Prior to vegetation clearing activities: o Develop a rehabilitation plan/strategy for implementation throughout all project phases. δ Site Walkdowns and Permitting: o Conduct a thorough walkdown of all footprint areas, including a 15 m buffer, during the optimal flowering season for provincially protected species before project initiation. o Follow appropriate permitting and authorisation processes as required by the Northern Cape Environmental Department (provincially protected species) and DFFE (TOPS/NFA species). o Develop a rescue and relocation plan under the guidance of the DFFE and/or Northern Cape Environmental Department, based on the outcomes of the walkdowns.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Rescue, relocate, or apply for destruction permits for provincially protected species prior to mining. δ Biodiversity and Habitat Protection: ○ Minimise loss of indigenous vegetation and natural habitat by considering findings of the biodiversity and other specialist studies. ○ Optimise layouts within medium to very low SEI habitats and avoid loss of high and very high SEI habitats. ○ Prevent unnecessary habitat fragmentation by placing infrastructure within already disturbed areas or as close to existing disturbances as possible. ○ Avoid disruption to ecological processes. ○ Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs). ○ Ensure that habitat degradation surrounding authorised footprints is kept to a minimum through strict edge management. δ Prior to commencement of construction, clearly demarcate the construction servitude to prevent footprint creep beyond authorised areas. δ Collection of Indigenous Plants:	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Collect abundant seeds, cuttings, seedlings and whole plants in the mining footprint that cover the indigenous plant diversity. ○ Translocate as many plant species of conservation concern and protected plant species as possible to the nursery. ○ Prevent collection of seeds, cuttings and seedlings of invasive alien plants. ○ Keep plants from the same area together in the nursery so it can be translocated to the area from where it originated.	
ALIEN INVASIVE PLANT SPECIES CONTROL **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Potential infestation of the footprint area by invasive plant species.	**ALIEN INVASIVE PLANT SPECIES CONTROL** Daily compliance monitoring by site management and ECO. Quarterly monitoring and reporting by ECO. Annual compliance monitoring by independent EAP.	**ALIEN INVASIVE PLANT SPECIES CONTROL** δ General AIP Control: ○ Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. ○ Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: ○ Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases.	**ALIEN INVASIVE PLANT SPECIES CONTROL** Alien and invasive plant species are effectively controlled to prevent their establishment, spread, and impact on indigenous habitats and surrounding ecosystems. Ongoing monitoring, targeted clearing, and responsible disposal ensure compliance with NEMBA regulations and minimise ecological risks. AIP management supports progressive rehabilitation efforts, maintains biodiversity integrity, and prevents long-term degradation of sensitive environments during all project phases.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. ○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal ○ Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. ○ Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions ○ Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. ○ Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping ○ Conduct annual monitoring of the AIP control plan, stormwater management, and general	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		housekeeping by the mine ECO, supported by photographic records. o Submit quarterly reports on AIP control to track effectiveness and monitor spread.	
FAUNA MANAGEMENT **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Potential impact on faunal habitat and diversity. **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Environmental mitigation strategies.	**FAUNA MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**FAUNA MANAGEMENT** δ Ensure that a suitable relocation plan is developed and implemented to guide the effective relocation of species, where necessary. δ Ensure that a trained snake handler is available on call, or that a designated staff member is suitably trained to remove snakes safely when encountered. δ Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.	**FAUNA MANAGEMENT** Faunal species are protected through proactive relocation, safe handling, and the creation of wildlife corridors that maintain ecological connectivity. Human–wildlife conflict is minimised, and sensitive species are safeguarded, ensuring that mining activities do not result in long-term loss of biodiversity or disruption of natural movement patterns.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
CULTURAL AND HERITAGE MANAGEMENT **CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT** δ Potential Physical Disturbance of Low-Density Scatters, Exploration Trenches, Burial Sites, or the historical farmhouse.	**CULTURAL AND HERITAGE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**CULTURAL AND HERITAGE MANAGEMENT** δ Protection of Cemeteries and Burial Sites: o Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone. o Provide access to family members for all cemeteries and burial sites within the buffer zone. o Compile a Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin. δ Include Historical Farmstead (MG003) in the development plans and maintain a 30 m buffer to avoid disturbance. δ Confine all development activities strictly to the approved development footprint. δ Chance Find Procedure: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds	**CULTURAL AND HERITAGE MANAGEMENT** Cultural and heritage resources, including cemeteries, burial sites, and the Historical Farmstead (MG003), are preserved and protected through avoidance buffers, access protocols, and strict adherence to chance find procedures. Development is confined to the approved footprint, ensuring compliance with heritage legislation and respect for cultural values, while providing continued access for affected families and safeguarding heritage assets for future generations.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. o Work may only continue once the go-ahead was issued by SAHRA.	
PALAEONTOLOGY MANAGEMENT **CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT** δ Potential impact on the fossil heritage.	**PALAEONTOLOGY MANAGEMENT** Daily compliance monitoring by site management and ECO.	**PALAEONTOLOGY MANAGEMENT** δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol:	**PALAEONTOLOGY MANAGEMENT** Palaeontological resources are identified, recorded, and protected through proactive chance find procedures and specialist oversight. Fossils of scientific value are rescued, catalogued, and housed in accredited institutions under SAHRA permits, ensuring compliance with heritage legislation and the preservation of scientific knowledge. Where no

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
	Annual compliance monitoring by independent EAP.	○ When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the project activities will not be interrupted. ○ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. ○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they	significant fossil material is discovered, operations proceed without unnecessary delays, while maintaining environmental due diligence.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. o If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. o If no fossils are found and the excavations have finished, then no further monitoring is required.	
SOCIO-ECONOMIC ENHANCEMENT MEASURES **SOCIO-ECONOMIC ENVIRONMENT** δ Employment opportunities and skills development. δ Economic multiplier effects.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** δ Local Employment and Skills Development: o Prioritise employment of communities surrounding the development, contributing to their growth and development. o Consider communities most in need of employment at the local level before outsourcing work. o Offer training and skills development programmes to employees prior to the commencement of the construction phase.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** The project contributes to local and regional socio-economic development by prioritising employment, training, and procurement opportunities for surrounding communities, particularly Historically Disadvantaged groups. Transparent hiring and supplier engagement support equitable participation, while collaboration with government ensures alignment with broader development plans. Job creation, skills transfer, and local economic stimulation provide both immediate benefits and long-term socio-economic sustainability beyond the life of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Engage proactively with local stakeholders and implement transparent hiring practices to ensure equitable distribution of employment opportunities. δ Local Procurement and Supplier Engagement: ○ Give preference to suppliers local to the operation where the service or product will be consumed. ○ Adopt a local procurement policy, where feasible, to maximise benefits to the local economy. ○ Prior to the start of construction contractor procurement, identify a database of local companies, particularly Historically Disadvantaged (HD) companies, and inform them about the tender process, inviting them to bid on project-related work where applicable. ○ Engage with local authorities and business organisations to investigate the feasibility of sourcing construction materials, goods, and services from local suppliers. δ Government Liaison and Integration: ○ Establish communication and liaison structures with district and local government structures. ○ Liaise with municipal authorities to ensure that group development initiatives are integrated	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		into the broader economic and development plans of the surrounding communities. δ Economic Development and Project Sustainability: o Create job opportunities, support local business activities, and contribute to government tax revenues through the development. o Continuously review the economic development aspects of the project during implementation to respond to changing needs and ensure long-term sustainability.	
SOCIO-ECONOMIC MITIGATION MEASURES **SOCIO-ECONOMIC ENVIRONMENT** δ Influx of jobseekers and chance in population. δ Safety and security impacts. δ Increased pressure on local services/resources.	**SOCIO-ECONOMIC MITIGATION MEASURES** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SOCIO-ECONOMIC MITIGATION MEASURES** δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: o Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. o Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. o Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project.	**SOCIO-ECONOMIC MITIGATION MEASURES** Potential negative socio-economic impacts associated with project activities, including worker influx, safety risks, and community conflict, are effectively minimised through transparent engagement, grievance mechanisms, and appointment of a Community Liaison Officer. Workplace safety and risk management systems protect employees and surrounding communities, while strict access control prevents security breaches and property encroachment. Education, training, and induction programmes foster responsible behaviour, ensuring that mining activities coexist safely and respectfully with local communities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Workplace Safety and Risk Management; o Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. o Provide safety awareness, training, and positive behaviour reinforcement for all personnel. o Improve system monitoring and analysis to enhance risk management. o Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: o Sign surface use agreements with the landowners and give written notice at least 21 calendar days prior to commencement of activities. o Strictly control access in and out of the construction area. o Ensure access to surrounding properties by construction and/or mining employees is prevented. o Identify abandoned buildings and either utilise them safely or ensure they cannot be used for malicious purposes.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: ○ Implement education, training, and development services for the local community to support skills growth and capacity building. ○ Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.	
ROAD UPGRADE MANAGEMENT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Road upgrades and improvements.	**ROAD UPGRADE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD UPGRADE MANAGEMENT** δ Widen shoulders and improve access at the proposed mine entrance to accommodate turning movements by heavy vehicles. ○ Design the access road with a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. ○ Provide bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. ○ Include shoulders of at least 1.5 m width on either side of the access road to accommodate	**ROAD UPGRADE MANAGEMENT** Safe and efficient access to the mine is ensured through properly designed and maintained roads that accommodate heavy vehicle movements without causing traffic hazards or excessive wear. Adequate signage, markings, and regular maintenance improve visibility, reduce accident risks, and protect surrounding road users and infrastructure from unnecessary impacts.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		vehicle recovery and enhance operational safety. δ Install appropriate signage and road markings to improve visibility, particularly at the mine access point. δ Implement a regular road maintenance schedule to repair wear and tear and ensure the safe passage of all vehicles.	
ROAD AND TRAFFIC MANAGEMENT **VISUAL CHARACTERISTICS** δ Visual impact on local infrastructure and traffic. **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Traffic management measures.	**ROAD AND TRAFFIC MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD AND TRAFFIC MANAGEMENT** δ Detours and Alternative Routes o Designate specific haul routes for mining vehicles. o Clearly mark temporary detours to guide traffic around construction areas and avoid residential or sensitive zones. δ Signage and Traffic Control: o Install clear, consistent signage to warn drivers of construction activities, speed limits, and detours.	**ROAD AND TRAFFIC MANAGEMENT** Road and traffic impacts associated with mining operations are minimised through the implementation of a coordinated TMP that ensures safe, efficient, and predictable vehicle movement. Designated haul routes, clear signage, and controlled working hours reduce congestion, noise, and community disturbance. Ongoing monitoring, communication with stakeholders, and adaptive management maintain traffic safety and flow for both mining operations and surrounding road users.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Use variable message signs to provide real-time updates on road conditions and traffic changes. δ Working Hours Restrictions: ○ Limit construction traffic to off-peak hours, such as early mornings or late evenings, to reduce congestion. ○ Minimise nighttime operations in noise-sensitive areas. ○ Stagger vehicle movements using shifts to distribute traffic evenly throughout the day. δ Traffic Flow Optimisation: ○ Employ traffic control personnel at critical points to manage queues and ensure smooth traffic flow. ○ Stagger vehicle movements to minimise bottlenecks. δ Public Awareness and Communication: ○ Provide local residents and businesses with timely information about traffic patterns, detours, and road closures. ○ Use websites, mobile apps, or other communication channels to help drivers plan alternative routes.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Monitoring and Evaluation: o Continuously monitor traffic conditions using cameras or personnel. o Adjust measures as required based on real-time observations. o Establish a feedback mechanism for the public to report traffic issues. δ Traffic Management Plan (TMP): o Implement a comprehensive TMP to coordinate all traffic-related mitigation measures. o Include designated haul routes, signage, scheduling of vehicle movements, and emergency response protocols to ensure safe and efficient movement of all vehicles associated with mining operations.	
MANAGEMENT OF EMPLOYEE TRANSPORT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Employee transportation stations.	**MANAGEMENT OF EMPLOYEE TRANSPORT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF EMPLOYEE TRANSPORT** δ Carpooling and Ride-Sharing Programs: o Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. o Facilitate this through ride-matching services or designated carpool parking areas.	**MANAGEMENT OF EMPLOYEE TRANSPORT** Employee commuting impacts are reduced through carpooling, shuttle services, public transport incentives, and flexible work arrangements. These measures decrease traffic congestion, minimise environmental emissions, and improve safe, efficient, and equitable access to the mine for all employees.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Shuttle Services: o Provide shuttle buses or vans to transport employees to and from the mining site. o Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously. δ Flexible Work Hours: o Implement staggered work shifts or flexible working hours to reduce peak-time congestion. o Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation o Encourage employees to use public transport options where available. o Offer subsidies or incentives (if possible) for employees who use buses or other public transport services to reach the site. δ Telecommuting and Remote Work o Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. o Reduce the need for daily commuting and associated traffic.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
ROAD SAFETY MANAGEMENT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Road related safety measures.	**ROAD SAFETY MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD SAFETY MANAGEMENT** δ Warning Signs: o Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. o Ensure signs are maintained and easily visible under all conditions. δ Pedestrian Crossings: o Designate safe pedestrian crossings near high-traffic areas or work zones. o Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles. δ Guardrails and Barriers: o Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. o Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring:	**ROAD SAFETY MANAGEMENT** Road safety risks are minimised through clear signage, designated pedestrian crossings, guardrails, lighting, and strict speed enforcement. Driver training and emergency access routes ensure preparedness and safe interaction between heavy mining vehicles, passenger vehicles, and pedestrians. Overall, transport routes within and around the mine are managed to reduce accidents, protect people, and maintain safe, efficient traffic flow.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		○ Establish speed limits appropriate for specific site conditions. ○ Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed. δ Adequate Lighting: ○ Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. ○ Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions. δ Safety Training for Drivers: ○ Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles. δ Emergency Access Routes: ○ Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS **WASTE MANAGEMENT** δ Storage and Handling of Hazardous Substances and/or Chemicals.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** δ Chemical and Hazardous Material Storage: o All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled, and only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. o PPE must be used when handling chemicals or hazardous substances.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** Hazardous substances and chemicals are safely stored, handled, and disposed of in compliance with legal standards, preventing pollution of soil, water, and air. Spill prevention and emergency response systems ensure rapid containment and clean-up, while strict access control, PPE use, and training protect worker health and safety. Segregated waste management and clean workshop practices minimise risks, ensuring that no hazardous materials enter the environment and all decommissioned areas are left free of contamination.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
SITE ESTABLISHMENT AND CONSTRUCTION PHASE			
		δ Spill Prevention and Management: o Oil spill kits must be present on site, with all relevant employees trained in their use and emergency response procedures. o Drip trays must be used under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. o Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons. o Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. o Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. o No contaminated water may be discharged into the natural environment; containment and safe disposal measures must be implemented. o Any significant chemical, fuel, or hazardous substance spill must be reported to the DWS and other relevant authorities.	

2. OPERATIONAL PHASE

Table 108: Proposed operational phase impact management objectives and the outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
MITIGATION OF VISUAL IMPACT **VISUAL CHARACTERISTICS** δ Altered landscape and sense of place. δ Visibility of the facility to residents.	**MITIGATION OF VISUAL IMPACT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MITIGATION OF VISUAL IMPACT** δ Use low-reflectivity materials and natural colours to blend structures into the surrounding landscape. Keep infrastructure as unobtrusive as possible. δ Implement landscaping and natural screening (using native vegetation, topography, or other methods) where feasible, with priority given to sensitive viewpoints such as nearby residents, travellers along the R385, and other key receptors. δ Establish indigenous trees and shrubs at key points of sensitivity to reduce visibility and integrate the site with the natural environment. δ Maintain infrastructure, landscaping, and vegetative screening in good condition throughout the life of the project to ensure the site remains visually unobtrusive. δ Conduct regular reviews of the effectiveness of visual impact mitigation measures and adapt them	**MITIGATION OF VISUAL IMPACT** During operations, the mine and associated infrastructure remain visually integrated into the surrounding environment through the use of unobtrusive design, natural colours, screening, landscaping, and lighting controls. Regular maintenance and periodic review of mitigation measures ensure effectiveness throughout the life of the project. Visual intrusion and light pollution are kept within acceptable levels, maintaining landscape character, protecting the sense of place, and addressing ongoing community concerns.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		where necessary, particularly given the long operational life of the project. δ Engage with local communities to understand their concerns and, where feasible, incorporate their feedback into the design, landscaping, and operation of the facility.	
MITIGATION OF LIGHTING IMPACT **VISUAL CHARACTERISTICS** δ Potential visual impact of operational, safety and security lighting.	**MITIGATION OF LIGHTING IMPACT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MITIGATION OF LIGHTING IMPACT** δ Use fixtures that direct light downwards to minimise upward light spill, preserving the night sky. δ Install motion sensors so that lights are only activated when necessary, reducing the duration of light emissions. δ Opt for low-intensity lighting that provides sufficient illumination for safety without being overly bright. δ Use shields on lights to direct illumination to the intended areas and prevent light spill into unintended areas. δ Ensure that staff are aware of the importance of minimising light pollution and are trained to use lighting efficiently.	**MITIGATION OF LIGHTING IMPACT** Artificial lighting is designed, operated, and maintained to ensure safety while minimising light pollution. Downward-facing, low-intensity, and shielded fixtures, combined with motion sensors and efficient practices, reduce unnecessary light emissions and preserve the natural night sky. Ongoing staff awareness and periodic reviews ensure lighting impacts remain minimal throughout the life of the project.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Conduct periodic reviews of lighting practices to identify and rectify any unnecessary light emissions.	
DUST MANAGEMENT **AIR QUALITY AND NOISE AMBIANCE** δ Potential impact of the proposed mining and materials handling activities on ambient air quality. **SOCIO-ECONOMIC ENVIRONMENT** δ Nuisance impacts (noise and dust). **HEALTH IMPACT ASSESSMENT** δ Air quality impact on health. **EXISTING INFRASTRUCTURE:**	**DUST MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**DUST MANAGEMENT** δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. If needed, spray haul roads twice daily with water. δ Install windbreaks or three-sided enclosures around ore stockpiles, waste rock dumps, and open pits to reduce wind-blown dust, in line with WRAP Fugitive Dust Handbook efficiencies. δ Seed topsoil stockpiles with indigenous grass species within 30 days of formation to stabilise surfaces and capture wind-blown dust. Limit vegetation clearing to immediately before mining commences.	**DUST MANAGEMENT** Dust emissions from mining, crushing, hauling, and material handling are effectively suppressed and maintained below regulatory thresholds, protecting air quality, community health, and ecological integrity. Infrastructure controls, daily operational practices, and proactive monitoring ensure fugitive dust is minimised at source. Continuous equipment maintenance, speed restrictions, weather-based adjustments, and adoption of cleaner technologies further reduce emissions and support ongoing compliance with legal standards.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
ROAD NETWORK AND TRAFFIC MANAGEMENT δ Environmental mitigation strategies.		δ Install and maintain operational water sprayers at the crusher plant and conveyor transfer points. δ Attach strips of used conveyor belts at discharge points to reduce fine particle escape (if needed). δ Remove compacted dust and spillage from the crusher plant on a weekly basis to prevent accumulation and secondary emissions. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place. δ Flatten and securely cover all loads during transport to prevent spillage and wind-blown dust. δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds. δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		suppression effectiveness bi-annually and adjust measures as required. δ Consider transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) to reduce harmful emissions.	
NOISE MANAGEMENT **AIR QUALITY AND NOISE AMBIANCE** δ Noise nuisance caused by mining (including blasting). **SOCIO-ECONOMIC ENVIRONMENT** δ Nuisance impacts (noise and dust). **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT**	**NOISE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**NOISE MANAGEMENT** δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict blasting to Monday–Friday during daylight hours (08:00–17:00), unless otherwise authorised. Plan blasting type, duration, and timing with due	**NOISE MANAGEMENT** Noise from mining, hauling, machinery, and blasting is managed to remain within acceptable occupational and community thresholds, protecting the health and wellbeing of workers and surrounding residents. Operational controls such as restricted blasting hours, equipment maintenance, sound barriers, and quieter technologies reduce noise at source, while regular monitoring ensures compliance with legal standards. Open communication with communities further minimises disturbance by providing predictability and opportunities for feedback.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
δ Environmental mitigation strategies.		consideration for nearby land users and structures and notify surrounding landowners in writing prior to each event. δ Design all blasts in accordance with the USBM criteria for ground vibration and airblast. Implement continuous air blast and ground vibration monitoring at sensitive receptors, and if monitoring results indicate exceedance of the USBM criteria, immediately review and amend the blast design to ensure compliance. δ Maintain open communication with the local community about operations and blasting schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Install barriers or planting vegetation around mining sites to help reduce noise pollution. δ Consider employing quieter machinery or retrofitting existing equipment with noise-reduction technologies to lessen noise levels.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
SOIL MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Loss of land capability. δ Stockpile and stripping management. δ Soil compaction management. δ Soil erosion management. **HYDROLOGY** δ Increased Risk of Erosion on Water Quality, Increased Surface Flow Entering Nearby Watercourses, Agitation and Dispersal of Soils due to Vegetation Clearance.	**SOIL MANAGEMENT** Daily compliance monitoring by site management, ECO, and rehabilitation specialist/nursery staff. Annual compliance monitoring by independent EAP.	**SOIL MANAGEMENT** δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land. δ Confine the proposed development and associated surface infrastructure to within the demarcated footprint area. δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential.	**SOIL MANAGEMENT** Soil resources are conserved and managed to maintain their fertility, structure, and long-term land capability throughout the operational phase. Infrastructure and stockpiles are confined to demarcated areas, with careful handling, separation, and stabilisation of topsoil to prevent compaction, contamination, or erosion. Stormwater and erosion controls, together with progressive rehabilitation, ensure soils remain viable for restoration and continued ecosystem services beyond the life of mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
TERRESTRIAL BIODIVERSITY CONSERVATION AREA, GROUNDCOVER AND FAUNA δ Floral ecology of the proposed development.		δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the 'cut and cover' technique when feasible to avoid unnecessary stockpiling. δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed). δ Keep monthly records of the volumes of topsoil and subsoils stripped, stockpiled and returned as part of progressive rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Prevent contamination of stockpiled topsoil by AIP material; prioritise AIP monitoring of topsoil stockpiles. δ Prohibit vehicle and personnel movement over stockpiles.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Strip soils when moisture content is as low as possible. If soils must be moved when wet, use trucks and shovels rather than bowl scrapers to reduce compaction. δ Appoint a competent ECO to oversee operation phase, with watercourse areas as a priority. δ Focus erosion control on areas identified as highest risk. δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately. δ Develop and implement a Rehabilitation Plan during the life of mine and post-decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
WASTE MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Soil contamination management. **GEOHYDROLOGY** δ Waste Water from Ablutions Potentially Impacting the Groundwater Quality. **HYDROLOGY** δ Water Quality affected by Domestic Waste and Hazardous Chemicals. δ Dirty water entering the surrounding watercourses. **HEALTH IMPACT ASSESSMENT**	**WASTE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**WASTE MANAGEMENT** δ EMPR Implementation and Awareness o Implement contamination prevention measures as outlined in the EMPR and ensure it is accessible to all sub-contractors and employees for reference on site. o Conduct environmental awareness training covering spill reporting, littering prevention, dust suppression, and fire safety. δ Waste Management o Develop and implement a waste management plan aligned with the NEM:WA waste hierarchy for the operational phase. o Contain hazardous and general waste in separately marked, sealable bins located at designated areas and remove waste to registered disposal facilities when full. o Domestic waste must be stored in predefined areas, outside floodplains, and maintained in a clean state. o Prohibit burial or burning of any waste, apart from inert material from the WRD. o Ensure all decommissioned or rehabilitated areas are cleared of waste.	**WASTE MANAGEMENT** Pollution and contamination risks are effectively prevented during operations through full implementation of the EMPR, comprehensive waste segregation and disposal, and strict vehicle, equipment, and fuel management practices. Ablution facilities and stormwater controls protect soil, surface water, and groundwater quality, while water-use efficiency and monitoring ensure compliance with legal standards. Ongoing awareness training, housekeeping, and oversight maintain a clean, well-managed site and ensure progressive rehabilitation leaves no residual contamination.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
δ Water quality impact on health. **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Environmental mitigation strategies. **WASTE MANAGEMENT** δ Management of general- and hazardous waste at the mine.		δ Vehicle, Equipment, and Fuel Management o Conduct all vehicle maintenance, repairs, and servicing at the workshop or designated service area. Emergency on-site repairs must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with disposal proof filed. o Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling. o Store vehicles and equipment in designated areas outside the 100-year floodline. δ Ablution Facilities o Provide adequate ablution facilities for all employees. Ensure they do not cause pollution or health hazards and that waste is removed to approved disposal sites. o Conduct routine maintenance of the sewage system to reduce the risk of failure and spillage. δ Stormwater and Water Management o Implement a stormwater management plan to manage operational runoff and prevent contamination. o Apply water-use efficiency measures to minimise discharge and promote water re-use within operations.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Bund all dirty water catchment areas and contain dirty water in storage facilities, such as wastewater control dams. ○ Conduct quarterly surface water quality monitoring (if available) to detect and quantify any operational impacts. δ General Operational Practices ○ Maintain site housekeeping to prevent environmental contamination and ensure all operational practices comply with EMPR requirements.	
FIRE MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Increased fire risk. **TERRESTRIAL BIODIVERSITY CONSERVATION AREA, GROUNDCOVER AND FAUNA**	**FIRE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**FIRE MANAGEMENT** δ Prohibit harvesting of surrounding trees, shrubs, or indigenous vegetation for firewood. δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project. δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas.	**FIRE MANAGEMENT** The risk of fire ignition, spread, and damage is minimised through strict controls on open fires, smoking, and storage of fuels and chemicals, together with implementation of a Fire Management Plan. Adequate firefighting equipment, staff training, and hot work precautions ensure rapid suppression of small fires, while clear reporting and emergency response procedures provide for safe evacuation and effective coordination with local fire services during larger incidents. Indigenous vegetation is protected, employees are safeguarded, and fire-related environmental impacts are prevented.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
δ Floral ecology of the proposed development.		δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites. δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other “hot work.” Keep a working fire extinguisher immediately at hand. δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
GROUNDWATER MANAGEMENT **GEOHYDROLOGY** δ Generation of stockpile area and WRD affecting the groundwater recharge and/or quality. **HEALTH IMPACT ASSESSMENT** δ Water quality impact on health. **WASTE MANAGEMENT** δ Development of the WRD Impacting the Surface and/or Groundwater.	**GROUNDWATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**GROUNDWATER MANAGEMENT** δ Operate the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Undertake all pit dewatering strictly in accordance with the conditions and requirements of the approved Water Use Licence (WUL). δ Where groundwater drawdown has the potential to impact neighbouring boreholes and if required, implement compensatory measures, including either re-injection of abstracted water into approved boreholes outside the affected aquifer system or provision of water to neighbouring farmers with affected boreholes to match the current supply or requirement. δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of	**GROUNDWATER MANAGEMENT** Groundwater quality and quantity are safeguarded through regular monitoring of mine-impacted areas, specialist-identified sites, and nearby user boreholes. Accredited laboratory analysis and periodic updates of numerical and geochemical models provide early warning of potential contamination or drawdown, ensuring timely corrective action. These measures protect surrounding communities and ecosystems that rely on groundwater resources throughout the life of mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		groundwater monitoring. Use existing exploration boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities. δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
SURFACE WATER MANAGEMENT **HYDROLOGY** δ Stream diversions impact the riverine habitats.	**SURFACE WATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SURFACE WATER MANAGEMENT** δ Keep all delineated water resources marked as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint. δ Locate all future mining activities away from water resources (if possible) and associated floodlines. δ Treat instream activities as least favourable options.	**SURFACE WATER MANAGEMENT** Surface water resources and associated ecosystems are protected by avoiding disturbance wherever possible and strictly limiting the footprint of any unavoidable activities. Instream work is only undertaken as a last resort and scheduled during dry periods to minimise risks. Downstream erosion is prevented through appropriate control measures, ensuring that natural hydrological processes and

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Conduct any required instream activities, such as stream diversions or channel modifications, during the dry period to minimise erosion and inundation risks. δ Implement measures to prevent erosion immediately downstream of activities, such as installing gabions or other appropriate scour protection structures.	water quality are maintained throughout the operational phase.
STORMWATER MANAGEMENT **HYDROLOGY** δ Potential of dirty water entering the surrounding watercourses as a result of operations. **WASTE MANAGEMENT** Development of the WRD Impacting the Surface and/or Groundwater.	**STORMWATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**STORMWATER MANAGEMENT** δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes. δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater ecosystems. Maintain strict separation of clean and dirty water in line with GN704. δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically	**STORMWATER MANAGEMENT** Stormwater is effectively managed to maintain separation of clean and dirty water, ensuring that runoff from mining areas does not impact downstream freshwater resources. Evaporation dams, lined ponds, and engineered channels provide adequate containment, capacity, and resilience against extreme rainfall events. Regular monitoring and inspections ensure compliance with GN704 and best practice guidelines, while water reuse and efficiency measures minimise discharges. Overall, stormwater is controlled as part of an integrated water management system, protecting both ecological systems and surrounding land users.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		feasible outside the GN 4167 100 m ZoR of EDLs to minimise spill and contamination risks. δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations. δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers. δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow. Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL. **FRESHWATER ECOSYSTEMS** δ Undertaking of open cast mining (including blasting) adjacent to and within the 100 m ZoR of the southern EDL (Pit 2). δ Operation of the portion of the Pit 2 dirty water channel and sump	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** δ Adhere strictly to all recommendations and mitigation measures outlined in the Stormwater Management Plan (SWMP). δ Undertake regular inspections of the dirty water channel to ensure functionality. δ Prepare and implement an emergency plan to address any tearing or leaks in the dirty water channel lining, preventing inundation of the EDL.	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** The ecological integrity and hydrological function of the Southern EDL and its 48 m buffer are safeguarded during operations through strict compliance with the Stormwater Management Plan, proactive inspection and maintenance of dirty water channels, and installation of berms and silt traps. Restricted access and careful buffer maintenance minimise disturbance, while dust suppression and routine monitoring programmes ensure that sediment, dust, or contaminated runoff do not degrade the EDL system. Periodic updates of numerical and geochemical models provide early warning of risks, enabling timely corrective action.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
within the GN 4167 100 m ZoR of the southern EDL. **WASTE MANAGEMENT** δ Development of the WRD Impacting the Surface and/or Groundwater.		δ Use only existing roadways during maintenance and monitoring activities to avoid indiscriminate vehicle movement. δ Maintain portions of the 48 m non-development ecological buffer around the EDL not impacted by Pit 2 to provide residual protection from spill-over and edge effects of mining operations. δ Install and maintain temporary berms and silt traps for the duration of mining operations to prevent polluted sediment and other fines from being transported by stormwater into the downgradient reach of the system. δ Implement a monitoring programme to detect and prevent pollution of soil, surface water, and groundwater. δ Reduce airborne dust during blasting activities by damping dust generation areas, ensuring that quantities used do not generate runoff. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL. **FRESHWATER ECOSYSTEMS** δ Transport of product from the open cast pit (Phase 2) to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR.	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF TRANSPORT WITHIN BUFFER OF SOUTHERN EDL** δ Use only the approved haul routes between extraction areas and screening/crushing plants. Ensure strict compliance monitoring. δ Maintain all vehicles in good working order. Overloading or use of leaking vehicles or machinery on haul roads is prohibited to prevent spillage. δ Enforce speed limits for all vehicles transporting product along haul roads. δ Avoid unnecessary disturbances surrounding the perimeter of surface infrastructure. δ Regularly wash vehicles on non-permeable surfaces or off-site to prevent the dispersal of alien or invasive plant seeds into freshwater ecosystems. δ Conduct routine inspections of instream infrastructure to monitor debris build-up, structure integrity, erosion, sedimentation, vegetation	**MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL.** Haul road use and instream infrastructure are managed to prevent erosion, sedimentation, and ecological degradation. Approved routes, strict vehicle maintenance, loading controls, and speed limits ensure safe and compliant transport. Regular inspections, cleaning, and maintenance protect freshwater ecosystems from debris, invasive plant dispersal, and structural failure, while prompt rehabilitation of erosion and revegetation with indigenous species maintains the integrity of surrounding land and water resources.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		establishment, and presence of alien or invasive plant species. δ Undertake routine maintenance of haul roads and instream infrastructure to prevent concentration of flow and erosion. Maintenance must occur especially after high rainfall events. δ If erosion is observed at road crossings, rehabilitate the affected areas by infilling gullies and revegetating with suitable indigenous species. Use sustainably sourced rocks from outside freshwater ecosystems if needed.	
VEGETATION MANAGEMENT **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Floral ecology of the proposed development.	**VEGETATION MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**VEGETATION MANAGEMENT** δ NCNCA-Protected Floral Species: o No NCNCA-protected species may be removed during mining activities without the required permits from DFFE and the Northern Cape Environmental Department. o All permit conditions must be strictly adhered to. o Where feasible and as per permit conditions, collect propagules and/or seeds for propagation under nursery conditions to	**VEGETATION MANAGEMENT** Indigenous vegetation and species of conservation concern are protected through strict permitting, footprint control, and monitoring programmes. Sensitive habitats are avoided, and footprint creep is prevented by regular oversight. Edge effects such as erosion, dust, and alien invasive plant spread are minimised to protect Ecological Support Areas. Cleared areas and disturbed habitats are progressively rehabilitated with indigenous species from reference vegetation types, ensuring long-term

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
δ Potential impact on the ESA during the mining phase.		support rehabilitation or supplement unsuccessful relocation attempts. δ Vegetation Clearing and Footprint Control: o Restrict removal of vegetation to areas within the approved project footprint. o Clearly demarcate footprints to avoid encroachment into adjacent habitats. o Place all proposed infrastructure, including temporary facilities, outside sensitive habitat units wherever possible. δ Vehicles must utilise existing and planned roads and avoid creating unplanned or unauthorised tracks. δ Vegetation Waste Management: o Do not leave cleared vegetation cuttings in freshwater habitats. o Dispose of cleared vegetation, construction waste, and rubble at a registered waste facility or in a designated area identified by the mine. o No waste may be dumped in surrounding natural habitats or unauthorised areas. δ Infrastructure and Footprint Monitoring: o Limit all infrastructure, including future expansions, to authorised footprints.	biodiversity integrity, habitat connectivity, and ecosystem resilience.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Prohibit disturbance of habitats outside demarcated and approved areas. ○ Conduct monthly monitoring and recording of footprint areas by the ECO and annual recording by the Mine Surveyor to prevent footprint creep. δ Vegetation Monitoring Programme ○ Manage and monitor the nursery as stipulated in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). ○ Establish and maintain an annual vegetation monitoring programme to protect and manage biodiversity in the Focus Areas (remaining natural areas). ○ Monitor species composition against reference vegetation types. ○ Continue monitoring relocated Species of Conservation Concern (SCC) until successful establishment is evident. δ Prohibit the collection of floral SCC or indigenous vegetation outside of planned and authorised footprints by all personnel. δ Limiting Edge Effects: ○ Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs).	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Rip, profile, and reseed compacted soils outside the footprint areas (if rehabilitation is needed). ○ Suppress dust to protect flora and prevent sedimentation of freshwater habitats. ○ Limit extent of disturbed vegetation and exposed soils to reduce erosion risks. δ Rehabilitation of Disturbed Areas: ○ Rehabilitate areas no longer required for operational activities. ○ Restore natural areas beyond the direct footprint that were affected by project activities using indigenous species. ○ Reinstate and maintain a vegetation layer to promote soil health, vegetation establishment, habitat connectivity, and fauna support. ○ Use indigenous species from the reference vegetation type or surrounding area for optimal biodiversity outcomes.	
ALIEN INVASIVE PLANT SPECIES CONTROL **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS,**	**ALIEN INVASIVE PLANT SPECIES CONTROL** Daily compliance monitoring by site management and ECO.	**ALIEN INVASIVE PLANT SPECIES CONTROL** δ General AIP Control: ○ Strictly manage AIP proliferation to prevent impacts on adjacent natural areas.	**ALIEN INVASIVE PLANT SPECIES CONTROL** Alien and invasive plants are effectively monitored, controlled, and lawfully disposed of to prevent their spread and protect surrounding natural habitats. Management prioritises high-risk species listed under

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
GROUNDCOVER AND FAUNA δ Potential infestation of the footprint area by invasive plant species.	Annual compliance monitoring by independent EAP.	○ Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: ○ Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases. ○ Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. ○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal ○ Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. ○ Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions ○ Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience.	NEMBA, with oversight by qualified specialists and restrictions on chemical use near watercourses. Ongoing monitoring, reporting, and record-keeping ensure compliance, while progressive clearing of disturbed areas supports rehabilitation and maintains biodiversity integrity throughout operations.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping ○ Conduct annual monitoring of the AIP control plan, stormwater management, and general housekeeping by the mine ECO, supported by photographic records. ○ Submit quarterly reports on AIP control to track effectiveness and monitor spread.	
FAUNA MANAGEMENT **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Potential impact on faunal habitat and diversity. δ Potential impact on faunal SCC.	**FAUNA MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**FAUNA MANAGEMENT** δ Undertake clearing activities in a phased manner to allow faunal species to move out ahead of disturbance. Where necessary, small/slow-moving species must be assisted and safely relocated. δ Species of Conservation Concern (SCC) and Faunal Protection: ○ Prior to and during vegetation clearance, inspect footprint and adjacent areas for SCC, including Temminck's Ground Pangolin (*Smutsia temminckii*), protected burrowing scorpions, and baboon spiders.	**FAUNA MANAGEMENT** Faunal species, including Species of Conservation Concern (SCC), are protected through phased vegetation clearance, safe relocation, and strict prohibitions on hunting or harm. Specialist oversight ensures SCC (such as pangolins, protected scorpions, baboon spiders, and avian nest sites) are identified and conserved with appropriate buffers and permits. Lighting controls reduce disturbance to nocturnal species, while wildlife corridors maintain habitat connectivity and natural movement patterns. These measures minimise human–wildlife conflict and ensure biodiversity resilience during mine operations.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT δ Environmental mitigation strategies.		○ Safely capture and relocate identified SCC to suitable habitat outside the footprint. For scorpions, conduct night-time UV surveys during summer to aid detection. ○ If avian SCC nests are located, consult a qualified avifaunal specialist to determine appropriate management. Active nests (with eggs or nestlings) must be left undisturbed until fledging, with no mining-related activities within 200 m. ○ All SCC relocation must be carried out by a trained professional/competent staff member, under the guidance of a biodiversity specialist or ECO, and with required permits where applicable. δ General Fauna Management: ○ If snakes, scorpions, baboon spiders, or other fauna are found within buildings or pose risks to staff/infrastructure, they must be carefully captured and relocated outside the footprint by a trained snake handler/competent staff member/ECO. ○ No collection, hunting, or harm to fauna is permitted by staff or contractors. δ Site Practices and Controls:	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Keep night lighting to a minimum, with lights directed inward and downward onto the footprint. Avoid bright white/LED lights; use soft yellow (sodium vapour) or red lights where necessary. δ Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.	
CULTURAL AND HERITAGE MANAGEMENT **CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT** δ Potential Physical Disturbance of Low-Density Scatters, Exploration Trenches, Burial Sites, or the historical farmhouse.	**CULTURAL AND HERITAGE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**CULTURAL AND HERITAGE MANAGEMENT** δ Protection of Cemeteries and Burial Sites: ○ Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone. ○ Provide access to family members for all cemeteries and burial sites within the buffer zone. ○ Implement the Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin. δ Maintain a 30 m buffer around the Historical Farmstead (MG003) to avoid disturbance. δ Confine all development activities strictly to the approved development footprint.	**CULTURAL AND HERITAGE MANAGEMENT** Cultural and heritage resources, including cemeteries, burial sites, and the Historical Farmstead (MG003), are preserved and respected through buffer zones, access protocols, and implementation of the Heritage Management Plan. All development remains within the approved footprint, while a formal chance find procedure ensures that any previously unknown artefacts or heritage resources are identified, reported, and managed in accordance with SAHRA requirements before work resumes.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Chance Find Procedure: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. o Work may only continue once the go-ahead was issued by SAHRA.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
PALAEONTOLOGY MANAGEMENT **CULTURAL, HERITAGE AND PALAEONTOLOGICAL ENVIRONMENT** Potential impact on the fossil heritage.	**PALAEONTOLOGY MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**PALAEONTOLOGY MANAGEMENT** δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol: o When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the project activities will not be interrupted. o Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. o Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.	**PALAEONTOLOGY MANAGEMENT** Palaeontological resources are protected through proactive chance find procedures, training of staff to recognise fossil material, and oversight by a qualified palaeontologist. Any fossils of scientific significance are identified, rescued, catalogued, and housed in accredited institutions under SAHRA permit conditions. Where no significant fossils are encountered, operations continue without delay, ensuring both legal compliance and the preservation of palaeontological heritage where it occurs.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ○ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ○ If no fossils are found and the excavations have finished, then no further monitoring is required.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
SOCIO-ECONOMIC ENHANCEMENT MEASURES **SOCIO-ECONOMIC ENVIRONMENT** δ Employment opportunities and skills development. δ Economic multiplier effect. δ Contribution to local economic development and socio-economic upliftment.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** δ Prioritise employment of local community members for all available positions. δ Where highly skilled expertise is required, provide mechanisms for skills transfer to local employees. δ Encourage local businesses to participate in providing materials, goods, and services during the operational phase of the project. δ Maintain open and continuous communication with the local community through the development's designated Community Liaison Officer. δ Ensure all employment practices align with the development's Social Labour Plan, promoting fair labour practices and safe working conditions for all personnel. δ Explore opportunities for public-private partnerships to fund and implement infrastructure projects.	**SOCIO-ECONOMIC ENHANCEMENT MEASURES** Local communities benefit directly from the project through prioritised employment, skills transfer, and support for local businesses. Open engagement via the Community Liaison Officer ensures transparent communication and responsiveness to community needs. Employment practices are aligned with the Social and Labour Plan, promoting fairness, equity, and safe working conditions. Opportunities for public-private partnerships further strengthen infrastructure and socio-economic development, ensuring shared and sustainable benefits throughout the operational phase.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
SOCIO-ECONOMIC MITIGATION MEASURES **SOCIO-ECONOMIC ENVIRONMENT** δ Influx of jobseekers and chance in population. δ Safety and security impacts.	**SOCIO-ECONOMIC MITIGATION MEASURES** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SOCIO-ECONOMIC MITIGATION MEASURES** δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: o Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. o Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. o Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project. δ Workplace Safety and Risk Management; o Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. o Provide safety awareness, training, and positive behaviour reinforcement for all personnel. o Improve system monitoring and analysis to enhance risk management.	**SOCIO-ECONOMIC MITIGATION MEASURES** Potential negative socio-economic impacts during construction, including risks from worker influx, safety concerns, and community conflict, are minimised through proactive communication, a formal grievance mechanism, and the appointment of a Community Liaison Officer. Strict access control and workplace safety measures protect both employees and surrounding communities, while training, induction, and development programmes promote responsible behaviour, capacity building, and safe integration of the project into the local socio-economic landscape.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: ○ Strictly control access in and out of the construction area. ○ Ensure access to surrounding properties by construction and/or mining employees is prevented. ○ Identify abandoned buildings and either utilise them safely or ensure they cannot be used for malicious purposes. ○ Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: ○ Implement education, training, and development services for the local community to support skills growth and capacity building. ○ Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
ROAD UPGRADE MANAGEMENT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Road upgrades and improvements.	**ROAD UPGRADE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD UPGRADE MANAGEMENT** δ Maintain widened shoulders and access improvements at the mine entrance to safely accommodate ongoing heavy vehicle traffic during operations. o Ensure the access road continues to provide a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. o Retain bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. o Maintain shoulders of at least 1.5 m width on either side of the access road for vehicle recovery and operational safety. δ Keep all signage and road markings in good condition to support visibility and safe navigation, especially at the mine access point. δ Implement ongoing, regular maintenance of the access road during the operational phase to repair wear and tear and ensure safe passage for all vehicles.	**ROAD UPGRADE MANAGEMENT** Mine access roads are safely maintained and designed to accommodate heavy vehicle movements without compromising road user safety. Adequate carriageway widths, shoulders, and turning radii minimise off-tracking risks, while clear signage and markings support safe navigation. Ongoing maintenance ensures the access road remains in good condition throughout the operational phase, reducing accident risks and ensuring efficient transport of materials and personnel.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
ROAD AND TRAFFIC MANAGEMENT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Traffic management measures.	**ROAD AND TRAFFIC MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD AND TRAFFIC MANAGEMENT** δ Designated Haul Routes: o Maintain clearly defined haul routes for all operational mining vehicles to ensure safe and efficient movement. o Avoid routing operational traffic through residential or sensitive areas. δ Signage and Traffic Control: o Ensure all permanent signage, including speed limits, heavy vehicle routes, and safety warnings, is clearly visible and maintained. o Use variable message signs where needed to provide real-time updates on road conditions or operational changes. δ Traffic Flow Management: o Employ traffic control personnel at critical points where operational traffic mixes with local or public traffic. o Stagger vehicle movements if necessary to prevent congestion during peak operational hours.	**ROAD AND TRAFFIC MANAGEMENT** Operational traffic is managed safely and efficiently through designated haul routes, clear signage, and traffic flow controls that minimise congestion and prevent routing through sensitive areas. A comprehensive Traffic Management Plan ensures coordination of vehicle scheduling, emergency response, and communication with local communities. Continuous monitoring and stakeholder feedback maintain safe coexistence between mining traffic and public road users throughout the life of mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Public Awareness and Communication: o Keep local residents and businesses informed of operational traffic patterns, heavy vehicle schedules, and any temporary disruptions. o Maintain a feedback mechanism for the public to report traffic-related concerns or incidents. δ Monitoring and Evaluation: o Continuously monitor operational traffic conditions to ensure safety and efficiency. o Adjust traffic management measures based on observations and feedback. δ Traffic Management Plan (TMP) o Implement a comprehensive TMP for the operational phase, coordinating all traffic-related measures. o Include permanent haul routes, signage maintenance, scheduling of vehicle movements, and emergency response protocols to ensure safe operations.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
MANAGEMENT OF EMPLOYEE TRANSPORT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Employee transportation stations.	**MANAGEMENT OF EMPLOYEE TRANSPORT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF EMPLOYEE TRANSPORT** δ Carpooling and Ride-Sharing Programs: o Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. o Facilitate this through ride-matching services or designated carpool parking areas. δ Shuttle Services: o Provide shuttle buses or vans to transport employees to and from the mining site. o Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously. δ Flexible Work Hours: o Implement staggered work shifts or flexible working hours to reduce peak-time congestion. o Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation o Encourage employees to use public transport options where available.	**MANAGEMENT OF EMPLOYEE TRANSPORT** Employee commuting impacts are minimised through carpooling, shuttle services, flexible work shifts, and support for public transport use. These measures reduce traffic congestion, improve road safety, lower vehicle emissions, and ensure affordable and efficient access to the mine for employees. Remote work options further decrease unnecessary commuting while maintaining operational efficiency.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Offer subsidies or incentives (if possible) for employees who use buses or other public transport services to reach the site. δ Telecommuting and Remote Work ○ Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. ○ Reduce the need for daily commuting and associated traffic.	
ROAD SAFETY MANAGEMENT **EXISTING INFRASTRUCTURE: ROAD NETWORK AND TRAFFIC MANAGEMENT** δ Road related safety measures.	**ROAD SAFETY MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ROAD SAFETY MANAGEMENT** δ Warning Signs: ○ Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. ○ Ensure signs are maintained and easily visible under all conditions. δ Pedestrian Crossings: ○ Designate safe pedestrian crossings near high-traffic areas or work zones. ○ Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles.	**ROAD SAFETY MANAGEMENT** Road safety risks are minimised through visible warning signage, designated pedestrian crossings, guardrails, and adequate lighting. Strict enforcement of speed limits and comprehensive driver training reduce accident risks, while clearly marked emergency access routes ensure rapid response capability. Together, these measures protect employees, contractors, and surrounding road users, ensuring safe coexistence with mining-related traffic throughout operations.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Guardrails and Barriers: o Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. o Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring: o Establish speed limits appropriate for specific site conditions. o Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed. δ Adequate Lighting: o Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. o Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions. δ Safety Training for Drivers: o Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		δ Emergency Access Routes: o Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.	
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS **WASTE MANAGEMENT** Storage and Handling of Hazardous Substances and/or Chemicals.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** δ Chemical and Hazardous Material Storage: o All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled, and only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible.	**MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS** Chemicals, fuels, and hazardous substances are safely stored, handled, and disposed of in compliance with SANS standards and legal requirements, preventing contamination of soil, surface water, and groundwater. Spill prevention and emergency response measures ensure rapid containment and safe disposal of hazardous materials, while strict access controls, PPE use, and staff training protect worker health and safety. Waste segregation, clean workshop practices, and final rehabilitation ensure that no residual contamination remains after mine closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ PPE must be used when handling chemicals or hazardous substances. δ Spill Prevention and Management: ○ Oil spill kits must be present on site, with all relevant employees trained in their use and emergency response procedures. ○ Drip trays must be used under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. ○ Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons. ○ Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. ○ Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. ○ No contaminated water may be discharged into the natural environment; containment and safe disposal measures must be implemented.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
OPERATIONAL PHASE			
		○ Any significant chemical, fuel, or hazardous substance spill must be reported to the Department of Water and Sanitation and other relevant authorities.	

3. DECOMMISSIONING PHASE

Table 109: Proposed decommissioning phase impact management objectives and the outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
MITIGATION OF VISUAL IMPACT **VISUAL CHARACTERISTICS** δ Landscape character and visual amenity during decommissioning. **SOCIO-ECONOMIC ENVIRONMENT** Environmental restoration and land use changes.	**MITIGATION OF VISUAL IMPACT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**MITIGATION OF VISUAL IMPACT** δ Develop and implement a plan that includes soil restoration, replanting native vegetation, and monitoring ecological recovery. δ Remove infrastructure gradually to minimise sudden disturbance. δ Where appropriate, re-use infrastructure (e.g., access roads) for community or landowner benefit, subject to agreement. δ Apply techniques during dismantling that limit soil and landscape disruption. δ Restore disturbed areas promptly after infrastructure removal, using local/indigenous plant species to enhance biodiversity. δ Implement soil conservation and proper drainage measures to prevent erosion, maintain soil health, and avoid waterlogging.	**MITIGATION OF VISUAL IMPACT** The mine site is decommissioned in a phased and controlled manner that minimises disturbance and ensures long-term ecological recovery. Infrastructure is dismantled responsibly, with opportunities for beneficial re-use were agreed with communities or landowners. Disturbed areas are restored with indigenous vegetation, supported by soil and water management measures to prevent erosion and waterlogging. Waste is recycled or lawfully disposed of, leaving no residual contamination. Post-decommissioning monitoring and adaptive management ensure restoration success, while active community engagement aligns rehabilitation outcomes with local needs and supports a positive post-mining legacy.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		δ Recycle or dispose of all decommissioned materials responsibly, ensuring no remnants are left on site. δ Conduct regular post-decommissioning monitoring of site recovery, with interventions as needed to ensure restoration success. δ Involve local communities in restoration planning, gather feedback, and address concerns to align rehabilitation with local needs.	
DUST MANAGEMENT **AIR QUALITY AND NOISE AMBIANCE** δ Potential impact of the proposed mining and materials handling activities on ambient air quality. **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK**	**DUST MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**DUST MANAGEMENT** δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and	**DUST MANAGEMENT** Dust emissions during decommissioning are effectively controlled through suppression measures, haul road and stockpile treatment, and strict vehicle speed limits. Daily weather assessments and operational adjustments minimise dust generation under adverse conditions. Regular inspection and maintenance of suppression equipment, together with a site-specific Dust Management Plan and ongoing monitoring, ensure dust levels remain within regulatory thresholds, protecting community health, air quality, and surrounding ecosystems during mine closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
δ Dust pollution during the decommissioning phase.		GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place. δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds. δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review suppression effectiveness bi-annually and adjust measures as required.	
NOISE MANAGEMENT **AIR QUALITY AND NOISE AMBIANCE** δ Noise nuisance caused by mining.	**NOISE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**NOISE MANAGEMENT** δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004,	**NOISE MANAGEMENT** Noise impacts during decommissioning are minimised through strict conduct rules, proper maintenance of vehicles and machinery, and regular monitoring of employee exposure in line with SANS and NEM:AQA standards. Open communication with surrounding communities ensures they are informed of potentially disruptive activities, reducing disturbance and maintaining good relations. Together, these measures protect worker health and wellbeing while keeping community impacts within acceptable levels.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Maintain open communication with the local community about decommissioning schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly.	
SOIL MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Loss of land capability. δ Stockpile and stripping management. δ Soil compaction management. δ Soil erosion management. **HYDROLOGY**	**SOIL MANAGEMENT** Daily compliance monitoring by site management, ECO and nursery staff. Annual compliance monitoring by independent EAP.	**SOIL MANAGEMENT** δ Implement the applicable soil related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). δ Use appropriate equipment and replace soils in the greatest possible thickness in single lifts to reduce compaction. δ Minimise heavy equipment movement over replaced soils. δ After placement, rip compacted soils to full rooting depth (at least 60 cm, with 30 cm as a minimum) to allow penetration of plant roots.	**SOIL MANAGEMENT** Soils are restored to support long-term land capability and ecological function through careful handling, ripping of compacted layers, and revegetation with indigenous species. Movement of heavy equipment is minimised to prevent re-compaction, while appropriate placement techniques ensure soil structure and fertility are maintained. Oversight by an Environmental Control Officer and implementation of a Rehabilitation Plan guarantee that soil resources are stabilised, erosion is reduced, and ecological integrity is progressively re-established following mine closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
δ Increased Risk of Erosion on Water Quality, Increased Surface Flow Entering Nearby Watercourses, Agitation and Dispersal of Soils due to Vegetation Clearance. **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS** δ Possible development of subsided areas after rehabilitation. δ Potential for crack development after rehabilitation. δ Insufficient topsoil and subsoil available for rehabilitation. δ Potential of topsoil being diluted and		δ Re-vegetate all disturbed areas with an indigenous grass mix as needed to re-establish protective cover and reduce soil erosion. δ Appoint a competent ECO, and rehabilitation specialist to oversee the rehabilitation phase, with watercourse areas as a priority. δ Develop and implement a Rehabilitation Plan during the life of mine and post-decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats. δ Determine topsoil bulk density, rip topsoil, analyse topsoil nutrient status, apply fertilisers (if needed) to help ameliorate the topsoil physically and chemically. δ Regularly monitor and evaluate the rehabilitation of Pit 1 and 2, and the waste rock area to assess the risk and determine when final shaping, and replacement of subsoils and topsoil must take place. δ Implement chemical testing of the topsoil and subsoils before revegetation of the rehabilitation area to ensure the soils are suitable for plant growth. Remediate affected areas.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
chemically deficient to be used during rehabilitation. δ Potential chemical changes in topsoil and subsoil leading to toxicity. δ Potential for wind and water erosion of the denuded areas.		δ Retain reserve overburden, subsoils, topsoil, mulch and nursery vegetation to remedy subsidence that may occur and maintain free-draining rehabilitated areas (where applicable) to conserve land capability. δ Minimise wind and water erosion: o Create concave slopes rather than linear slopes; o Mimic natural slopes using the geomorphic approach; o Determine the best slope angle for soils; o Minimise slope length; o Minimise runoff velocities; o Plant stabilising grasses from the nursery without delay; o Keep livestock out of the rehabilitation area until revegetation is well established; o Conduct ongoing monitoring of the erosion status of the mining footprint and rehabilitated land and identify areas of excessive erosion for remedial action.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
WASTE & HAZARDOUS SUBSTANCE MANAGEMENT **GEOLOGY, SOILS AND AGRICULTURAL SENSITIVITY** δ Soil contamination management. **HYDROLOGY** δ Water Quality affected by Domestic Waste and Hazardous Chemicals. **WASTE MANAGEMENT** δ Management of General- and Hazardous Waste Generated at the Mine. δ Storage and Handling of Hazardous Substances and/or Chemicals.	**WASTE & HAZARDOUS SUBSTANCE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**WASTE & HAZARDOUS SUBSTANCE MANAGEMENT** δ EMPR Implementation and Awareness o Ensure the EMPR is accessible to all contractors and staff for reference on site. o Follow all procedures outlined in the EMPR for contamination prevention, waste management, and emergency response during decommissioning. δ Chemical and Hazardous Material Storage o Store all chemicals and dangerous goods in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled; only authorised staff may handle substances.	**WASTE & HAZARDOUS SUBSTANCE MANAGEMENT** Waste and hazardous materials are managed responsibly during the decommissioning phase, ensuring that storage, handling, and disposal practices prevent contamination of soil, surface water, and groundwater. Strict implementation of the EMPR, combined with effective spill prevention, emergency response, and segregation of waste streams, minimises environmental and health risks. Rehabilitation areas are cleared of all waste, and ablution facilities, workshops, and salvage yards are managed to maintain hygiene, safety, and compliance with legal requirements. Overall, decommissioning activities achieve a clean, safe, and environmentally compliant closure that protects ecosystems and surrounding communities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS δ Potential contamination of soils. δ Potential of surface water pollution flowing into the mining area.		○ Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. ○ PPE must be worn when handling chemicals or hazardous substances. δ Spill Prevention and Management ○ Maintain oil spill kits on site and train relevant employees in their use and emergency response procedures. ○ Use drip trays under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. ○ Vehicle and equipment washing may only occur in designated wash bays with impermeable surfaces draining to oil sumps; water reuse is only permitted if verified free of hydrocarbons. ○ Collect effluents containing oil, grease, or industrial substances in suitable receptacles for appropriate disposal or resale. ○ Clean significant spills immediately (within 2 hours), contain contaminated soil in designated hazardous waste bins, and file proof of safe disposal. ○ No contaminated water may be discharged into the natural environment.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		○ Report significant chemical, fuel, or hazardous substance spills to the Department of Water and Sanitation and other relevant authorities. ○ Follow an approved spill prevention and emergency response plan. δ Waste Management ○ Develop and implement a waste management plan in line with the NEM:WA waste hierarchy for the decommissioning phase. ○ Segregate hazardous and general waste into clearly marked, sealable bins and remove to registered disposal facilities when full. ○ Prohibit burying or burning of waste, including rubble, domestic waste, or containers. ○ Place all domestic waste in predefined storage areas outside floodplains; ensure regular inspection and maintenance of cleanliness. ○ Ensure all decommissioned or rehabilitated areas are cleared of waste at the conclusion of the project. δ Vehicle, Equipment, and Workshop Practices ○ Store vehicles and equipment in designated areas outside the 100-year floodline. ○ Conduct vehicle maintenance, repairs, and servicing only in designated workshop areas. Emergency repairs on immobile equipment	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		must use drip trays and waste must be disposed of immediately as hazardous waste. δ If a salvage yard is present, drain hydrocarbons from equipment and vehicles, keep the area clean, and remove unwanted materials from site. δ Ablution Facilities o Provide adequate ablution facilities for all decommissioning staff. o Ensure no pollution or health hazards arise; all waste must be removed to approved disposal sites.	
GROUNDWATER MANAGEMENT **GEOHYDROLOGY** δ Potential impact on the water availability in some of the user boreholes to the north. δ The gradient of groundwater towards the pit will contain any potential contamination	**GROUNDWATER MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**GROUNDWATER MANAGEMENT** δ Rehabilitated the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Continue with chemical and volume testing of the groundwater in the mining area boreholes and neighbouring farm boreholes for up to three years post-closure.	**GROUNDWATER MANAGEMENT** Groundwater quality and quantity are safeguarded through regular monitoring of mine-impacted areas, specialist-identified sites, and nearby user boreholes for up to three years post-closure. Accredited laboratory analysis and periodic updates of numerical and geochemical models provide early warning of potential contamination or drawdown, ensuring timely corrective action. These measures protect surrounding communities and ecosystems that rely on groundwater.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
from the Stockpile or WRD. **(Positive Impact)** **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS** δ Potential groundwater depletion and/or pollution due to mining activities.			
REHABILITATION OF MINING FOOTPRINT WITHIN 100 M ZOR OF EDLS **FRESHWATER ECOSYSTEMS** δ Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs.	**REHABILITATION OF MINING FOOTPRINT WITHIN 100 M ZOR OF EDLS** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**REHABILITATION OF MINING FOOTPRINT WITHIN 100 M ZOR OF EDLS** δ Reshape the western side of Pit 2 within the 48 m buffer to achieve a natural gradient that integrates with the overall landscape. δ Reinstate substrate to allow interflow to follow the natural slope direction.	**REHABILITATION OF MINING FOOTPRINT WITHIN 100 M ZOR OF EDLS** The ecological function and stability of EDL buffer areas are restored through reshaping of mined slopes, reinstatement of soils, and rehabilitation with indigenous vegetation. Erosion is prevented through soil ripping, revegetation, and surface roughness enhancements that promote diffuse flow patterns. Contaminated materials are excluded from restoration, and ongoing alien invasive plant control ensures natural vegetation recovery. Post-closure

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
δ Post-closure management activities. **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS** δ Sedimentation of EDL's and PFPs due to water erosion from denuded areas.		δ Restore subsoil and topsoil immediately after backfilling is complete. Rip all bare areas and re-vegetate with suitable indigenous species. δ Implement post-backfilling alien invasive plant (AIP) control measures. Continue monitoring and control of alien vegetation during post-closure rehabilitation. δ Rehabilitate backfilled areas using a species assemblage similar to the current vegetation, as recommended by a suitably qualified specialist. δ Monitor erosion in backfilled and disturbed areas. Immediately rehabilitate any developing rills, gullies, or bare patches by infilling and revegetation. Use sediment control measures within 100 m of the southern EDL boundary where necessary. δ Infilling and revegetation should increase surface roughness to discourage concentrated flow and promote diffuse flow patterns. δ Conduct follow-up revegetation where initial efforts are unsuccessful to maintain soil protection and prevent sheet and rill erosion.	monitoring of freshwater ecosystems confirms rehabilitation success, supporting long-term biodiversity integrity and hydrological resilience within the EDL buffers.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		δ Remove and appropriately dispose of contaminated topsoil along roads and immediate vicinities (e.g., hydrocarbons or oils). Contaminated material must not be used for restoration. δ Undertake monitoring of the freshwater ecosystems for at least three years post-closure, with particular attention to alien vegetation invasion.	
VEGETATION MANAGEMENT **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Floral ecology of the proposed development. δ Potential impact on faunal habitat and diversity. **DECOMMISSIONING PHASE: RESIDUAL**	**VEGETATION MANAGEMENT** Daily compliance monitoring by site management, ECO, nursery staff and/or rehabilitation specialist. Annual compliance monitoring by independent EAP.	**VEGETATION MANAGEMENT** δ Implement the applicable fauna and flora related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). δ Rehabilitation of Infrastructure and Footprint Areas: o Rehabilitate all infrastructure and footprint areas in accordance with the approved rehabilitation plan. o Appoint an experienced nursery manager that will train nursery staff, establish and manage the nursey and propagate plant species from the pre-mining footprint. o Implement and monitor rehabilitation for a minimum of 5 years post-closure, or until habitat and biodiversity reinstatement is	**VEGETATION MANAGEMENT** The mine footprint and surrounding affected areas are successfully rehabilitated and restored to a condition that supports natural ecological processes, veld succession, and the designated post-closure land use. Indigenous vegetation resembling pre-mined communities is re-established, ensuring habitat connectivity, biodiversity protection (including floral Species of Conservation Concern), and long-term ecosystem resilience. Alien invasive plants are effectively controlled, soil stability and hydrological function are restored, and the landscape integrates seamlessly with its natural surroundings, meeting both ecological and community expectations.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
AND/OR LATENT ENVIRONMENTAL RISKS δ Potential failure of the nursery that may threaten the rehabilitation process. δ Potential impact of livestock browsing/grazing on revegetated areas. δ Potential failure of revegetation of the mined areas. δ Potential hunting, trapping, trafficking and plant harvesting. δ Potential degradation of the surrounding areas. δ Potential failure of rehabilitation.		achieved to a level that supports natural processes and veld succession. o Ensure rehabilitation outcomes are aligned with the designated post-closure land use, aiming to restore natural vegetation resembling pre-mined communities, enhance ecological function, and maintain habitat connectivity. δ Post-Closure Land Use Guidance: o Determine and agree upon the post-closure rehabilitation land use prior to finalising the rehabilitation plan. o Preferably restore natural vegetation representing pre-mined vegetation communities, prioritising ecological function and habitat connectivity. δ Species Selection and Biodiversity Objectives: o Select species that meet biodiversity and land-use objectives, with preference for locally adapted indigenous species. o Ensure rehabilitated areas can sustain floral Species of Conservation Concern (SCC), particularly those rescued and propagated for relocation into rehabilitated sites. o Prohibit the collection of floral SCC or protected flora by rehabilitation and decommissioning teams.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		○ Propagate plants from the pre-mining footprint in the nursery. ○ Monitor chemical and physical properties of soil to promote healthy plant growth. ○ Water the revegetated areas daily. δ Site Clearance and Preparation: ○ Remove all temporary structures, waste, rubble, and alien invasive plants (AIPs) before rehabilitation activities commence. ○ Prepare and level sites carefully to avoid disturbance to adjacent natural areas. ○ Backfill pits with excavated waste rock material where feasible and shape remaining disturbed areas to blend with the natural landscape. ○ Shape slopes to gradients conducive to vegetation establishment; where steeper slopes are unavoidable, implement erosion-control measures and provide adequate stormwater management. δ Topsoil and Backfilling Management: ○ Replace stockpiled topsoil to its original depth during rehabilitation. ○ Where stockpiled topsoil is insufficient or unsuitable (e.g., contaminated with AIPs), import appropriate soils to support vegetation re-establishment.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		○ Monitor backfilled areas for subsidence and erosion; remediate promptly through infilling, re-profiling, and revegetation. δ Rehabilitation of Surrounding Natural Areas: ○ Rehabilitate any natural areas beyond the authorised footprint that were affected by mining or decommissioning activities, using indigenous species. ○ Rip and profile soils compacted during mining and construction activities outside the footprint, with particular focus on suppressing AIP spread. δ Edge Effects and Alien Invasive Plant (AIP) Control: ○ Manage edge effects such as erosion, dust, and AIP spread adjacent to rehabilitated areas. δ Floral SCC Monitoring: ○ Continue monitoring of rescued and relocated floral SCC until successful establishment is confirmed in rehabilitated areas. ○ Prevent livestock browsing/grazing on recently revegetated areas.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
ALIEN INVASIVE PLANT SPECIES CONTROL **TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS, GROUNDCOVER AND FAUNA** δ Potential infestation of the footprint area by invasive plant species. **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISKS** δ Invasive plant species establishing in the rehabilitated areas.	**ALIEN INVASIVE PLANT SPECIES CONTROL** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**ALIEN INVASIVE PLANT SPECIES CONTROL** δ General AIP Control: o Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. o Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: o Conduct ongoing AIP monitoring, clearing, and control throughout decommissioning phase. o Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. o Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal o Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. o Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site.	**ALIEN INVASIVE PLANT SPECIES CONTROL** Alien and invasive plants are effectively controlled during decommissioning to prevent their spread and protect adjacent natural habitats. Regular monitoring of disturbed areas and surrounding buffers ensures rapid detection and removal of invasive species, while cleared material is safely disposed of at licensed facilities. Management is guided by the NEMBA AIS Regulations and implemented by qualified professionals, with chemical control restricted near watercourses. Quarterly reporting and record-keeping demonstrate compliance and ensure successful rehabilitation of disturbed areas.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		δ Implementation and Restrictions o Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. o Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping o Submit quarterly reports on AIP control to track effectiveness and monitor spread, during the decommissioning phase.	
SOCIO-ECONOMIC MITIGATION **SOCIO-ECONOMIC ENVIRONMENT** δ Loss of employment opportunities and economic changes.	**SOCIO-ECONOMIC MITIGATION** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**SOCIO-ECONOMIC MITIGATION** δ Introduce re-skilling and training programmes for employees to facilitate transition into other employment sectors, reducing the impact of potential job losses. δ Facilitate workshops and provide funding support for local businesses to explore and access new	**SOCIO-ECONOMIC MITIGATION** Employees and local communities are supported in adapting to the post-mining economy through re-skilling initiatives, training, and diversification programmes. Workforce members are equipped with transferable skills to access alternative employment opportunities, while local businesses are strengthened to explore new markets, ensuring improved economic

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		markets, promoting economic resilience in the community.	resilience and reduced dependency on mining activities.
FIRE MANAGEMENT **DECOMMISSIONING PHASE: RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK** δ Veld fires affecting sensitive areas such as the nursery and/or revegetated areas.	**FIRE MANAGEMENT** Daily compliance monitoring by site management and ECO. Annual compliance monitoring by independent EAP.	**FIRE MANAGEMENT** δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project. δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas. δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites.	**FIRE MANAGEMENT** The risk of fire ignition, spread, and damage is minimised through strict controls on open fires, smoking, and storage of fuels and chemicals, together with implementation of a Fire Management Plan. Adequate firefighting equipment, staff training, and hot work precautions ensure rapid suppression of small fires, while clear reporting and emergency response procedures provide for safe evacuation and effective coordination with local fire services during larger incidents. Indigenous vegetation is protected, employees are safeguarded, and fire-related environmental impacts are prevented.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
DECOMMISSIONING PHASE			
		δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other “hot work.” Keep a working fire extinguisher immediately at hand. δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control. δ Should the risk increase, retain a reserve of plants in the nursery for revegetation and create effective firebreaks.	

m) Final proposed alternatives.

The Final Project Proposal entails the following:

(a) **Property:** Inclusion of Portion 2 (portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the farm Makganyene No 667 (1 549.61 ha) as part of the mining right footprint.

(b) **Type of Activity:** Mining is considered a preferable and more sustainable land use for this site when compared to continued extensive agricultural use.

(c) **Design/Layout:** The Phase 1 & 2 design scenario has been identified as the preferred and most feasible option for implementation. Furthermore, Layout Option 2 is considered the preferred option as it reflects a more environmentally responsible and technically informed design.

(d) **Technology:** The exclusive use of sump pumping (Dewatering Technique 1) emerged as a more viable and cost-effective solution and is therefore preferred.

(e) **Operational Aspects:** Dust Suppression Scenario 2 was adapted as the preferred operational aspect for the proposed MIOM. The mitigation measures proposed by the various specialists have been incorporated into the EMPR and, if effectively implemented, collectively represent the best-case operational scenario for minimising environmental impact.

Also refer to *Part A(1)(g)(i) Details of the development footprint alternatives considered* for a discussion regarding the matters that were considered when determining the final project proposal for the MIOM.

n) Aspects for inclusion as conditions of Authorization.

It is proposed that the following aspects be considered for inclusion as conditions of the Environmental Authorisation and Waste Management Licence:

δ The management objectives listed in this report under *Part A(1)(L) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR*

- The management approach for water abstracted through pit dewatering must be finalised through the Water Use Licence Application (WULA) process, in consultation with and subject to approval by the Department of Water and Sanitation (DWS). All dewatering activities must be undertaken in a manner that prevents deterioration of groundwater quality, in accordance with the National Water Act, 1998 (Act No. 36 of 1998), and NEMA principles.

- If upgrades to the public road network is needed, the Applicant must obtain all relevant way leave authorisations from the Northern Cape Department of Roads and Public Works.

o) Description of any assumptions, uncertainties, and gaps in knowledge.

The assumptions made in this document regarding the assessment and proposed mitigation measures are based on site-specific information gathered from the Applicant, desktop analyses, site inspections, and specialist studies. At present, no uncertainties regarding the proposed project or the receiving environment have been identified.

p) Reasoned opinion as to whether the proposed activity should or should not be authorized.

i) Reasons why the activity should be authorized or not.

The specialists agree that, with mitigation management and monitoring, the risk posed by the proposed activity on the receiving environment will be of acceptable significance. Therefore, it is proposed that, should the Applicant commit to the project as presented in this report, along with the proposed mitigation measures and monitoring programs, no fatal flaws have been identified that would be severe enough to prevent the continuation of the activity.

ii) Conditions that must be included in the authorization.

(1) Specific conditions to be included into the compilation and approval of EMPR

The management objectives listed in this report under *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* must be included into the compilation and approval of the EMPR.

(2) Rehabilitation requirements

The rehabilitation- and closure objectives proposed in *Part B(d)(i) Determination of Closure Objectives* and the Rehabilitation, Decommissioning and Closure Plan attached as Appendix H1, to this report, must be included in the authorisation.

Once the mining area was rehabilitated the MR Holder must submit a closure application to the DMPR in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

q) Period for which the Environmental Authorization is required.

The Applicant requests that the Environmental Authorisation be valid for the duration of the mining right.

r) Undertaking

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report.

s) Financial Provision

i) Explain how the aforesaid amount was derived.

The amount required to annually manage and rehabilitate the affected environment was estimated to be R 99 903 239.82. Please to Section 7.9 of Appendix H1 – *Rehabilitation, Decommissioning and Closure Plan* for and explanation as to how this amount was calculated.

ii) Confirm that this amount can be provided for from operating expenditure.

Assmang (Pty) Ltd is one of the largest iron ore mining operators in South Africa and has a proven track record of successful project and mine development

across the country. Assmang (Pty) Ltd will take responsibility for financing the cashflow with a combination of debt and equity funding.

t) Deviations from the approved scoping report and plan of study.

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

No deviation from the methodology used in determining the significance of potential environmental impacts and risks were deemed necessary. The methodology outlined in the Scoping Report was consistently applied in this Environmental Impact Assessment Report.

ii) Motivation for the deviation.

Not applicable.

u) Other Information required by the competent Authority.

i) Compliance with the provisions of sections 24 (4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA report must include the:

(1) Impact on the socio-economic conditions of any directly affected person.

Kindly refer to the following sections in the report where the socio-economic conditions and potential associated impacts are discussed:

- *Part A(1)(g)(i) Details of the development footprint alternatives considered.*
- *Part A(1)(g)(iv) The Environmental attributes associated with the development footprint alternatives.*
- *Part A(1)(f) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.*
- *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.*

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

The HIA identified two cemeteries, a stone cairn, exploration trenches, as well as a burial site and historical farmstead in the study area. Although

these sites will not be impacted, it was added to development plans along with the graves and a no-go buffer zone of 30 m.

The overall impact of the project with the recommended mitigation measures is acceptable and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the MIOM Project.

Also refer to:

- *Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – 11. Cultural, Heritage and Palaeontological Environment.*
- *Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – 10. Site Specific Cultural, Heritage and Palaeontological Environment.*

v) Other matter required in terms of section 24(4)(a) and (b) of the Act.

The alternatives associated with the proposed activity, explored during the impact assessment process, were based on information gathered from site investigations, the public participation process, specialist studies, and desktop analyses conducted within the study area. For further details, refer to *Part A(1)(m) Final Proposed Alternatives.*

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

a) Details of the EAP,

The details and expertise of Ms C Fouché of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in *Part A(1)(a) Details of Greenmined Environmental* as well as Appendix X as required.

b) Description of the Aspects of the Activity

The aspects of the activity that are covered by the draft environmental management programme have been discussed and included in *Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity*.

c) Composite Map

As mentioned under *Part A(1)(k)(ii) Finale Site Map* the maps were compiled in relation to the specialist findings and are attached as Appendix C1-5.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

The primary objective, at the end of the mine's life, is to obtain a closure certificate in as short a time as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA].

To realise this, the following closure objectives were proposed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H1):

- δ Minimise negative impacts within the clearly demarcated mining footprint.
- δ Prevent negative impacts outside of the clearly demarcated mining footprint.
- δ Remove all equipment, infrastructure and materials introduced during mining operations.

- Reshape the mining footprint to a landform similar to the pre-mining condition, with stable gradients and topographical features that support a sustainable wilderness ecosystem (excluding Pits 1 and 2, that will not be fully backfilled, and the waste rock dump, which will form new permanent features).
- Shape and stabilise Pits 1 and 2 and the waste rock dump into safe, sustainable landforms with gradients that minimise erosion and maximise ecosystem development.
- Remove unsafe edges in Pits 1 and 2 and on the waste rock dump.
- Ensure adequate, non-toxic, non-polluted, and non-compacted topsoil and subsoil are available to support indigenous vegetation from the on-site nursery.
- Eliminate visible erosion within the mining footprint and downslope areas and mitigate any future erosion risks through an erosion risk assessment and management plan.
- Prevent water pollution and toxicity in Pits 1 and 2.
- Prevent water pollution and toxicity in monitoring boreholes within the mining right area and in boreholes on neighbouring farms.
- Eradicate all alien and invasive plants within the 264 ha rehabilitation area.

The MR Holder will also comply with the minimum closure objectives as prescribed by DMPR and detailed below.

1. REHABILITATION OF THE EXCAVATION

- No waste (other than inert material) may be permitted to be deposited in the excavations.
- Once overburden, rocks and coarse natural materials have been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that

the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

2. REHABILITATION OF PROCESSING/STOCKPILE AREA

- δ Coarse natural material used for the construction of ramps must be removed and dumped into the excavations.
- δ Stockpiles must be removed during the decommissioning phase, the area ripped, and the topsoil returned to its original depth to provide a growth medium.
- δ On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - o Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
  - o The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- δ Photographs, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the DMPR Regional Manager.
- δ On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200 mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.
- δ The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.
- δ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the DMPR Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

3. FINAL REHABILITATION

- δ Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- δ All mining equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- δ Waste material of any description, including receptacles, scrap, rubble, and tyres, must be removed entirely from the mining area, and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- δ The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- δ Final rehabilitation must be completed within a period specified by the Regional Manager (DMPR).

Once the mining area was rehabilitated the MR Holder is required to submit a closure application to the Department of Mineral and Petroleum Resources in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

Any potential environmental damage, pollution, extraneous water management, or ecological degradation arising from the listed activities will be managed in accordance with the mitigation measures and monitoring programmes outlined in the EIAR and incorporated into this EMPR. These measures include site-specific actions for pollution prevention, water management (pumping and

treatment of extraneous water), rehabilitation, and ecological protection to ensure that impacts are minimised and managed to acceptable levels.

Refer to *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.*

iii) Potential risk of Acid Mine Drainage.

This project does not present a risk of acid mine drainage as confirmed by the Waste Classification Study attached to this report as Appendix G.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

Not applicable.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

Not applicable.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

Not applicable.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

As mentioned in *Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2.1 Water Management* it is anticipated that ±250 m³ (250 000 ℓ) of process water will be required per day. The project is expected to require ±10 m³ (10 000 ℓ) of potable water per day.

viii) Has a water use license been applied for?

A client link for the WULA associated with the proposed project was created on 03 December 2024 on the e-WULAAS system of DWS. DWS assigned CT31224 as temporary reference number to the application. Refer to Appendix D2 for proof of correspondence with the DWS.

ix) Impacts to be mitigated in their respective phases.

Table 110: Impact to be mitigated in their respective phases

ACTIVITY	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MITIGATION OF VISUAL IMPACT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Restrict construction activities to the minimum footprint required for the development by confining work to localised areas. δ Minimise the height and visibility of temporary structures and use natural colours and materials that blend with the environment. δ Use natural topography, existing vegetation, landscaping, or planted vegetative screens to reduce visual intrusion at sensitive viewpoints. δ Post-construction, prioritise revegetation efforts, especially in areas that will not be used during the operational phase. δ Engage with the local community and stakeholders in the surrounding area to understand their values and concerns related to the landscape and sense of place.	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations	Throughout the site establishment and construction phase.

ACTIVITY	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MITIGATION OF VISUAL IMPACT					
			δ Reduce light pollution by limiting night-time construction activities where possible, and by using downward directed, shielded lighting.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ Use low-reflectivity materials and natural colours to blend structures into the surrounding landscape. Keep infrastructure as unobtrusive as possible. δ Implement landscaping and natural screening (using native vegetation, topography, or other methods) where feasible, with priority given to sensitive viewpoints such as nearby residents, travellers along the R385, and other key receptors. δ Establish indigenous trees and shrubs at key points of sensitivity to reduce visibility and integrate the site with the natural environment. δ Maintain infrastructure, landscaping, and vegetative screening in good condition throughout the life of the project to ensure the site remains visually unobtrusive.	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the operational phase.

ACTIVITY	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MITIGATION OF VISUAL IMPACT					
			δ Conduct regular reviews of the effectiveness of visual impact mitigation measures and adapt them where necessary, particularly given the long operational life of the project. δ Engage with local communities to understand their concerns and, where feasible, incorporate their feedback into the design, landscaping, and operation of the facility.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ Develop and implement a plan that includes soil restoration, replanting native vegetation, and monitoring ecological recovery. δ Remove infrastructure gradually to minimise sudden disturbance. δ Where appropriate, re-use infrastructure (e.g., access roads) for community or landowner benefit, subject to agreement. δ Apply techniques during dismantling that limit soil and landscape disruption. δ Restore disturbed areas promptly after infrastructure removal, using	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the decommissioning phase.

ACTIVITY	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			MITIGATION OF VISUAL IMPACT		
			local/indigenous plant species to enhance biodiversity. δ Implement soil conservation and proper drainage measures to prevent erosion, maintain soil health, and avoid waterlogging. δ Recycle or dispose of all decommissioned materials responsibly, ensuring no remnants are left on site. δ Conduct regular post-decommissioning monitoring of site recovery, with interventions as needed to ensure restoration success. δ Involve local communities in restoration planning, gather feedback, and address concerns to align rehabilitation with local needs.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Regularly suppress dust on exposed surfaces, haul roads, and stockpiles using water and/or approved environmentally friendly dust suppressants. Increase application frequency during dry or windy conditions. δ Enforce a maximum speed limit of 30 km/h on all internal roads. Install signage and ensure compliance to minimise dust kick-up. δ Install dust screens, windbreaks, or enclosures around crushers, stockpiles, waste rock dumps, and open pits to reduce wind-blown dust. Ensure control efficiencies align with those recommended in the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. δ Promptly rehabilitate inactive areas. Seed topsoil stockpiles with indigenous grass species within 30 days of formation and re-vegetate disturbed areas with indigenous plants to stabilise soil. δ Install and maintain water sprayers at crushers and conveyor transfer points. Fit conveyor belts with skirts or strips to	Air quality management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1) δ National Dust Control Regulations, GNR 827	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
			reduce fine particle escape. Remove compacted dust and spillage weekly to prevent secondary emissions. δ Ensure all loads are levelled and securely covered during transport to prevent spillage and windblown dust. δ Pause or reschedule dust-generating activities during strong winds or adverse weather conditions. δ Implement a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Inspect suppression equipment monthly and review effectiveness bi-annually, adjusting as needed. δ Transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) can reduce harmful emissions.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be*	Operational Phase	±113 ha (Within Mining Area)	δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS	Air quality management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
undertaken – 2.2 Operataional Phase)		±20 km (MIOM to Beeshoek Mine)	products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. If needed, spray haul roads twice daily with water. δ Install windbreaks or three-sided enclosures around ore stockpiles, waste rock dumps, and open pits to reduce wind-blown dust, in line with WRAP Fugitive Dust Handbook efficiencies. δ Seed topsoil stockpiles with indigenous grass species within 30 days of formation to stabilise surfaces and capture wind-blown dust. Limit vegetation clearing to immediately before mining commences. δ Install and maintain operational water sprayers at the crusher plant and conveyor transfer points. δ Attach strips of used conveyor belts at discharge points to reduce fine particle escape (if needed).	δ National Dust Control Regulations, GNR 827 δ ASTM D1739 (SANS 1137:2012)	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
			δ Remove compacted dust and spillage from the crusher plant on a weekly basis to prevent accumulation and secondary emissions. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place. δ Flatten and securely cover all loads during transport to prevent spillage and wind-blown dust. δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds. δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review suppression effectiveness bi-annually and adjust measures as required.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
			δ Consider transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) to reduce harmful emissions.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place.	Dust management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1) δ National Dust Control Regulations, GNR 827 δ ASTM D1739 (SANS 1137:2012)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
DUST MANAGEMENT					
			δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds. δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review suppression effectiveness bi-annually and adjust measures as required.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
NOISE MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and construction machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of	Noise management must adhere to the following standards: δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
NOISE MANAGEMENT					
			employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict noisy construction activities to daytime hours where possible, and avoid early mornings, late evenings, or weekends when residents are more likely to be at home. δ Maintain open communication with the local community about construction schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Installing barriers or planting vegetation around mining sites to help reduce noise pollution.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be*	Operational Phase	±113 ha (Within Mining Area) ±20 km	δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area.	Noise management must adhere to the following standards: δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
NOISE MANAGEMENT					
undertaken – 2.2 Operataional Phase)		(MIOM to Beeshoek Mine)	δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict blasting to Monday–Friday during daylight hours (08:00–17:00), unless otherwise authorised. Plan blasting type, duration, and timing with due consideration for nearby land users and structures and notify surrounding landowners in writing prior to each event. δ Design all blasts in accordance with the United States Bureau of Mines (USBM) criteria for ground vibration and airblast. Implement continuous airblast and ground vibration monitoring at sensitive receptors,	δ USBM RI 8507 standards	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
NOISE MANAGEMENT					
			and if monitoring results indicate exceedance of the USBM criteria, immediately review and amend the blast design to ensure compliance. δ Maintain open communication with the local community about operations and blasting schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Install barriers or planting vegetation around mining sites to help reduce noise pollution. δ Consider employing quieter machinery or retrofitting existing equipment with noise-reduction technologies to lessen noise levels.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±113 ha	δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations.	Noise management must adhere to the following standards: δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan δ USBM RI 8507 standards	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
NOISE MANAGEMENT					
			δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Maintain open communication with the local community about decommissioning schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the*	Site Establishment and Construction Phase	±14 ha	δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land.	Soil must be managed in accordance with the: δ CARA δ Erosion Risk Assessment δ MPRDA	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
activities to be undertaken – 2.1 Site Establishment / Construction Phase)			δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed. δ Remove vegetation only where absolutely necessary and rehabilitate areas promptly where possible. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential. δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the ‘cut and cover’ technique when feasible to avoid unnecessary stockpiling.	δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ SWMP (Appendix F)	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed). δ Keep monthly records of the volumes of topsoil and subsoils stripped and stockpiled. δ Test soil nutrient levels to establish baseline data for comparison during rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events and infestation with invasive plant species. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Strip soils when moisture content is as low as possible. If soils must be moved when wet, use trucks and shovels rather than bowl scrapers to reduce compaction.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			δ Appoint a competent Environmental Control Officer (ECO) to oversee construction phase activities, with watercourse areas as a priority. δ Complete and implement an Erosion Risk Assessment and Management Plan prior to commencement. Focus erosion control on areas identified as highest risk. δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately.		
Operational activites. *(Part A(1)(d)(ii) Description of the*	Operational Phase	±113 ha	δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land.	Soil must be managed in accordance with the: δ CARA	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
activities to be undertaken – 2.2 Operataional Phase)			δ Confine the proposed development and associated surface infrastructure to within the demarcated footprint area. δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential. δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the ‘cut and cover’ technique when feasible to avoid unnecessary stockpiling.	δ Erosion Risk Assessment δ MPRDA δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ SWMP (Appendix F)	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed). δ Keep monthly records of the volumes of topsoil and subsoils stripped, stockpiled and returned as part of progressive rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Prevent contamination of stockpiled topsoil by AIP material; prioritise AIP monitoring of topsoil stockpiles. δ Prohibit vehicle and personnel movement over stockpiles. δ Strip soils when moisture content is as low as possible. If soils must be moved when		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			wet, use trucks and shovels rather than bowl scrapers to reduce compaction. δ Appoint a competent ECO to oversee operation phase, with watercourse areas as a priority. δ Focus erosion control on areas identified as highest risk. δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately. δ Develop and implement a Rehabilitation Plan during the life of mine and post-decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ Implement the applicable soil related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). δ Use appropriate equipment and replace soils in the greatest possible thickness in single lifts to reduce compaction. δ Minimise heavy equipment movement over replaced soils. δ After placement, rip compacted soils to full rooting depth (at least 60 cm, with 30 cm as a minimum) to allow penetration of plant roots. δ Re-vegetate all disturbed areas with an indigenous grass mix as needed to re-establish protective cover and reduce soil erosion. δ Appoint a competent ECO, and rehabilitation specialist to oversee the rehabilitation phase, with watercourse areas as a priority. δ Develop and implement a Rehabilitation Plan during the life of mine and post-	Soil must be managed in accordance with the: δ CARA δ Erosion Risk Assessment δ MPRDA δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ SWMP (Appendix F)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats. δ Determine topsoil bulk density, rip topsoil, analyse topsoil nutrient status, apply fertilisers (if needed) to help ameliorate the topsoil physically and chemically. δ Regularly monitor and evaluate the rehabilitation of Pit 1 and 2, and the waste rock area to assess the risk and determine when final shaping, and replacement of subsoils and topsoil must take place. δ Implement chemical testing of the topsoil and subsoils before revegetation of the rehabilitation area to ensure the soils are suitable for plant growth. Remediate affected areas. δ Retain reserve overburden, subsoils, topsoil, mulch and nursery vegetation to remedy subsidence that may occur and maintain free-draining rehabilitated areas (where applicable) to conserve land capability. δ Minimise wind and water erosion:		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOIL MANAGEMENT					
			○ Create concave slopes rather than linear slopes; ○ Mimic natural slopes using the geomorphic approach; ○ Determine the best slope angle for soils; ○ Minimise slope length; ○ Minimise runoff velocities; ○ Plant stabilising grasses from the nursery without delay; ○ Keep livestock out of the rehabilitation area until revegetation is well established; ○ Conduct ongoing monitoring of the erosion status of the mining footprint and rehabilitated land and identify areas of excessive erosion for remedial action.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
Site establishment and construction activites.	Site Establishment	±14 ha	δ EMPR Implementation and Environmental Awareness	Mining related waste must be managed in accordance with the: δ Emergency Response Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)	and Construction Phase		○ Ensure the EMPR is accessible to all contractors and employees on site. ○ Conduct environmental awareness induction for all personnel, covering littering prevention, spill reporting, fire safety, and general housekeeping. δ Waste Management Plan ○ Develop and implement a waste management plan and emergency response plan for all project phases, aligned with the waste hierarchy of the NEM:WA. ○ Prohibit burial or burning of general waste (except for inert WRD material). ○ Place hazardous and general waste in separately marked, sealable bins at designated areas. Remove and dispose of waste at registered waste facilities or landfill sites as applicable. ○ Place domestic waste in predefined storage areas located outside the 100-year floodline and ensure regular inspection and maintenance of cleanliness. δ Vehicle, Equipment, and Fuel Management	δ NWA δ NEM:WA δ NEM:WA: National norms and standards for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Conduct all vehicle maintenance, repairs, and services in the designated workshop or service area. Emergency repairs on site must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with proof filed for auditing purposes. ○ Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling to prevent drips. ○ Keep vehicles and equipment in designated areas outside the 100-year floodline. δ Ablution Facilities: ○ Provide adequate ablution facilities for all employees. Ensure facilities do not cause pollution, health hazards, or secondary pollution from waste or sewage. ○ Locate facilities outside the floodplain and maintain cleanliness throughout project phases. δ Salvage Yard and Site Cleanliness:		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Drain all hydrocarbons from equipment, tools, or vehicles before placement in a salvage yard. Maintain the yard's cleanliness and remove unwanted materials regularly. ○ At project completion, ensure all decommissioned and rehabilitated areas are cleared of waste. δ General Environmental Practices: δ Ensure continuous monitoring of site housekeeping, waste management, and compliance with all environmental protocols.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ EMPR Implementation and Awareness ○ Implement contamination prevention measures as outlined in the EMPR and ensure it is accessible to all sub-contractors and employees for reference on site. ○ Conduct environmental awareness training covering spill reporting, littering prevention, dust suppression, and fire safety. δ Waste Management	Mining related waste must be managed in accordance with the: δ Emergency Response Plan δ NWA δ NEM:WA δ NEM:WA: National norms and standards for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Develop and implement a waste management plan aligned with the NEM:WA waste hierarchy for the operational phase. ○ Contain hazardous and general waste in separately marked, sealable bins located at designated areas and remove waste to registered disposal facilities when full. ○ Domestic waste must be stored in predefined areas, outside floodplains, and maintained in a clean state. ○ Prohibit burial or burning of any waste, apart from inert material from the WRD. ○ Ensure all decommissioned or rehabilitated areas are cleared of waste. δ Vehicle, Equipment, and Fuel Management ○ Conduct all vehicle maintenance, repairs, and servicing at the workshop or designated service area. Emergency on-site repairs must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with disposal proof filed.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling. ○ Store vehicles and equipment in designated areas outside the 100-year floodline. δ Ablution Facilities ○ Provide adequate ablution facilities for all employees. Ensure they do not cause pollution or health hazards and that waste is removed to approved disposal sites. ○ Conduct routine maintenance of the sewage system to reduce the risk of failure and spillage. δ Stormwater and Water Management ○ Implement a stormwater management plan to manage operational runoff and prevent contamination. ○ Apply water-use efficiency measures to minimise discharge and promote water re-use within operations. ○ Bund all dirty water catchment areas and contain dirty water in storage facilities, such as wastewater control dams.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Conduct quarterly surface water quality monitoring (if available) to detect and quantify any operational impacts. δ General Operational Practices δ Maintain site housekeeping to prevent environmental contamination and ensure all operational practices comply with EMPR requirements.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ EMPR Implementation and Awareness ○ Ensure the EMPR is accessible to all contractors and staff for reference on site. ○ Follow all procedures outlined in the EMPR for contamination prevention, waste management, and emergency response during decommissioning. δ Chemical and Hazardous Material Storage ○ Store all chemicals and dangerous goods in bunded areas, outside the 100-year floodline where applicable. ○ Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to	Mining related waste must be managed in accordance with the: δ Emergency Response Plan δ NWA δ NEM:WA δ NEM:WA: National norms and standards for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled; only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. o PPE must be worn when handling chemicals or hazardous substances. δ Spill Prevention and Management o Maintain oil spill kits on site and train relevant employees in their use and emergency response procedures. o Use drip trays under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. o Vehicle and equipment washing may only occur in designated wash bays with impermeable surfaces draining to oil sumps; water reuse is only		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			permitted if verified free of hydrocarbons. o Collect effluents containing oil, grease, or industrial substances in suitable receptacles for appropriate disposal or resale. o Clean significant spills immediately (within 2 hours), contain contaminated soil in designated hazardous waste bins, and file proof of safe disposal. o No contaminated water may be discharged into the natural environment. o Report significant chemical, fuel, or hazardous substance spills to the Department of Water and Sanitation and other relevant authorities. o Follow an approved spill prevention and emergency response plan. δ Waste Management o Develop and implement a waste management plan in line with the NEM:WA waste hierarchy for the decommissioning phase. o Segregate hazardous and general waste into clearly marked, sealable bins and remove to registered disposal facilities when full.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			○ Prohibit burying or burning of waste, including rubble, domestic waste, or containers. ○ Place all domestic waste in predefined storage areas outside floodplains; ensure regular inspection and maintenance of cleanliness. ○ Ensure all decommissioned or rehabilitated areas are cleared of waste at the conclusion of the project. δ Vehicle, Equipment, and Workshop Practices ○ Store vehicles and equipment in designated areas outside the 100-year floodline. ○ Conduct vehicle maintenance, repairs, and servicing only in designated workshop areas. Emergency repairs on immobile equipment must use drip trays and waste must be disposed of immediately as hazardous waste. ○ If a salvage yard is present, drain hydrocarbons from equipment and vehicles, keep the area clean, and remove unwanted materials from site.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
WASTE MANAGEMENT					
			δ Ablution Facilities o Provide adequate ablution facilities for all decommissioning staff. o Ensure no pollution or health hazards arise; all waste must be removed to approved disposal sites.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
GROUNDWATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Design and construct the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of groundwater	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
GROUNDWATER MANAGEMENT					
			monitoring. Use existing exploration boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities. δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ Operate the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Undertake all pit dewatering strictly in accordance with the conditions and requirements of the approved Water Use Licence (WUL).	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
GROUNDWATER MANAGEMENT					
			δ Where groundwater drawdown has the potential to impact neighbouring boreholes and if required, implement compensatory measures, including either re-injection of abstracted water into approved boreholes outside the affected aquifer system or provision of water to neighbouring farmers with affected boreholes to match the current supply or requirement. δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of groundwater monitoring. Use existing exploration boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
GROUNDWATER MANAGEMENT					
			δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±113 ha	δ Rehabilitate the WRD in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Continue with chemical and volume testing of the groundwater in the mining area boreholes and neighbouring farm boreholes for the duration of the decommissioning phase.	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SURFACE WATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Limit the construction footprint to a Right of Way (RoW) with a 5 m buffer upstream and downstream of any freshwater ecosystem crossing to prevent indiscriminate movement of mining equipment. δ Mark all delineated water resources as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint. δ Locate all future mining activities away from water resources and associated floodlines wherever possible. δ Treat instream activities, such as stream diversions or channel modifications, as least favourable options and avoid them unless essential. δ Conduct any required instream activities during the dry period to minimise erosion and inundation risks. δ When upgrading informal roads crossing freshwater ecosystems, ensure the delineated extent of the ecosystem is respected. Expand the road on the side	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			SURFACE WATER MANAGEMENT		
			opposite the freshwater feature to maintain the natural buffer. δ Stockpile any materials used for road upgrades (e.g., gravel) outside the delineated freshwater ecosystems and preferably outside the 48 m ecological buffer. Stockpiles may not exceed 2 m in height and must be protected from wind using tarpaulins. δ During excavation, any soil, sediment, or silt removed from the freshwater ecosystem may be temporarily stockpiled within the construction RoW but outside the delineated freshwater ecosystem. Stockpiles may not exceed 2 m in height, and their footprint must be minimised. Excavated materials must remain uncontaminated, with minimal mixing of lower and upper soil layers for later use as backfill or rehabilitation material. Temporary stockpiles must be disposed of or used promptly. δ Rehabilitate the disturbed area surrounding the road with suitable indigenous vegetation to prevent erosion		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SURFACE WATER MANAGEMENT					
			and the establishment of alien invasive species. δ Implement the alien vegetation management plan. Remove all existing alien and invasive vegetation and dispose of all material at a registered garden refuse site; burning or mulching on site is not permitted. δ Take care to ensure that no scouring or erosion occurs as a result of the crossing or excavation. δ Install measures such as gabions or other appropriate scour protection structures immediately downstream of activities to prevent erosion.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ Keep all delineated water resources marked as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint. δ Locate all future mining activities away from water resources (if possible) and associated floodlines. δ Treat instream activities as least favourable options.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SURFACE WATER MANAGEMENT					
			δ Conduct any required instream activities, such as stream diversions or channel modifications, during the dry period to minimise erosion and inundation risks. δ Implement measures to prevent erosion immediately downstream of activities, such as installing gabions or other appropriate scour protection structures.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
STORMWATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes. δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater ecosystems. Maintain strict separation of clean and dirty water in line with GN704.	Stormwater management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
STORMWATER MANAGEMENT					
			δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically feasible outside the GN 4167 100 m Zone of Restriction (ZoR) of Ecological Drainage Lines (EDLs) to minimise spill and contamination risks. δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations. δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
STORMWATER MANAGEMENT					
			δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow. Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be*	Operational Phase	±113 ha	δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes.	Stormwater management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
STORMWATER MANAGEMENT					
undertaken – 2.2 Operataional Phase)			δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater ecosystems. Maintain strict separation of clean and dirty water in line with GN704. δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically feasible outside the GN 4167 100 m Zone of Restriction (ZoR) of Ecological Drainage Lines (EDLs) to minimise spill and contamination risks. δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations.	δ SWMP (Appendix F)	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
STORMWATER MANAGEMENT					
			δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers. δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow. Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±0.5 ha	δ Demarcate the approved works area prior to any clearing (preferably as part of proposed fencing of the mining footprint). Clearly mark the reaches of the EDLs and the associated 48 m ecological buffer as no-access areas outside the open-cast or other mining infrastructure footprint. δ Transport all vegetation removed during site clearing (particularly from large areas) from the construction site, unless used for rehabilitation. Vegetation may not be stockpiled and must be disposed of at a registered waste disposal facility. δ Strip topsoil and vegetation in small, systematic blocks, clearing only the areas where excavation is immediately planned to minimise exposed subsoil and reduce the duration of exposure.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the site establishment and construction phase.
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±0.5 ha	δ Adhere strictly to all recommendations and mitigation measures outlined in the Stormwater Management Plan (SWMP). δ Undertake regular inspections of the dirty water channel to ensure functionality.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL					
			δ Prepare and implement an emergency plan to address any tearing or leaks in the dirty water channel lining, preventing inundation of the EDL. δ Use only existing roadways during maintenance and monitoring activities to avoid indiscriminate vehicle movement. δ Maintain portions of the 48 m non-development ecological buffer around the EDL not impacted by Pit 2 to provide residual protection from spill-over and edge effects of mining operations. δ Install and maintain temporary berms and silt traps for the duration of mining operations to prevent polluted sediment and other fines from being transported by stormwater into the downgradient reach of the system. δ Implement a monitoring programme to detect and prevent pollution of soil, surface water, and groundwater. δ Reduce airborne dust during blasting activities by damping dust generation		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL					
			areas, ensuring that quantities used do not generate runoff. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±0.5 ha	δ Reshape the western side of Pit 2 within the 48 m buffer to achieve a natural gradient that integrates with the overall landscape. δ Reinstate substrate to allow interflow to follow the natural slope direction. δ Restore subsoil and topsoil immediately after backfilling is complete. Rip all bare areas and re-vegetate with suitable indigenous species. δ Implement post-backfilling alien invasive plant (AIP) control measures. Continue monitoring and control of alien vegetation during post-closure rehabilitation. δ Rehabilitate backfilled areas using a species assemblage similar to the current vegetation, as recommended by a suitably qualified specialist.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF DEVELOPMENT WITHIN BUFFER OF SOUTHERN EDL					
			δ Monitor erosion in backfilled and disturbed areas. Immediately rehabilitate any developing rills, gullies, or bare patches by infilling and revegetation. Use sediment control measures within 100 m of the southern EDL boundary where necessary. δ Infilling and revegetation should increase surface roughness to discourage concentrated flow and promote diffuse flow patterns. δ Conduct follow-up revegetation where initial efforts are unsuccessful to maintain soil protection and prevent sheet and rill erosion. δ Remove and appropriately dispose of contaminated topsoil along roads and immediate vicinities (e.g., hydrocarbons or oils). Contaminated material must not be used for restoration. δ Undertake monitoring of the freshwater ecosystems for at least three years post-closure, with particular attention to alien vegetation invasion.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Ensure that sound environmental management practices are in place at all times during the planning phase. δ Stockpile Design and Stability: o Stockpile height and slope angle must comply with sound geotechnical design principles. o Slopes must not be excessively steep to prevent failure. o Incorporate mechanisms to improve slope stability. o Apply strict stormwater management and erosion control measures for all newly proposed stockpiles, as existing stockpiles have contributed to sedimentation of adjacent natural habitats. δ Establish the nursery two years before mining commences as prescribed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H1). δ Rehabilitation, Rescue and Relocation, and AIP Control Plans - Prior to vegetation clearing activities:	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Vegetation Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			○ Develop a rehabilitation plan/strategy for implementation throughout all project phases. δ Site Walkdowns and Permitting: ○ Conduct a thorough walkdown of all footprint areas, including a 15 m buffer, during the optimal flowering season for provincially protected species before project initiation. ○ Follow appropriate permitting and authorisation processes as required by the Northern Cape Environmental Department (provincially protected species) and DFFE (TOPS/NFA species). ○ Develop a rescue and relocation plan under the guidance of the DFFE and/or Northern Cape Environmental Department, based on the outcomes of the walkdowns. ○ Rescue, relocate, or apply for destruction permits for provincially protected species prior to mining. δ Biodiversity and Habitat Protection: ○ Minimise loss of indigenous vegetation and natural habitat by		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			considering findings of the biodiversity and other specialist studies. o Optimise layouts within medium to very low SEI habitats and avoid loss of high and very high SEI habitats. o Prevent unnecessary habitat fragmentation by placing infrastructure within already disturbed areas or as close to existing disturbances as possible. o Avoid disruption to ecological processes. o Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs). o Ensure that habitat degradation surrounding authorised footprints is kept to a minimum through strict edge management. δ Prior to commencement of construction, clearly demarcate the construction servitude to prevent footprint creep beyond authorised areas. δ Collection of Indigenous Plants: o Collect abundant seeds, cuttings, seedlings and whole plants in the		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			mining footprint that cover the indigenous plant diversity. ○ Translocate as many plant species of conservation concern and protected plant species as possible to the nursery. ○ Prevent collection of seeds, cuttings and seedlings of invasive alien plants. ○ Keep plants from the same area together in the nursery so it can be translocated to the area from where it originated.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ NCNCA-Protected Floral Species: ○ No NCNCA-protected species may be removed during mining activities without the required permits from DFFE and the Northern Cape Environmental Department. ○ All permit conditions must be strictly adhered to. ○ Where feasible and as per permit conditions, collect propagules and/or seeds for propagation under nursery conditions to support rehabilitation or supplement unsuccessful relocation attempts. δ Vegetation Clearing and Footprint Control:	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Vegetation Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			○ Restrict removal of vegetation to areas within the approved project footprint. ○ Clearly demarcate footprints to avoid encroachment into adjacent habitats. ○ Place all proposed infrastructure, including temporary facilities, outside sensitive habitat units wherever possible. δ Vehicles must utilise existing and planned roads and avoid creating unplanned or unauthorised tracks. δ Vegetation Waste Management: ○ Do not leave cleared vegetation cuttings in freshwater habitats. ○ Dispose of cleared vegetation, construction waste, and rubble at a registered waste facility or in a designated area identified by the mine. ○ No waste may be dumped in surrounding natural habitats or unauthorised areas. δ Infrastructure and Footprint Monitoring: ○ Limit all infrastructure, including future expansions, to authorised footprints.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			○ Prohibit disturbance of habitats outside demarcated and approved areas. ○ Conduct monthly monitoring and recording of footprint areas by the ECO and annual recording by the Mine Surveyor to prevent footprint creep. δ Vegetation Monitoring Programme ○ Manage and monitor the nursery as stipulated in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). ○ Establish and maintain an annual vegetation monitoring programme to protect and manage biodiversity in the Focus Areas (remaining natural areas). ○ Monitor species composition against reference vegetation types. ○ Continue monitoring relocated Species of Conservation Concern (SCC) until successful establishment is evident. δ Prohibit the collection of floral SCC or indigenous vegetation outside of planned and authorised footprints by all personnel.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			δ Limiting Edge Effects: o Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs). o Rip, profile, and reseed compacted soils outside the footprint areas (if rehabilitation is needed). o Suppress dust to protect flora and prevent sedimentation of freshwater habitats. o Limit extent of disturbed vegetation and exposed soils to reduce erosion risks. δ Rehabilitation of Disturbed Areas: o Rehabilitate areas no longer required for operational activities. o Restore natural areas beyond the direct footprint that were affected by project activities using indigenous species. o Reinstate and maintain a vegetation layer to promote soil health, vegetation establishment, habitat connectivity, and fauna support. o Use indigenous species from the reference vegetation type or		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			surrounding area for optimal biodiversity outcomes.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ Implement the applicable fauna and flora related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). δ Rehabilitation of Infrastructure and Footprint Areas: o Rehabilitate all infrastructure and footprint areas in accordance with the approved rehabilitation plan. o Appoint an experienced nursery manager that will train nursery staff, establish and manage the nursey and propagate plant species from the pre-mining footprint. o Implement and monitor rehabilitation for a minimum of 5 years post-closure, or until habitat and biodiversity reinstatement is achieved to a level that supports natural processes and veld succession. o Ensure rehabilitation outcomes are aligned with the designated post-closure land use, aiming to restore natural vegetation resembling pre-mined communities, enhance	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Vegetation Management Plan	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			ecological function, and maintain habitat connectivity. δ Post-Closure Land Use Guidance: o Determine and agree upon the post-closure rehabilitation land use prior to finalising the rehabilitation plan. o Preferably restore natural vegetation representing pre-mined vegetation communities, prioritising ecological function and habitat connectivity. δ Species Selection and Biodiversity Objectives: o Select species that meet biodiversity and land-use objectives, with preference for locally adapted indigenous species. o Ensure rehabilitated areas can sustain floral Species of Conservation Concern (SCC), particularly those rescued and propagated for relocation into rehabilitated sites. o Prohibit the collection of floral SCC or protected flora by rehabilitation and decommissioning teams. o Propagate plants from the pre-mining footprint in the nursery.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			○ Monitor chemical and physical properties of soil to promote healthy plant growth. ○ Water the revegetated areas daily. δ Site Clearance and Preparation: ○ Remove all temporary structures, waste, rubble, and alien invasive plants (AIPs) before rehabilitation activities commence. ○ Prepare and level sites carefully to avoid disturbance to adjacent natural areas. ○ Backfill pits with excavated waste rock material where feasible and shape remaining disturbed areas to blend with the natural landscape. ○ Shape slopes to gradients conducive to vegetation establishment; where steeper slopes are unavoidable, implement erosion-control measures and provide adequate stormwater management. δ Topsoil and Backfilling Management: ○ Replace stockpiled topsoil to its original depth during rehabilitation. ○ Where stockpiled topsoil is insufficient or unsuitable (e.g., contaminated with		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			AIPs), import appropriate soils to support vegetation re-establishment. ○ Monitor backfilled areas for subsidence and erosion; remediate promptly through infilling, re-profiling, and revegetation. δ Rehabilitation of Surrounding Natural Areas: ○ Rehabilitate any natural areas beyond the authorised footprint that were affected by mining or decommissioning activities, using indigenous species. ○ Rip and profile soils compacted during mining and construction activities outside the footprint, with particular focus on suppressing AIP spread. δ Edge Effects and Alien Invasive Plant (AIP) Control: ○ Manage edge effects such as erosion, dust, and AIP spread adjacent to rehabilitated areas. δ Floral SCC Monitoring: ○ Continue monitoring of rescued and relocated floral SCC until successful		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
VEGETATION MANAGEMENT					
			establishment is confirmed in rehabilitated areas. o Prevent livestock browsing/grazing on recently revegetated areas.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±15 ha	δ General AIP Control: o Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. o Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: o Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases. o Regularly monitor a 30 m buffer surrounding proposed activities for	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
			AIP proliferation and control instances as they arise. o Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal o Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. o Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions o Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. o Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping:		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
			○ Conduct annual monitoring of the AIP control plan, stormwater management, and general housekeeping by the mine Environmental Control Officer (ECO), supported by photographic records. ○ Submit quarterly reports on AIP control to track effectiveness and monitor spread.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±114 ha	δ General AIP Control: ○ Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. ○ Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: ○ Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases. ○ Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise.	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
			○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal ○ Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. ○ Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions ○ Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. ○ Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping ○ Conduct annual monitoring of the AIP control plan, stormwater management, and general		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
			housekeeping by the mine Environmental Control Officer (ECO), supported by photographic records. ○ Submit quarterly reports on AIP control to track effectiveness and monitor spread.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ General AIP Control: ○ Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. ○ Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: ○ Conduct ongoing AIP monitoring, clearing, and control throughout decommissioning phase. ○ Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. ○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated.	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ALIEN INVASIVE PLANT SPECIES CONTROL					
			δ Cleared Vegetation Disposal o Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. o Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions o Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. o Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping o Submit quarterly reports on AIP control to track effectiveness and monitor spread, during the decommissioning phase.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FAUNA MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±14 ha	δ Ensure that a suitable relocation plan is developed and implemented to guide the effective relocation of species, where necessary. δ Ensure that a trained snake handler is available on call, or that a designated staff member is suitably trained to remove snakes safely when encountered. δ Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.	Fauna management must be in accordance with the: δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)	Throughout the site establishment and construction phase.
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ Undertake clearing activities in a phased manner to allow faunal species to move out ahead of disturbance. Where necessary, small/slow-moving species must be assisted and safely relocated. δ Species of Conservation Concern (SCC) and Faunal Protection: o Prior to and during vegetation clearance, inspect footprint and adjacent areas for SCC, including Temminck's Ground Pangolin (*Smutsia temminckii*), protected		Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FAUNA MANAGEMENT					
			burrowing scorpions, and baboon spiders. ○ Safely capture and relocate identified SCC to suitable habitat outside the footprint. For scorpions, conduct night-time UV surveys during summer to aid detection. ○ If avian SCC nests are located, consult a qualified avifaunal specialist to determine appropriate management. Active nests (with eggs or nestlings) must be left undisturbed until fledging, with no mining-related activities within 200 m. ○ All SCC relocation must be carried out by a trained professional/competent staff member, under the guidance of a biodiversity specialist or ECO, and with required permits where applicable. δ General Fauna Management: ○ If snakes, scorpions, baboon spiders, or other fauna are found within buildings or pose risks to staff/infrastructure, they must be carefully captured and relocated outside the footprint by a trained		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FAUNA MANAGEMENT					
			snake handler/competent staff member/ECO. o No collection, hunting, or harm to fauna is permitted by staff or contractors. δ Site Practices and Controls: o Keep night lighting to a minimum, with lights directed inward and downward onto the footprint. Avoid bright white/LED lights; use soft yellow (sodium vapour) or red lights where necessary. δ Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
CULTURAL AND HERITAGE MANAGEMENT					
Site establishment and construction activites.	Site Establishment and Construction Phase	N/A (No heritage sites to be disturbed)	δ Protection of Cemeteries and Burial Sites: o Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone.	Cultural and/or heritage management must be in accordance with the: δ Heritage Management Plan δ NHRA	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
CULTURAL AND HERITAGE MANAGEMENT					
(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)			○ Provide access to family members for all cemeteries and burial sites within the buffer zone. ○ Compile a Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin. δ Include Historical Farmstead (MG003) in the development plans and maintain a 30 m buffer to avoid disturbance. δ Confine all development activities strictly to the approved development footprint. δ Chance Find Procedure: ○ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
CULTURAL AND HERITAGE MANAGEMENT					
			○ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ○ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. δ Work may only continue once the go-ahead was issued by SAHRA.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	N/A (No heritage sites to be disturbed)	δ Protection of Cemeteries and Burial Sites: ○ Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone. ○ Provide access to family members for all cemeteries and burial sites within the buffer zone. ○ Implement the Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin.	Cultural and/or heritage management must be in accordance with the: δ Heritage Management Plan δ NHRA	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
CULTURAL AND HERITAGE MANAGEMENT					
			δ Maintain a 30 m buffer around the Historical Farmstead (MG003) to avoid disturbance. δ Confine all development activities strictly to the approved development footprint. δ Chance Find Procedure: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager must inform the ECO of the chance find and		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
CULTURAL AND HERITAGE MANAGEMENT					
			its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. ○ Work may only continue once the go-ahead was issued by SAHRA.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
PALAEONTOLOGY MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	N/A (No palaeo sites to be disturbed)	δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol: ○ When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the	Paleo management must be in accordance with the: δ Heritage Management Plan δ NHRA	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
PALAEONTOLOGY MANAGEMENT					
			project activities will not be interrupted. ○ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. ○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
PALAEONTOLOGY MANAGEMENT					
			Annual reports must be submitted to SAHRA as required by the relevant permits. ○ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ○ If no fossils are found and the excavations have finished, then no further monitoring is required.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	N/A (No palaeo sites to be disturbed)	δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol: ○ When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the	Paleo management must be in accordance with the: δ Heritage Management Plan δ NHRA	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			PALAEONTOLOGY MANAGEMENT		
			project activities will not be interrupted. ○ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. ○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
PALAEONTOLOGY MANAGEMENT					
			Annual reports must be submitted to SAHRA as required by the relevant permits. ○ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ○ If no fossils are found and the excavations have finished, then no further monitoring is required.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site*	Site Establishment and Construction Phase	±1 549 ha (Area of Responsibility)	δ Local Employment and Skills Development: ○ Prioritise employment of communities surrounding the development, contributing to their growth and development.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
Establishment / Construction Phase)			○ Consider communities most in need of employment at the local level before outsourcing work. ○ Offer training and skills development programmes to employees prior to the commencement of the construction phase. ○ Engage proactively with local stakeholders and implement transparent hiring practices to ensure equitable distribution of employment opportunities. δ Local Procurement and Supplier Engagement: ○ Give preference to suppliers local to the operation where the service or product will be consumed. ○ Adopt a local procurement policy, where feasible, to maximise benefits to the local economy. ○ Prior to the start of construction contractor procurement, identify a database of local companies, particularly Historically Disadvantaged (HD) companies, and inform them about the tender process, inviting them to bid on project-related work where applicable.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
			○ Engage with local authorities and business organisations to investigate the feasibility of sourcing construction materials, goods, and services from local suppliers. δ Government Liaison and Integration: ○ Establish communication and liaison structures with district and local government structures. ○ Liaise with municipal authorities to ensure that group development initiatives are integrated into the broader economic and development plans of the surrounding communities. δ Economic Development and Project Sustainability: ○ Create job opportunities, support local business activities, and contribute to government tax revenues through the development. ○ Continuously review the economic development aspects of the project during implementation to respond to changing needs and ensure long-term sustainability.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±1 549 ha (Area of Responsibility)	δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: ○ Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. ○ Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. ○ Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project. δ Workplace Safety and Risk Management; ○ Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. ○ Provide safety awareness, training, and positive behaviour reinforcement for all personnel.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
			○ Improve system monitoring and analysis to enhance risk management. ○ Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: ○ Strictly control access in and out of the construction area. ○ Ensure access to surrounding properties by construction and/or mining employees is prevented. ○ Identify abandoned buildings and either utilise them safely or ensure they cannot be used for malicious purposes. ○ Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: ○ Implement education, training, and development services for the local community to support skills growth and capacity building. ○ Prepare a comprehensive employee induction programme covering land		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC ENHANCEMENT MEASURES					
			access protocols, fire management, and road safety.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC MITIGATION MEASURES					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±1 549 ha (Area of Responsibility)	δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: ○ Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. ○ Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. ○ Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC MITIGATION MEASURES					
			δ Workplace Safety and Risk Management; o Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. o Provide safety awareness, training, and positive behaviour reinforcement for all personnel. o Improve system monitoring and analysis to enhance risk management. o Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: o Sign surface use agreements with the landowners and give written notice at least 21 calendar days prior to commencement of activities. o Strictly control access in and out of the construction area. o Ensure access to surrounding properties by construction and/or mining employees is prevented. o Identify abandoned buildings and either utilise them safely or ensure		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC MITIGATION MEASURES					
			they cannot be used for malicious purposes. ○ Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: ○ Implement education, training, and development services for the local community to support skills growth and capacity building. ○ Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±1 549 ha (Area of Responsibility)	δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: ○ Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. ○ Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC MITIGATION MEASURES					
			○ Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project. δ Workplace Safety and Risk Management; ○ Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. ○ Provide safety awareness, training, and positive behaviour reinforcement for all personnel. ○ Improve system monitoring and analysis to enhance risk management. ○ Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: ○ Strictly control access in and out of the construction area. ○ Ensure access to surrounding properties by construction and/or mining employees is prevented. ○ Identify abandoned buildings and either utilise them safely or ensure		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SOCIO-ECONOMIC MITIGATION MEASURES					
			they cannot be used for malicious purposes. o Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: o Implement education, training, and development services for the local community to support skills growth and capacity building. o Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±1 549 ha (Area of Responsibility)	δ Introduce re-skilling and training programmes for employees to facilitate transition into other employment sectors, reducing the impact of potential job losses. δ Facilitate workshops and provide funding support for local businesses to explore and access new markets, promoting economic resilience in the community.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD UPGRADE MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±5 km	δ Widen shoulders and improve access at the proposed mine entrance to accommodate turning movements by heavy vehicles. o Design the access road with a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. o Provide bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. o Include shoulders of at least 1.5 m width on either side of the access road to accommodate vehicle recovery and enhance operational safety. δ Install appropriate signage and road markings to improve visibility, particularly at the mine access point. o Maintenance: Implement a regular road maintenance schedule to repair wear and tear and ensure the safe passage of all vehicles.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD UPGRADE MANAGEMENT					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±5 km	δ Maintain widened shoulders and access improvements at the mine entrance to safely accommodate ongoing heavy vehicle traffic during operations. o Ensure the access road continues to provide a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. o Retain bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. o Maintain shoulders of at least 1.5 m width on either side of the access road for vehicle recovery and operational safety. δ Keep all signage and road markings in good condition to support visibility and safe navigation, especially at the mine access point. o Maintenance: Implement ongoing, regular maintenance of the access road during the operational phase to repair wear and tear and ensure safe passage for all vehicles.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD TRAFFIC MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±5 km (Within Mining Area) ±20 km (Makganyane Mine to Beeshoek Mine)	δ Detours and Alternative Routes ○ Designate specific haul routes for mining vehicles. ○ Clearly mark temporary detours to guide traffic around construction areas and avoid residential or sensitive zones. δ Signage and Traffic Control: ○ Install clear, consistent signage to warn drivers of construction activities, speed limits, and detours. ○ Use variable message signs to provide real-time updates on road conditions and traffic changes. δ Working Hours Restrictions: ○ Limit construction traffic to off-peak hours, such as early mornings or late evenings, to reduce congestion. ○ Minimise nighttime operations in noise-sensitive areas. ○ Stagger vehicle movements using shifts to distribute traffic evenly throughout the day. δ Traffic Flow Optimisation:	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD TRAFFIC MANAGEMENT					
			○ Employ traffic control personnel at critical points to manage queues and ensure smooth traffic flow. ○ Stagger vehicle movements to minimise bottlenecks. δ Public Awareness and Communication: ○ Provide local residents and businesses with timely information about traffic patterns, detours, and road closures. ○ Use websites, mobile apps, or other communication channels to help drivers plan alternative routes. δ Monitoring and Evaluation: ○ Continuously monitor traffic conditions using cameras or personnel. ○ Adjust measures as required based on real-time observations. ○ Establish a feedback mechanism for the public to report traffic issues. δ Traffic Management Plan (TMP): ○ Implement a comprehensive TMP to coordinate all traffic-related mitigation measures. ○ Include designated haul routes, signage, scheduling of vehicle		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD TRAFFIC MANAGEMENT					
			movements, and emergency response protocols to ensure safe and efficient movement of all vehicles associated with mining operations.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±5 km (Within Mining Area) ±20 km (Makganyane Mine to Beeshoek Mine)	δ Designated Haul Routes: ○ Maintain clearly defined haul routes for all operational mining vehicles to ensure safe and efficient movement. ○ Avoid routing operational traffic through residential or sensitive areas. δ Signage and Traffic Control: ○ Ensure all permanent signage, including speed limits, heavy vehicle routes, and safety warnings, is clearly visible and maintained. ○ Use variable message signs where needed to provide real-time updates on road conditions or operational changes. δ Traffic Flow Management: ○ Employ traffic control personnel at critical points where operational traffic mixes with local or public traffic. ○ Stagger vehicle movements if necessary to prevent congestion during peak operational hours.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD TRAFFIC MANAGEMENT					
			δ Public Awareness and Communication: o Keep local residents and businesses informed of operational traffic patterns, heavy vehicle schedules, and any temporary disruptions. o Maintain a feedback mechanism for the public to report traffic-related concerns or incidents. δ Monitoring and Evaluation: o Continuously monitor operational traffic conditions to ensure safety and efficiency. o Adjust traffic management measures based on observations and feedback. δ Traffic Management Plan (TMP) o Implement a comprehensive TMP for the operational phase, coordinating all traffic-related measures. o Include permanent haul routes, signage maintenance, scheduling of vehicle movements, and emergency response protocols to ensure safe operations.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF EMPLOYEE TRANSPORT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±5 km (Within Mining Area) ±20 km (Makganyane Mine to Beeshoek Mine)	δ Carpooling and Ride-Sharing Programs: ○ Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. ○ Facilitate this through ride-matching services or designated carpool parking areas. δ Shuttle Services: ○ Provide shuttle buses or vans to transport employees to and from the mining site. ○ Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously. δ Flexible Work Hours: ○ Implement staggered work shifts or flexible working hours to reduce peak-time congestion. ○ Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation ○ Encourage employees to use public transport options where available. ○ Offer subsidies or incentives(if possible) for employees who use	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF EMPLOYEE TRANSPORT					
			buses or other public transport services to reach the site. δ Telecommuting and Remote Work ○ Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. ○ Reduce the need for daily commuting and associated traffic.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±5 km (Within Mining Area) ±20 km (Makganyane Mine to Beeshoek Mine)	δ Carpooling and Ride-Sharing Programs: ○ Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. ○ Facilitate this through ride-matching services or designated carpool parking areas. δ Shuttle Services: ○ Provide shuttle buses or vans to transport employees to and from the mining site. ○ Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF EMPLOYEE TRANSPORT					
			δ Flexible Work Hours: o Implement staggered work shifts or flexible working hours to reduce peak-time congestion. o Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation o Encourage employees to use public transport options where available. o Offer subsidies or incentives (if possible) for employees who use buses or other public transport services to reach the site. δ Telecommuting and Remote Work o Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. o Reduce the need for daily commuting and associated traffic.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD SAFETY MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±5 km (Within Mining Area) ±20 km (Makganyane Mine to Beeshoek Mine)	δ Warning Signs: ○ Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. ○ Ensure signs are maintained and easily visible under all conditions. δ Pedestrian Crossings: ○ Designate safe pedestrian crossings near high-traffic areas or work zones. ○ Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles. δ Guardrails and Barriers: ○ Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. ○ Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring: ○ Establish speed limits appropriate for specific site conditions.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD SAFETY MANAGEMENT					
			○ Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed. δ Adequate Lighting: ○ Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. ○ Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions. δ Safety Training for Drivers: ○ Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles. δ Emergency Access Routes: ○ Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be*	Operational Phase	±5 km (Within Mining Area)	δ Warning Signs: ○ Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD SAFETY MANAGEMENT					
undertaken – 2.2 Operataional Phase)		±20 km (Makganyane Mine to Beeshoek Mine)	steep slopes, sharp turns, or heavy truck traffic. o Ensure signs are maintained and easily visible under all conditions. δ Pedestrian Crossings: o Designate safe pedestrian crossings near high-traffic areas or work zones. o Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles. δ Guardrails and Barriers: o Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. o Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring: o Establish speed limits appropriate for specific site conditions. o Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed.	δ MHSA δ NRTA δ Traffic Management Plan	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
ROAD SAFETY MANAGEMENT					
			δ Adequate Lighting: o Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. o Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions. δ Safety Training for Drivers: o Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles. δ Emergency Access Routes: o Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	Site Establishment and Construction Phase	±1 ha	δ Chemical and Hazardous Material Storage: o All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled, and only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. o PPE must be used when handling chemicals or hazardous substances. δ Spill Prevention and Management: o Oil spill kits must be present on site, with all relevant employees trained in	Chemicals and hazardous materials management must be in accordance with the: δ Emergency Response Plan δ Fire Management Plan δ HSA δ MHSA δ SDS's δ NEM:WA δ OHSA δ Waste Management Plan	Throughout the site establishment and construction phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS					
			their use and emergency response procedures. ○ Drip trays must be used under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. ○ Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons. ○ Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. ○ Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. ○ No contaminated water may be discharged into the natural environment; containment and safe disposal measures must be implemented.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS					
			○ Any significant chemical, fuel, or hazardous substance spill must be reported to the Department of Water and Sanitation and other relevant authorities.		
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±1 ha	δ Chemical and Hazardous Material Storage: ○ All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. ○ Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). ○ Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. ○ Access to chemicals must be controlled, and only authorised staff may handle substances. ○ Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. ○ PPE must be used when handling chemicals or hazardous substances.	Chemicals and hazardous materials management must be in accordance with the: δ Emergency Response Plan δ Fire Management Plan δ HSA δ MHSA δ SDS's δ NEM:WA δ OHSA δ Waste Management Plan	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS					
			δ Spill Prevention and Management: ○ Oil spill kits must be present on site, with all relevant employees trained in their use and emergency response procedures. ○ Drip trays must be used under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. ○ Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons. ○ Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. ○ Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. ○ No contaminated water may be discharged into the natural		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS					
			environment; containment and safe disposal measures must be implemented. ○ Any significant chemical, fuel, or hazardous substance spill must be reported to the Department of Water and Sanitation and other relevant authorities.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MITIGATION OF LIGHTING IMPACT					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±14 ha	δ Use fixtures that direct light downwards to minimise upward light spill, preserving the night sky. δ Install motion sensors so that lights are only activated when necessary, reducing the duration of light emissions. δ Opt for low-intensity lighting that provides sufficient illumination for safety without being overly bright.	Visibility of the mine must be management in accordance with the: δ MPRDA δ NEMA δ EIA Regulations	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MITIGATION OF LIGHTING IMPACT					
			δ Use shields on lights to direct illumination to the intended areas and prevent light spill into unintended areas. δ Ensure that staff are aware of the importance of minimising light pollution and are trained to use lighting efficiently. o Periodic Reviews: Conduct periodic reviews of lighting practices to identify and rectify any unnecessary light emissions.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FIRE MANAGEMENT					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±113 ha	δ Prohibit harvesting of surrounding trees, shrubs, or indigenous vegetation for firewood. δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project.	Fire control and management must be in accordance with the: δ Emergency Response Plan δ Fire Management Plan δ MHSA δ OHSA	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FIRE MANAGEMENT					
			δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas. δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites. δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other “hot work.” Keep a working fire extinguisher immediately at hand.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FIRE MANAGEMENT					
			δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control.		
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	Decommissioning Phase	±264 ha	δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project. δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas. δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical	Fire control and management must be in accordance with the: δ Emergency Response Plan δ Fire Management Plan δ MHSA δ OHSA	Throughout the decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
FIRE MANAGEMENT					
			storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites. δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other “hot work.” Keep a working fire extinguisher immediately at hand. δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control. δ Should the risk increase, retain a reserve of plants in the nursery for revegetation and create effective firebreaks.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF TRANSPORT WITHIN BUFFER OF SOUTHERN EDL					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	Operational Phase	±0.5 ha	δ Use only the approved haul routes between extraction areas and screening/crushing plants. Ensure strict compliance monitoring. δ Maintain all vehicles in good working order. Overloading or use of leaking vehicles or machinery on haul roads is prohibited to prevent spillage. δ Enforce speed limits for all vehicles transporting product along haul roads. δ Avoid unnecessary disturbances surrounding the perimeter of surface infrastructure. δ Regularly wash vehicles on non-permeable surfaces or off-site to prevent the dispersal of alien or invasive plant seeds into freshwater ecosystems. δ Conduct routine inspections of instream infrastructure to monitor debris build-up, structure integrity, erosion, sedimentation, vegetation establishment, and presence of alien or invasive plant species.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
MANAGEMENT OF TRANSPORT WITHIN BUFFER OF SOUTHERN EDL					
			δ Undertake routine maintenance of haul roads and instream infrastructure to prevent concentration of flow and erosion. Maintenance must occur especially after high rainfall events. o Erosion Rehabilitation: If erosion is observed at road crossings, rehabilitate the affected areas by infilling gullies and revegetating with suitable indigenous species. Use sustainably sourced rocks from outside freshwater ecosystems if needed.		

e) Impact Management Actions and Outcomes

Table 111: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MITIGATION OF VISUAL IMPACT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site*	δ Altered landscape and sense of place during construction.	The introduction of construction activities and infrastructure for the proposed MIOM will temporarily alter the visual character of the landscape. The current landscape	Site Establishment and Construction Phase	Control: Implementing proper housekeeping and the proposed mitigation measures.	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MITIGATION OF VISUAL IMPACT					
Establishment / Construction Phase)	δ Visibility of the facility to residents during construction.	will be interspersed with construction equipment, temporary storage, and initial mining structures.			
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Altered landscape and sense of place during operation. δ Visibility of the facility to residents during operation. δ Potential visual impact of operational, safety and security lighting during operation.	The operational phase of the MIOM will introduce a new visual element to the landscape, characterised by the presence of large industrial structures and infrastructure. The presence of these structures can alter the visual harmony and the intrinsic sense of place that residents, workers and visitors associate with the region.	Operational Phase	<u>Control:</u> Implementing proper housekeeping and the proposed mitigation measures.	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Landscape character and visual amenity during decommissioning. δ Site restoration during decommissioning **(Positive Impact).**	The decommissioning phase involves the removal of the proposed MIOM infrastructure, and any other related structures from the site. This process will temporarily disrupt the landscape, potentially leading to a transient alteration in the visual character of the area. The removal process might expose previously covered or altered grounds, leading to a	Decommissioning Phase	<u>Control:</u> Implementing proper housekeeping and the proposed mitigation measures.	Mining will need to adhere to the following standards: δ MPRDA, δ NEMA δ EIA Regulations

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MITIGATION OF VISUAL IMPACT					
		temporary visual contrast in the landscape.			

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
DUST MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Dust and construction impact during contruction. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. δ Nuisance impact (dust)	**Potential environmental aspects:** δ Air quality degradation; δ Vegetation impacts; δ Soil changes; δ Surface water contamination. **Potential HHA aspects:** δ Respiratory irritation; δ Chronic respiratory disease; δ Community nuisance; δ Property and infrastructure soiling; δ Agricultural Impacts.	Site Establishment and Construction Phase	Control: Dust suppression methods, monitoring and proper housekeeping.	Air quality management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1) δ National Dust Control Regulations, GNR 827

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
DUST MANAGEMENT					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. δ Air quality impact on health: all-cause (natural) mortality. δ Air quality impact on health: cardiovascular hospital admissions. δ Air quality impact on health: chronic bronchitis.		Operational Phase	Control: Dust suppression methods, monitoring and proper housekeeping.	Air quality management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1) δ National Dust Control Regulations, GNR 827

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
DUST MANAGEMENT					
	δ Air quality impact on health: acute bronchitis in children. δ Air quality impact on health: lung cancer in adults. δ Nuisance impact (dust). δ Increased air pollution due to increased traffic on the R385.				
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$.		Decommissioning Phase	<u>Control:</u> Dust suppression methods, monitoring and proper housekeeping.	Air quality management must adhere to the following standards: δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1) δ National Dust Control Regulations, GNR 827

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
NOISE MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Noise nuisance caused by site establishment / construction phase. δ Nuisance impact (noise).	**Potential environmental aspects:** δ Disturbance of animal behaviour and breeding patterns; δ Habitat displacement. **Potential HHA aspects:** δ Hearing loss; δ Annoyance and reduced quality of life; δ Property value impacts; δ Potential conflicts with local community members.	Site Establishment and Construction Phase	<u>Control, Remedy and Modify:</u> Noise suppression methods, monitoring and proper housekeeping.	Noise management must adhere to the following standards: δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Noise nuisance caused by mining machinery and operations (excluding blasting). δ Potential blasting noise and vibration nuisance to neighbouring properties. δ Nuisance impact (noise). δ Increased noise pollution due to increased traffic on the R385		Operational Phase	<u>Control, Remedy and Modify:</u> Noise suppression methods, monitoring and proper housekeeping.	Noise management must adhere to the following standards: δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be*	δ Noise nuisance caused during the decommissioning phase.		Decommissioning Phase	<u>Control, Remedy and Modify:</u> Noise suppression methods, monitoring and proper housekeeping.	Noise management must adhere to the following standards:

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
NOISE MANAGEMENT					
undertaken – 2.3 Decommissioning Phase)					δ NEM:AQA 2004 Regulations 6(1) δ NRTA δ Traffic Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOIL MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Loss of land capability δ Soil erosion δ Soil compaction δ Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality. δ As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils	**Potential environmental aspects:** δ Geology; δ Soil; δ Agriculture. **Potential social & economic aspects:** δ Livelihood impacts; δ Food security risks; Displacement or land-use conflicts.	Site Establishment and Construction Phase	<u>Control:</u> Implementation of the mitigation measures proposed in this report and rehabilitation of the mining area upon closure.	Soil must be managed in accordance with the: δ CARA δ Erosion Risk Assessment δ MPRDA δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOIL MANAGEMENT					
	would be agitated and disperse.				
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Loss of land capability. δ Soil erosion. δ Soil compaction. δ Increased fire risk.		Operational Phase	Control: Implementation of the mitigation measures proposed in this report and rehabilitation of the mining area upon closure.	Soil must be managed in accordance with the: δ CARA δ Erosion Risk Assessment δ MPRDA δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ SWMP (Appendix F)
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Loss of land capability δ Soil erosion δ Soil compaction		Decommissioning Phase	Control: Implementation of the mitigation measures proposed in this report and rehabilitation of the mining area upon closure.	Soil must be managed in accordance with the: δ CARA δ Erosion Risk Assessment δ MPRDA δ NEM:BA δ NWA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOIL MANAGEMENT					
					δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
WASTE AND HAZARDOUS SUBSTANCES AND/OR CHEMICALS MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Soil contamination. δ During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality. δ During the construction period it is anticipated that hazardous chemicals and/or materials may be stored and utilized on site. These could pose a risk to the surface water resources.	**Potential environmental aspects:** δ Soil contamination; δ Water pollution; δ Air quality degradation; δ Ecosystem impacts; δ Visual intrusion. **Potential social & livelihood aspects:** δ Human health risks; δ Community nuisance; δ Reduced land usability/ δ Loss of property value.	Site Establishment and Construction Phase	Control & Remedy: Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: δ Emergency Response Plan δ NWA δ NEM:WA δ NEM:WA: National norms and standards for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
WASTE AND HAZARDOUS SUBSTANCES AND/OR CHEMICALS MANAGEMENT					
	δ Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. δ Leaching of contaminants from the WRD into groundwater. δ Ingestion/use of contaminated groundwater (that originated from the WRD). δ Ingestion/use of contaminated surface water (that originated from the WRD).				
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Soil contamination δ Waste water from ablutions potentially impacting the groundwater quality. δ Potential for dirty water to enter the surrounding		Operational Phase	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: δ Emergency Response Plan δ NWA δ NEM:WA δ NEM:WA: National norms and standards

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
WASTE AND HAZARDOUS SUBSTANCES AND/OR CHEMICALS MANAGEMENT					
	watercourses as a result of operations. δ Potential for domestic waste to enter the surrounding watercourses as a result of operations. δ Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations. δ Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. δ Leaching of contaminants from the WRD into groundwater. δ Ingestion/use of contaminated groundwater (that originated from the WRD).				for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
WASTE AND HAZARDOUS SUBSTANCES AND/OR CHEMICALS MANAGEMENT					
	δ Ingestion/use of contaminated surface water (that originated from the WRD).				
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Soil contamination. δ Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. δ Infrastructure decommissioning and waste management. δ Leaching of contaminants from the WRD into groundwater. δ Ingestion/use of contaminated groundwater (that originated from the WRD). δ Ingestion/use of contaminated surface		Decommissioning Phase	<u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: δ Emergency Response Plan δ NWA δ NEM:WA δ NEM:WA: National norms and standards for the storage of waste (GN 926) δ Waste Regulations, 2015 (as amended) δ NEMA (Section 30) δ SWMP (Appendix F) δ Waste Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
WASTE AND HAZARDOUS SUBSTANCES AND/OR CHEMICALS MANAGEMENT					
	water (that originated from the WRD).				

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
GROUNDWATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.	**Potential environmental aspects:** δ Groundwater table changes; δ Flow pattern alteration; δ Aquifer depletion; δ Groundwater contamination; δ Surface water impacts. **Potential human health & social aspects:** δ Water supply risks; δ Water quality risks; δ Livelihood impacts; δ Community conflict.	Site Establishment and Construction Phase	<u>Control, Remedy and Modify:</u> Implementation of the mitigation measures proposed in this report and monitoring of groundwater until closure.	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential impact on the water availability in some of the user boreholes to the North.		Operational Phase	<u>Control, Remedy and Modify:</u> Implementation of the mitigation measures proposed in this report and monitoring of groundwater until closure.	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
GROUNDWATER MANAGEMENT					
	δ The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD **(Positive Impact)**. δ Water quality impact on health.				Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential impact on the water availability in some of the user boreholes to the north. δ The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD **(Positive Impact).**		Decommissioning Phase	<u>Control, Remedy and Modify:</u> Implementation of the mitigation measures proposed in this report and monitoring of groundwater until closure.	Groundwater management must be in accordance with the: δ NWA δ Groundwater Monitoring Programme (Appendix E) δ SWMP (Appendix F) δ NEM:WA δ Waste Regulations, 2015 (as amended)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SURFACE WATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses. δ The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats. δ Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase. δ Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat,	**Potential environmental aspects:** δ Flow regime alteration; δ Reduced downstream flow; δ Increased flooding or erosion; δ Sedimentation; δ Water quality degradation; δ Habitat alteration. **Potential human health & social aspects:** δ Reduced water availability; δ Contaminated water supply; δ Loss of ecosystem services.	Site Establishment and Construction Phase	Control: Consideration of specialist recommendations and implementation of the SWMP. Stop: Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SURFACE WATER MANAGEMENT					
	diversity, and SCC during the planning phase.				
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality. δ Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses. δ Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase. δ Potential impact on the Freshwater Habitat: PFP		Operational Phase	<u>Control:</u> Consideration of specialist recommendations and implementation of the SWMP. <u>Stop:</u> Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SURFACE WATER MANAGEMENT					
	and diversity during the mining phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the mining phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase.				
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential impact on the Freshwater Habitat: EDL and diversity during the decommissioning phase. δ Potential impact on the Freshwater Habitat: PFP and diversity during the decommissioning phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat and diversity during the decommissioning phase.		Decommissioning Phase	<u>Control:</u> Consideration of specialist recommendations and implementation of the SWMP. <u>Stop:</u> Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SURFACE WATER MANAGEMENT					
	δ Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the decommissioning phase.				

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
STORMWATER MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs.	**Potential environmental aspects:** δ Flow regime alteration; δ Reduced downstream flow; δ Increased flooding or erosion; δ Sedimentation; δ Water quality degradation; δ Habitat alteration. **Potential human health & social aspects:** δ Reduced water availability; δ Contaminated water supply;	Site Establishment and Construction Phase	Control: Consideration of specialist recommendations and implementation of the SWMP.	Stormwater management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
STORMWATER MANAGEMENT					
		δ Loss of ecosystem services.			

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MANAGEMENT OF DEVELOPMENT WITHIN BUFFERS OF EDLs					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL. δ Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of regulation (DWS) of the southern EDL) as the first step of open cast mining. δ Creation of the stockpile within the immediate	**Potential environmental aspects:** δ Flow regime alteration; δ Reduced downstream flow; δ Increased flooding or erosion; δ Sedimentation; δ Water quality degradation; δ Habitat alteration. **Potential human health & social aspects:** δ Reduced water availability; δ Contaminated water supply; δ Loss of ecosystem services.	Site Establishment and Construction Phase	Control: Consideration of specialist recommendations and implementation of the SWMP. Stop: Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MANAGEMENT OF DEVELOPMENT WITHIN BUFFERS OF EDLs					
	catchment of the northern EDL. δ Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).				
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Undertaking of open cast mining (including blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2). δ Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation (ZoR) of the southern EDL. δ Transport of product from Pit 2 to the primary beneficiation plant		Operational Phase	<u>Control:</u> Consideration of specialist recommendations and implementation of the SWMP. <u>Stop:</u> Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
MANAGEMENT OF DEVELOPMENT WITHIN BUFFERS OF EDLs					
	(offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR. δ Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL. δ Operation and maintenance of the upgraded road crossings within the EDLs.				
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs. δ Post-closure management activities.		Decommissioning Phase	<u>Control:</u> Consideration of specialist recommendations and implementation of the SWMP. <u>Stop:</u> Demarcation of buffer areas.	Surface water management must be in accordance with the: δ NWA δ Surface Water Monitoring Programme δ SWMP (Appendix F)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
VEGETATION MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase. δ Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase. δ Potential impact on the ESA during the pre-construction and planning phase.	**Potential environmental aspects:** δ Habitat loss and fragmentation; δ Altered species composition; δ Soil and microclimate changes; δ Reduced infiltration; δ Loss of soil fertility; δ Loss of keystone species. **Potential social & livelihood aspects:** δ Loss of ecosystem services; δ Reduced grazing potential; δ Lower agricultural productivity.	Site Establishment and Construction Phase	<u>Control:</u> Consideration of specialist recommendations, demarcation of buffer areas, monitoring and the control of AIP.	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Vegetation Management Plan
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase. δ Potential impact on the Olifantshoek Plains Thornveld habitat and		Operational Phase	<u>Control:</u> Consideration of specialist recommendations, demarcation of buffer areas, monitoring and the control of AIP.	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
VEGETATION MANAGEMENT					
	diversity during the mining phase. δ Potential impact on the ESA during the mining phase.				Closure Plan (Appendix H1) δ Vegetation Management Plan
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase. δ Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase. δ Potential impact on the ESA during the decommissioning phase.		Decommissioning Phase	<u>Control:</u> Consideration of specialist recommendations, demarcation of buffer areas, monitoring and the control of AIP.	Vegetation management must be in accordance with the: δ Alien Invasive Plant Species Plan δ Fire Management Plan δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Vegetation Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
ALIEN INVASIVE PLANT SPECIES CONTROL					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential infestation of the footprint area by invasive plant species.	**Potential environmental aspects:** δ Altered species composition; δ Soil and microclimate changes; δ Reduced infiltration; δ Loss of keystone species. **Potential social & livelihood aspects:** δ Loss of ecosystem services; δ Reduced grazing potential; δ Lower agricultural productivity.	Site Establishment and Construction Phase	Control: Consideration of specialist recommendations, monitoring and the control of AIP.	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential infestation of the mining footprint with invasive plant species.		Operational Phase	Control: Consideration of specialist recommendations, monitoring and the control of AIP.	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
ALIEN INVASIVE PLANT SPECIES CONTROL					
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential infestation of the rehabilitated areas with invasive plant species.		Decommissioning Phase	Control: Consideration of specialist recommendations, monitoring and the control of AIP.	Invasive plant management must be in accordance with the: δ Alien Invasive Plant Species Plan δ CARA δ National List of Invasive Species δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
FAUNA MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase. δ Potential impact on the Olifantshoek Plain	**Potential environmental aspects:** δ Habitat loss and fragmentation; δ Altered species composition; δ Loss of keystone species.	Site Establishment and Construction Phase	Control: Consideration of specialist recommendations and monitoring.	Fauna management must be in accordance with the: δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
FAUNA MANAGEMENT					
	Thornveld faunal habitat, diversity, and SCC during the planning phase.	**Potential social & livelihood aspects:** δ Loss of ecosystem services.			
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase. δ Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase. δ Wildlife disruption due to increased traffic on the R385.		Operational Phase	<u>Control:</u> Consideration of specialist recommendations and monitoring.	Fauna management must be in accordance with the: δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
FAUNA MANAGEMENT					
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase. δ Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the decommissioning phase.		Decommissioning Phase	<u>Control:</u> Consideration of specialist recommendations and monitoring.	Fauna management must be in accordance with the: δ NEM:BA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
CULTURAL AND HERITAGE MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. δ Potential physical disturbance of the burial sites and/or its context. δ Potential physical disturbance of the historical farmhouse.	**Potential environmental aspects:** δ Loss or damage to physical heritage resources; δ Contextual alteration; δ Disturbance or loss of culturally significant sites; **Potential social & livelihood aspects:** δ Loss of cultural traditions; δ Community conflict.	Site Establishment and Construction Phase	<u>Control:</u> Consideration of specialist recommendations. <u>Stop & Modify:</u> Demarcation of no-go areas and chance find procedures.	Cultural and/or heritage management must be in accordance with the: δ Heritage Management Plan δ NHRA
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. δ Potential physical disturbance of the burial sites and/or its context. δ Potential physical disturbance of the historical farmhouse.		Operational Phase	<u>Control:</u> Consideration of specialist recommendations. <u>Stop & Modify:</u> Demarcation of no-go areas and chance find procedures.	Cultural and/or heritage management must be in accordance with the: δ Heritage Management Plan δ NHRA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
PALAEONTOLOGY MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Potential impact to fossil heritage.	**Potential environmental aspects:** δ Loss of fossil resources. **Potential social & livelihood aspects:** δ Loss of cultural traditions; δ Community conflict.	Site Establishment and Construction Phase	<u>Control:</u> Consideration of specialist recommendations. <u>Stop & Modify:</u> Demarcation of no-go areas and chance find procedures.	Palaeo management must be in accordance with the: δ Heritage Management Plan δ NHRA
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Potential impact to fossil heritage.		Operational Phase	<u>Control:</u> Consideration of specialist recommendations. <u>Stop & Modify:</u> Demarcation of no-go areas and chance find procedures.	Palaeo management must be in accordance with the: δ Heritage Management Plan δ NHRA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOCIO-ECONOMIC ENHANCEMENT & MITIGATION MEASURES					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site*	δ Employment opportunities and skills development **(Positive Impact).**	**Potential environmental aspects:** δ Indirect environmental pressure; δ Land use changes.	Site Establishment and Construction Phase	<u>Control & Stop:</u> Implementation of the proposed mitigation measures and proper human resources management.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOCIO-ECONOMIC ENHANCEMENT & MITIGATION MEASURES					
Establishment / Construction Phase)	δ Economic multiplier effects **(Positive Impact).** δ Influx of jobseekers and change in population. δ Safety and security impacts. δ Increased pressure on local services/resources.	**Potential social & livelihood aspects:** δ Employment opportunities; δ Skills development; δ Economic stimulation; δ Health and safety concerns.			δ MPRDA δ NEMA δ SLP (Appendix T)
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Direct and indirect employment opportunities **(Positive Impact).** δ Economic multiplier effect **(Positive Impact).** δ Contribution to local economic development and socio-economic upliftment **(Positive Impact).**		Operational Phase	<u>Control & Stop:</u> Implementation of the proposed mitigation measures and proper human resources management.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SOCIO-ECONOMIC ENHANCEMENT & MITIGATION MEASURES					
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.3 Decommissioning Phase)*	δ Loss of employment opportunities and economic changes. δ Environmental restoration and land use changes **(Positive Impact).**		Decommissioning Phase	<u>Control & Stop:</u> Implementation of the proposed mitigation measures and proper human resources management.	Socio-economic management must be in accordance with the: δ BBBEE δ MHSA δ Mining Charter δ MPRDA δ NEMA δ SLP (Appendix T)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
ROAD AND TRAFFIC MANAGEMENT					
Site establishment and construction activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.1 Site Establishment / Construction Phase)*	δ Impact on local infrastructure and traffic during construction.	**Potential environmental aspects:** δ Air quality degradation; δ Noise pollution; δ Soil erosion and runoff; δ Vegetation loss. **Potential social & livelihood aspects:**	Site Establishment and Construction Phase	<u>Control:</u> Implementing of the specialist recommendations and continuous road condition monitoring.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
ROAD AND TRAFFIC MANAGEMENT					
Operational activites. *(Part A(1)(d)(ii) Description of the activities to be undertaken – 2.2 Operataional Phase)*	δ Traffic congestion on the R385 due to mining activities. δ Road wear and tear of the R385 due to mining activities. δ Safety concerns and accidents on R385 due to mining activities. δ Community disruption due to increased traffic on the R385.	δ Traffic safety risks; δ Community nuisance; δ Access disruption; δ Economic impacts.	Operational Phase	<u>Control:</u> Implementing of the specialist recommendations and continuous road condition monitoring.	Road and traffic management must be in accordance with the: δ Emergency Response Plan δ Erosion Risk Assessment δ MHSA δ NRTA δ Traffic Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
POTENTIAL RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK					
Decommissioning activites. *(Part A(1)(d)(ii) Description of the activities to be*	δ Veld fires affecting sensitive areas such as the nursery and/or revegetated areas.	**Potential environmental aspects:** δ Soil resources; δ Surface water resources;	Decommissioning Phase	<u>Control:</u> Implementing of the specialist recommendations and continuous monitoring of the rehabilitation activities.	All rehabilitation related activities must be in accordance with the: δ MPRDA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
POTENTIAL RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK					
undertaken – 2.3 Decommissioning Phase)	δ Possible development of subsided areas after rehabilitation. δ Potential for crack development after rehabilitation. δ Insufficient topsoil and subsoil available for rehabilitation. δ Potential of topsoil being diluted and chemically deficient to be used during rehabilitation. δ Potential contamination of soils. δ Potential chemical changes in topsoil and subsoil leading to toxicity. δ Dust pollution during the decommissioning phase. δ Potential for wind and water erosion of the denuded areas.	δ Groundwater resources; δ Air quality; δ Fauna and flora; δ Ecosystem processes. **Potential social & livelihood aspects:** δ Livelihood and land use; δ Community nuisance; δ Aesthetic and recreational value.			δ NEMA δ NEM:BA δ NEM:WA δ Waste Regulations, 2015 (as amended) δ CARA δ NWA δ MHSA δ Rehabilitation, Decommissioning and Closure Plan (Appendix H1) δ Emergency Response Plan δ Erosion Risk Assessment δ SWMP (Appendix F) δ Waste Management Plan δ Groundwater Monitoring Programme (Appendix E) δ Dust Management Plan δ NEM:AQA 2004 Regulations 6(1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
POTENTIAL RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK					
	δ Sedimentation of EDL's and PFPs due to water erosion from denuded areas. δ Potential of surface water pollution flowing into the mining area. δ Potential groundwater depletion and/or pollution due to mining activities. δ Invasive plant species establishing in the rehabilitated areas. δ Potential failure of the nursery that may threaten the rehabilitation process. δ Potential impact of livestock browsing/grazing on revegetated areas. δ Potential failure of revegetation of the mined areas.				δ National Dust Control Regulations, GNR 827 δ Alien Invasive Plant Species Plan δ Fire Management Plan δ Vegetation Management Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
POTENTIAL RESIDUAL AND/OR LATENT ENVIRONMENTAL RISK					
	δ Potential hunting, trapping, trafficking and plant harvesting. δ Potential degradation of the surrounding areas. δ Potential failure of rehabilitation.				

i) Financial Provision

(1) Determination of the amount of Financial Provision.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

In accordance with regulatory requirements, the closure objectives for the MIOM have been formulated to achieve a safe, stable, and sustainable post-mining landscape. These objectives are not defined in isolation but are directly informed by the findings of the baseline environmental studies, including (but not limited to) soil, land capability, hydrology, biodiversity, and ecological assessments. Alignment with the baseline environment ensures that rehabilitation and closure measures restore the site as far as practicable to conditions resembling the pre-mining wilderness ecosystem, while also addressing site-specific constraints such as shallow soils, arid climate, and sensitive biodiversity features. The table below illustrates how each closure objective is explicitly linked to baseline environmental conditions, thereby demonstrating both the rationale for their selection and the extent of their alignment.

Table 112: Closure objectives and alignment with baseline environment.

CLOSURE OBJECTIVE	ALIGNMENT WITH BASELINE ENVIRONMENT
Minimise negative impacts within the demarcated mining footprint.	The baseline surveys (soil, flora, fauna, hydrology) identified sensitive ecosystems within the project area. Restricting impacts to the defined footprint prevents additional disturbance to intact wilderness and biodiversity outside the mining area.
Prevent negative impacts outside the mining footprint.	Baseline terrestrial and freshwater assessments recorded surrounding wilderness and aquatic habitats. Ensuring no off-site impacts maintains connectivity and ecological integrity.
Remove all equipment, infrastructure and materials introduced during operations.	The baseline environment was a largely undisturbed wilderness area intersected by areas previously prospecting areas. Removing introduced elements restores land to as natural state as possible and eliminates sources of pollution and habitat fragmentation.
Reshape the mining footprint to approximate pre-mining topography (stable gradients, sustainable landforms).	Baseline topography consisted of stable wilderness terrain. Reshaping ensures landforms mimic natural geomorphology, minimising erosion and supporting ecosystem recovery.

CLOSURE OBJECTIVE	ALIGNMENT WITH BASELINE ENVIRONMENT
Stabilise Pits 1 and 2 and the waste rock dump into sustainable landforms.	Baseline land capability assessments indicated wilderness potential, with shallow soils and natural rocky features. Stabilising artificial features ensures it integrate safely with the baseline wilderness setting.
Remove unsafe edges in pits and waste rock dump.	Baseline conditions had no steep hazardous edges. This objective reduces physical risks to humans, livestock, and wildlife while restoring a safer natural landform.
Ensure adequate, non-toxic, non-compacted soils for vegetation growth.	Soil surveys found shallow, low-fertility soils (Mispah/Glenrosa) supporting natural vegetation. Closure objectives align by ensuring soils are suitable for indigenous species adapted to these baseline conditions.
Eliminate visible erosion within and downstream of the mining footprint.	Baseline erosion risk was low under natural vegetation cover. Closure aims to restore this state by stabilising disturbed soils and slopes.
Prevent water pollution/toxicity in pits, boreholes and neighbouring farms.	Baseline groundwater and surface water were of acceptable quality, supporting limited domestic and ecological use. Closure targets aim to maintain or restore this baseline water quality.
Eradicate all alien and invasive plants from the rehabilitation area.	Baseline biodiversity assessments recorded indigenous vegetation. Eradication of alien and invasive species aligns closure with the original floristic composition and ecological functioning.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This report, the draft EIAR & EMPR, includes all the environmental objectives in relation to closure and will be available for perusal by the landowners, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR will be incorporated into the Final EIAR & EMPR.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The Preliminary Rehabilitation Map is attached as Appendix H2.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation plan is inherently compatible with the closure objectives, as it has been developed to give effect to the desired post-mining land use and

ecological outcomes identified in the baseline assessments. Key measures such as progressive rehabilitation during operations, topsoil conservation and amelioration, shaping of landforms to stable gradients, active erosion control, and the re-establishment of indigenous vegetation directly support the achievement of closure objectives related to land stability, ecosystem restoration, and water quality protection. The plan further includes alien plant eradication, nursery propagation of locally sourced species, and ongoing monitoring, all of which align with objectives to restore biodiversity and ecological function comparable to the pre-mining wilderness state. Because each rehabilitation intervention is explicitly designed to address site-specific risks and environmental conditions, it can be confirmed that the rehabilitation plan is fully compatible with, and will contribute to the achievement of, the closure objectives.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The calculation of the quantum for financial provision was according to the Guideline Document for the Evaluation for the Quantum of Closure Related to Financial Provision Provided by a Mine, generated by the DMPR.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	δ Braunite δ Diamonds (general) δ Goethite δ Hausmannite δ Hematite δ Iron ore δ Limonite δ Magnetite δ Manganese ore δ Manganite δ Psilomelane δ Pyrolusite δ Rhodochrosite δ Siderite
Saleable mineral by-product	None

Risk ranking

According to Tables B.12, B.13 and B.14

Primary risk ranking (either Table B.12 or B.13	C (Low risk)
Revised risk ranking (B.14)	N/A

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine area	Medium

Level of information

According to Step 4.2:

Level of information available	Extensive

Identify closure components.

According to Table B.5 and site-specific conditions

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS (CIRCLE YES OR NO)	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	NO
2(A)	Demolition of steel buildings and structures	-	NO
2(B)	Demolition of reinforced concrete buildings and structures	-	NO
3	Rehabilitation of access roads	YES	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	NO
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	NO
5	Demolition of housing and facilities	YES	-
6	Opencast rehabilitation including final voids and ramps	YES	-
7	Sealing of shafts, adits and inclines	-	NO
8(A)	Rehabilitation of overburden and spoils	YES	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	YES	-

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS (CIRCLE YES OR NO)	
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	**NO**
9	Rehabilitation of subsided areas	**YES**	-
10	General surface rehabilitation, including grassing of all denuded areas	**YES**	-
11	River diversions	-	**NO**
12	Fencing	**YES**	-
13	Water management (Separating clean and dirty water, managing polluted water, and managing the impact on groundwater)	**YES**	-
14	2 to 3 years of maintenance and aftercare	**YES**	-

Unit rates for closure components

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	43	1.00
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	477	1.00
6	Opencast rehabilitation including final voids and ramps	242 984	1.00
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	166 847	1.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	207 805	1.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	139 710	1.00
10	General surface rehabilitation, including grassing of all denuded areas	132 171	0.50
11	River diversions	-	-
12	Fencing	151	1.00

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
13	Water management (Separating clean and dirty water, managing polluted water, and managing the impact on groundwater)	50 255	1.00
14	2 to 3 years of maintenance and aftercare	17 589	1.00

Determine weighting factors.

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.00

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision.

Table 113: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	**Makganyane Iron Ore Mine**			**Location:**	**Postmasburg**		
Evaluators:	**Mr NS Wilson**			**Date:**	**03 September 2025**		
No	**Description**	**Unit**	**A Quantity**	**B Master rate**	**C Multiplication factor**	**D Weighting factor 1**	**E=A *B*C*D Amount (rands)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	17.40	1.00	1.00	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	238.71	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	351.79	1.00	1.00	R 0.00
3	Rehabilitation of access roads	m^2	50 000	42.72	1.00	1.00	R 2 136 000.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	414.61	1.00	1.00	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	226.15	1.00	1.00	R 0.00
5	Demolition of housing and/or administration facilities	m^2	2 500	477.42	1.00	1.00	R 1 193 550.00
6	Opencast rehabilitation including final voids and ramps	ha	40	242 984.15	1.00	1.00	R 9 719 366.00
7	Sealing of shaft, audits, and inclines	m^3	0	128.15	1.00	1.00	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	90	166 847.44	1.00	1.00	R 15 016 269.60
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	2	207 805.47	1.00	1.00	R 415 610.94

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	603 565.59	1.00	1.00	R 0.00
9	Rehabilitation of subsided areas	ha	6	139 709.60	1.00	1.00	R 838 257.60
10	General surface rehabilitation	ha	264	132 171.31	0.50	0.50	R 8 723 306.46
11	River diversions	ha	0	132 171.31	1.00	1.00	R 0.00
12	Fencing	m	6 100	150.77	1.00	1.00	R 919 697.00
13	Water Management	ha	264	50 255.25	1.00	1.00	R 13 267 386.00
14	2 to 3 years of maintenance and aftercare	ha	264	17 589.34	1.00	1.00	R 4 643 585.76
15(A)	Plant and animal search and rescue	Sum	1	-	-	-	R 342 872.50
15(B)	Nursery establishment	Sum	1	-	-	-	R 1 462 480.30
15(C)	Nursery manager and staff salaries and training (10 years)	Sum	1	-	-	-	R 12 259 101.20
15(D)	Provincial and national plant and animal permits	Sum	1	-	-	-	R 58 650.00
15(E)	Soil physical and chemical testing before mining and during rehabilitation (10 tests)	Sum	1	-	-	-	R 87 400.00
15(F)	Erosion risk assessment and management plan	Sum	1	-	-	-	R 31 050.00
15(G)	Vegetation, faunal and ecosystem assessment before closure.	Sum	1	-	-	-	R 92 287.50
						Sum of items 1 to 15 above	R 71 206 870.86
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.00		R 71 206 870.86		**Sub Total 1**	R 71 206 870.86

1	Preliminary and General	12% of Subtotal 1	R 8 544 824.50
2	Contingency	10.0% of Subtotal 1	R 7 120 687.09
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 86 872 382.45
		Vat (15%)	R 13 030 857.37
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 99 903 239.82**

According to the above calculations, the amount that will be necessary for the rehabilitation of damages caused by the operation, both at sudden closure during the normal operation of the project and at final, planned closure gives a sum of R 99 903 239.82.

(f) Confirm that the financial provision will be provided as determined.

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including,

f) Monitoring of Impact Management Actions,
g) Monitoring and reporting frequency,
h) Responsible persons,
i) Time period for implementing impact management actions,
j) Mechanism for monitoring compliance.

1. SITE ESTABLISHMENT / CONSTRUCTION PHASE

Table 114: Mechanisms for monitoring compliance, assessing performance against the EMPR, and reporting: Site-Establishment and Construction Phase.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
VISUAL IMPACTS	<u>Visual Characteristics</u> δ Altered landscape and sense of place during construction. δ Visibility of the facility to residents during construction.	δ Parking- and dedicated storage areas for equipment. δ Good housekeeping practices.	<u>Responsible Person</u> δ Site Manager and Environmental Control Officer (ECO) to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent Environmental Assessment Practitioner (EAP) during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			<u>Mitigation / Monitoring to be Implemented</u> δ Restrict construction activities to the minimum footprint required for the development by confining work to localised areas. δ Minimise the height and visibility of temporary structures and use natural colours and materials that blend with the environment. δ Use natural topography, existing vegetation, landscaping, or planted vegetative screens to reduce visual intrusion at sensitive viewpoints. δ Post-construction, prioritise revegetation efforts, especially in areas that will not be used during the operational phase. δ Engage with the local community and stakeholders in the surrounding area to understand their values and concerns related to the landscape and sense of place. δ Reduce light pollution by limiting night-time construction activities where possible, and by using downward directed, shielded lighting.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
DUST MANAGEMENT	<u>Air Quality</u> δ Dust and construction impact during contruction. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. δ Nuisance impact (dust)	<u>Monitoring Programme</u> δ Dust Management Plan. δ Fall-out dust monitoring per ASTM D1739 (SANS 1137:2012). <u>Requirements</u> δ Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. δ Signage that clearly reduce the speed on the internal roads. δ Maintenance schedule to remove excess dust from the crusher plant. δ Cover crop to re-vegetate denuded areas.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Fallout dust monitoring by qualified service provider. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Regularly suppress dust on exposed surfaces, haul roads, and stockpiles using water and/or approved environmentally friendly dust suppressants. Increase application frequency during dry or windy conditions. δ Enforce a maximum speed limit of 30 km/h on all internal roads. Install signage and ensure compliance to minimise dust kick-up. δ Install dust screens, windbreaks, or enclosures around crushers, stockpiles, waste rock dumps, and open pits to reduce wind-blown dust. Ensure control efficiencies align with those recommended in the	δ Daily compliance monitoring by site management and ECO. δ Weekly cleaning of dust and fines at crusher plant. δ Monthly monitoring of dust suppression equipment by ECO. δ Monthly fallout dust reporting by qualified service provider. δ Bi-annual review of effectivity of dust monitoring measures by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. δ Promptly rehabilitate inactive areas. Seed topsoil stockpiles with indigenous grass species within 30 days of formation and re-vegetate disturbed areas with indigenous plants to stabilise soil. δ Install and maintain water sprayers at crushers and conveyor transfer points. Fit conveyor belts with skirts or strips to reduce fine particle escape. Remove compacted dust and spillage weekly to prevent secondary emissions. δ Ensure all loads are levelled and securely covered during transport to prevent spillage and windblown dust. δ Pause or reschedule dust-generating activities during strong winds or adverse weather conditions. δ Implement a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Inspect suppression equipment monthly and review effectiveness bi-annually, adjusting as needed.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) can reduce harmful emissions.	
NOISE MANAGEMENT	<u>Noise Ambiance</u> δ Noise nuisance caused by site establishment / construction phase. δ Nuisance impact (noise)	<u>Monitoring Programme</u> δ Noise Management Plan. δ Personal noise exposure monitoring by occupational hygienist (SANS 10083:2004; SANS 10103:2008). <u>Requirements</u> δ Personal noise exposure monitoring equipment. δ Signage indicating noise zones.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Noise monitoring by qualified service provider. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and construction machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004,	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by qualified service provider. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict noisy construction activities to daytime hours where possible, and avoid early mornings, late evenings, or weekends when residents are more likely to be at home. δ Maintain open communication with the local community about construction schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Installing barriers or planting vegetation around mining sites to help reduce noise pollution.	
SOIL MANAGEMENT	<u>Geology, Soils and Agricultural Sensitivity</u> δ Loss of land capability δ Soil erosion δ Soil compaction	<u>Monitoring Programme</u> δ Erosion Risk Assessment. <u>Requirements</u> δ Earthmoving equipment to strip and stockpile the topsoil.	<u>Responsible Person</u> δ Site Manager, ECO and rehabilitation specialist/nursery staff to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management, ECO, and rehabilitation specialist/nursery staff. δ Monthly recording of topsoil and subsoils volume stripped and stockpiled.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
	δ Increased risk of erosion resulting in increased sediments entering the watercourses resulting in changes to water quality. δ As a result vegetation clearing, removal of topsoil for opencast mining activities and the development of roads, it is anticipated that soils would be agitated and disperse.	δ Baseline soil nutrient results. δ Signage to identify Topsoil Stockpiles. δ Stormwater control infrastructure. δ Designated team to control invasive and/or alien plant species that may germinate on the topsoil heaps. δ Cover crop to vegetate topsoil heaps (when needed) and reinstated soil.	<u>Mitigation / Monitoring to be Implemented</u> δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land. δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed. δ Remove vegetation only where absolutely necessary and rehabilitate areas promptly where possible. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential.	δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the 'cut and cover' technique when feasible to avoid unnecessary stockpiling. δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed). δ Keep monthly records of the volumes of topsoil and subsoils stripped and stockpiled. δ Test soil nutrient levels to establish baseline data for comparison during rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events and infestation with invasive plant species. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Strip soils when moisture content is as low as possible. If soils must be moved when wet, use	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			trucks and shovels rather than bowl scrapers to reduce compaction. δ Appoint a competent Environmental Control Officer (ECO) to oversee construction phase activities, with watercourse areas as a priority. δ Complete and implement an Erosion Risk Assessment and Management Plan prior to commencement. Focus erosion control on areas identified as highest risk. δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
WASTE MANAGEMENT	<u>Waste Management</u> δ Soil contamination. δ During the construction period it is anticipated that domestic waste will be generated by staff and contractors. The potential of domestic waste entering the watercourses exists, affecting water quality. δ During the construction period it is anticipated that hazardous chemicals and/or materials may be stored and utilized on site. These could pose a risk to the surface water resources. δ Contaminated run-off/stormwater from	<u>Monitoring Programme</u> δ Waste Management Plan. δ Hazardous Substance Register. δ Formal Inspection Programme Register. δ Stormwater Management Plan. δ Emergency Response Plan. <u>Requirements</u> δ Formal waste disposal system with waste registers. δ Drip trays.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ EMPR Implementation and Environmental Awareness o Ensure the EMPR is accessible to all contractors and employees on site. o Conduct environmental awareness induction for all personnel, covering littering prevention, spill reporting, fire safety, and general housekeeping. δ Waste Management Plan o Develop and implement a waste management plan and emergency response plan for all project phases, aligned with the waste hierarchy of the NEM:WA. o Prohibit burial or burning of general waste (except for inert WRD material).	δ Daily compliance monitoring by site management and ECO. δ Weekly inspection of bunded areas by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
	waste rock dump (WRD) into unnamed stream. δ Leaching of contaminants from the WRD into groundwater. δ Ingestion/use of contaminated groundwater (that originated from the WRD). δ Ingestion/use of contaminated surface water (that originated from the WRD).	δ Covered refuse bins for both hazardous- and general waste. δ Oil spill kit. δ Bunded areas with impermeable surface. δ Safety Data Sheets. δ Stormwater control infrastructure.	○ Place hazardous and general waste in separately marked, sealable bins at designated areas. Remove and dispose of waste at registered waste facilities or landfill sites as applicable. ○ Place domestic waste in predefined storage areas located outside the 100-year floodline and ensure regular inspection and maintenance of cleanliness. δ Vehicle, Equipment, and Fuel Management ○ Conduct all vehicle maintenance, repairs, and services in the designated workshop or service area. Emergency repairs on site must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with proof filed for auditing purposes. ○ Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling to prevent drips. ○ Keep vehicles and equipment in designated areas outside the 100-year floodline. δ Ablution Facilities: ○ Provide adequate ablution facilities for all employees. Ensure facilities do not cause	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			pollution, health hazards, or secondary pollution from waste or sewage. o Locate facilities outside the floodplain and maintain cleanliness throughout project phases. δ Salvage Yard and Site Cleanliness: o Drain all hydrocarbons from equipment, tools, or vehicles before placement in a salvage yard. Maintain the yard's cleanliness and remove unwanted materials regularly. o At project completion, ensure all decommissioned and rehabilitated areas are cleared of waste. δ General Environmental Practices: o Ensure continuous monitoring of site housekeeping, waste management, and compliance with all environmental protocols.	
GROUNDWATER MANAGEMENT	<u>Geohydrology</u> δ Generation of the stockpile area and WRD affecting the groundwater recharge and/or quality.	<u>Monitoring Programme</u> δ Groundwater Monitoring Programme (Appendix E) δ Emergency Response Plan.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Groundwater specialist to monitor groundwater level and quality.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of groundwater level and quality by appropriately qualified specialist.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Waste Management Plan. δ Stormwater Management Plan. <u>Requirements</u> δ Copy of Water Use Authorisation. δ Groundwater monitoring equipment. δ Water quality monitoring results. δ Stormwater control infrastructure.	δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Design and construct the Waste Rock Dump (WRD) in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of groundwater monitoring. Use existing exploration boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities. δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical	δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			constituents normally associated with iron ore mining and related activities. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
SURFACE WATER MANAGEMENT	<u>Hydrology & Freshwater Ecosystems</u> δ Increase in hard standing areas, resulting in potentially higher surface flow entering the nearby watercourses. δ The current project footprint is located within the vicinity of existing drainage lines. As such, stream diversions may be required that could impact the riverine habitats.	<u>Monitoring Programme</u> δ Surface water sampling and monitoring. δ Emergency Response Plan. δ Stormwater Management Plan. δ Waste Management Plan. <u>Requirements</u> δ Copy of Water Use Authorisation. δ Surface water monitoring equipment.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Hydrologist to monitor surface water quality. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Limit the construction footprint to a RoW with a 5 m buffer upstream and downstream of any freshwater ecosystem crossing to prevent indiscriminate movement of mining equipment. δ Mark all delineated water resources as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of surface water quality (if water available) by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
	δ Potential impact on the Freshwater Habitat: EDL and diversity during the pre-construction and planning phase. δ Potential impact on the Freshwater Habitat: PFP and diversity during the pre-construction and planning phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal habitat, diversity, and SCC during the planning phase.	δ Water quality monitoring results. δ Stormwater control infrastructure.	δ Locate all future mining activities away from water resources and associated floodlines wherever possible. δ Treat instream activities, such as stream diversions or channel modifications, as least favourable options and avoid them unless essential. δ Conduct any required instream activities during the dry period to minimise erosion and inundation risks. δ When upgrading informal roads crossing freshwater ecosystems, ensure the delineated extent of the ecosystem is respected. Expand the road on the side opposite the freshwater feature to maintain the natural buffer. δ Stockpile any materials used for road upgrades (e.g., gravel) outside the delineated freshwater ecosystems and preferably outside the 48 m ecological buffer. Stockpiles may not exceed 2 m in height and must be protected from wind using tarpaulins. δ During excavation, any soil, sediment, or silt removed from the freshwater ecosystem may be temporarily stockpiled within the construction RoW	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			but outside the delineated freshwater ecosystem. Stockpiles may not exceed 2 m in height, and their footprint must be minimised. Excavated materials must remain uncontaminated, with minimal mixing of lower and upper soil layers for later use as backfill or rehabilitation material. Temporary stockpiles must be disposed of or used promptly. δ Rehabilitate the disturbed area surrounding the road with suitable indigenous vegetation to prevent erosion and the establishment of alien invasive species. δ Implement the alien vegetation management plan. Remove all existing alien and invasive vegetation and dispose of all material at a registered garden refuse site; burning or mulching on site is not permitted. δ Take care to ensure that no scouring or erosion occurs as a result of the crossing or excavation. δ Install measures such as gabions or other appropriate scour protection structures immediately downstream of activities to prevent erosion.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
STORMWATER MANAGEMENT	<u>Hydrology & Freshwater Ecosystems</u> δ Potential poor planning of stormwater management and pollution control for the project during the pre-construction phase affecting the EDLs.	<u>Monitoring Programme</u> δ Stormwater Management Plan (Appendix F) δ Emergency Response Plan δ Waste Management Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Stormwater control infrastructure. δ Surface water monitoring equipment. δ Water quality monitoring results.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes. δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater ecosystems. Maintain strict separation of clean and dirty water in line with GN704. δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically feasible outside the GN 4167 100 m Zone of Restriction (ZoR) of Ecological Drainage Lines (EDLs) to minimise spill and contamination risks.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations. δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers. δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow. Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
MANAGEMENT OF DEVELOPMENT WITHIN BUFFERS OF EDLs	<u>Hydrology & Freshwater Ecosystems</u> δ Clearing of vegetation and earthworks associated with the dirty water channel and sump within 48 m ecological buffer and 100 m zone of regulation (DWS) of the southern EDL. δ Clearing of vegetation and topsoil stripping in the Pit 2 footprint area (adjacent to and within the 100 m zone of	<u>Monitoring Programme</u> δ Surface water sampling and monitoring as part of the SWMP. δ Emergency Response Plan δ Waste Management Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Surface water monitoring equipment.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Demarcate the approved works area prior to any clearing (preferably as part of proposed fencing of the mining footprint). Clearly mark the reaches of the EDLs and the associated 48 m ecological buffer as no-access areas outside the open-cast or other mining infrastructure footprint.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of surface water quality (if water available) by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
	regulation (DWS) of the southern EDL) as the first step of open cast mining. δ Creation of the stockpile within the immediate catchment of the northern EDL. δ Upgrading of existing informal roads (if required) which bisect the EDLs and are located within the 100 m zone of regulation (DWS).	δ Water quality monitoring results. δ Stormwater control infrastructure. δ Structures to demarcate no-go areas.	δ Transport all vegetation removed during site clearing (particularly from large areas) from the construction site, unless used for rehabilitation. Vegetation may not be stockpiled and must be disposed of at a registered waste disposal facility. δ Strip topsoil and vegetation in small, systematic blocks, clearing only the areas where excavation is immediately planned to minimise exposed subsoil and reduce the duration of exposure.	
VEGETATION MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover</u> δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the pre-construction and planning phase.	<u>Monitoring Programme</u> δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Alien Invasive Plant Species Management Plan.	<u>Responsible Person</u> δ Site Manager, ECO and nursery staff to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u>	δ Daily compliance monitoring by site management and ECO. δ Weekly monitoring by the nursery manager, staff and/or rehabilitation specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
	δ Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the pre-construction and planning phase. δ Potential impact on the ESA during the pre-construction and planning phase.	<u>Requirements</u> δ Visible beacons / fences to demarcate mineable areas. δ Environmental awareness training material. δ Nursery to plant and propagate species harvested from the mining footprint for revegetation during rehabilitation. δ Plant destruction/removal permits.	δ Ensure that sound environmental management practices are in place at all times during the planning phase. δ Stockpile Design and Stability: ○ Stockpile height and slope angle must comply with sound geotechnical design principles. ○ Slopes must not be excessively steep to prevent failure. ○ Incorporate mechanisms to improve slope stability. ○ Apply strict stormwater management and erosion control measures for all newly proposed stockpiles, as existing stockpiles have contributed to sedimentation of adjacent natural habitats. δ Establish the nursery two years before mining commences as prescribed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H1). δ Rehabilitation, Rescue and Relocation, and AIP Control Plans - Prior to vegetation clearing activities: ○ Develop a rehabilitation plan/strategy for implementation throughout all project phases.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Site Walkdowns and Permitting: o Conduct a thorough walkdown of all footprint areas, including a 15 m buffer, during the optimal flowering season for provincially protected species before project initiation. o Follow appropriate permitting and authorisation processes as required by the Northern Cape Environmental Department (provincially protected species) and DFFE (TOPS/NFA species). o Develop a rescue and relocation plan under the guidance of the DFFE and/or Northern Cape Environmental Department, based on the outcomes of the walkdowns. o Rescue, relocate, or apply for destruction permits for provincially protected species prior to mining. δ Biodiversity and Habitat Protection: o Minimise loss of indigenous vegetation and natural habitat by considering findings of the biodiversity and other specialist studies. o Optimise layouts within medium to very low SEI habitats and avoid loss of high and very high SEI habitats. o Prevent unnecessary habitat fragmentation by placing infrastructure within already disturbed	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			areas or as close to existing disturbances as possible. o Avoid disruption to ecological processes. o Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs). o Ensure that habitat degradation surrounding authorised footprints is kept to a minimum through strict edge management. δ Prior to commencement of construction, clearly demarcate the construction servitude to prevent footprint creep beyond authorised areas. δ Collection of Indigenous Plants: o Collect abundant seeds, cuttings, seedlings and whole plants in the mining footprint that cover the indigenous plant diversity. o Translocate as many plant species of conservation concern and protected plant species as possible to the nursery. o Prevent collection of seeds, cuttings and seedlings of invasive alien plants. o Keep plants from the same area together in the nursery so it can be translocated to the area from where it originated.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
ALIEN INVASIVE PLANT SPECIES MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover</u> δ Potential infestation of the footprint area by invasive plant species.	<u>Monitoring Programme</u> δ Alien Invasive Plant Species Management Plan. δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Stormwater Management Plan <u>Requirements</u> δ Designated team to control invasive plant species when needed. δ Contact details of a Pest Control Officer. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ General AIP Control: o Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. o Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: o Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases. o Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Cover crop to seed rehabilitated areas.	○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal ○ Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. ○ Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions ○ Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. ○ Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping ○ Conduct annual monitoring of the AIP control plan, stormwater management, and general housekeeping by the mine ECO, supported by photographic records.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			○ Submit quarterly reports on AIP control to track effectiveness and monitor spread.	
FAUNA MANAGEMENT	<u>Fauna</u> δ Potential impact on the Kuruman Mountain Bushveld faunal habitat, diversity, and SCC during the planning phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal habitat, diversity, and SCC during the planning phase.	<u>Monitoring Programme</u> δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Waste Management Plan. δ Emergency Response Plan. δ Traffic Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the mining area. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Ensure that a suitable relocation plan is developed and implemented to guide the effective relocation of species, where necessary. δ Ensure that a trained snake handler is available on call, or that a designated staff member is suitably trained to remove snakes safely when encountered. δ Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by ECO. δ Annual compliance monitoring by independent EAP.

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Snake posters. δ Refuse bins with lids. δ Contact number of a qualified snake handler.		
CULTURAL AND HERITAGE MANAGEMENT	<u>Cultural, Heritage and Palaeontological Environment.</u> δ Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. δ Potential physical disturbance of the burial sites and/or its context. δ Potential physical disturbance of the historical farmhouse.	<u>Monitoring Programme</u> δ Chance Find Protocol. δ Heritage Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the no-go areas. δ Environmental awareness training material. δ Contact number of a qualified archaeologist.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Protection of Cemeteries and Burial Sites: o Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone. o Provide access to family members for all cemeteries and burial sites within the buffer zone. o Compile a Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Include Historical Farmstead (MG003) in the development plans and maintain a 30 m buffer to avoid disturbance. δ Confine all development activities strictly to the approved development footprint. δ Chance Find Procedure: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			assessment of the finds who must notify the SAHRA. o Work may only continue once the go-ahead was issued by SAHRA.	
PALAEONTOLOGY MANAGEMENT	<u>Cultural, Heritage and Palaeontological Environment</u> δ Potential impact to fossil heritage.	<u>Monitoring Programme</u> δ Fossil Chance Find Protocol. δ Heritage Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the no-go areas. δ Environmental awareness training material. δ Contact number of a qualified palaeontologist.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol: o When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			protected place. This way the project activities will not be interrupted. ○ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. ○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			○ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ○ If no fossils are found and the excavations have finished, then no further monitoring is required.	
SOCIO-ECONOMIC ENHANCEMENT MEASURES	<u>Socio-Economic Environment</u> δ Employment opportunities and skills development **(Positive Impact).** δ Economic multiplier effects **(Positive Impact).**	<u>Monitoring Programme</u> δ Social and Labour Plan (Appendix T) <u>Requirements</u> δ Local procurement policy. δ Community Liaison Officer.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Local Employment and Skills Development: ○ Prioritise employment of communities surrounding the development, contributing to their growth and development. ○ Consider communities most in need of employment at the local level before outsourcing work. ○ Offer training and skills development programmes to employees prior to the commencement of the construction phase.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Annual reporting on the implementation of the SLP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			○ Engage proactively with local stakeholders and implement transparent hiring practices to ensure equitable distribution of employment opportunities. δ Local Procurement and Supplier Engagement: ○ Give preference to suppliers local to the operation where the service or product will be consumed. ○ Adopt a local procurement policy, where feasible, to maximise benefits to the local economy. ○ Prior to the start of construction contractor procurement, identify a database of local companies, particularly Historically Disadvantaged (HD) companies, and inform them about the tender process, inviting them to bid on project-related work where applicable. ○ Engage with local authorities and business organisations to investigate the feasibility of sourcing construction materials, goods, and services from local suppliers. δ Government Liaison and Integration: ○ Establish communication and liaison structures with district and local government structures. ○ Liaise with municipal authorities to ensure that group development initiatives are integrated	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			into the broader economic and development plans of the surrounding communities. δ Economic Development and Project Sustainability: o Create job opportunities, support local business activities, and contribute to government tax revenues through the development. o Continuously review the economic development aspects of the project during implementation to respond to changing needs and ensure long-term sustainability.	
SOCIO-ECONOMIC MANAGEMENT	<u>Socio-Economic Environment</u> δ Influx of jobseekers and change in population. δ Safety and security impacts. δ Increased pressure on local services/resources.	<u>Monitoring Programme</u> δ Social and Labour Plan (Appendix T) <u>Requirements</u> δ Local procurement policy. δ Community Liaison Officer. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Local Employment Prioritisation: Prioritise employment of local communities most in need before outsourcing work.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Annual reporting on the implementation of the SLP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Community Awareness and Engagement: o Inform surrounding landowners of potential risks associated with an influx of workers during the construction period. o Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. o Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project. δ Workplace Safety and Risk Management; o Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. o Provide safety awareness, training, and positive behaviour reinforcement for all personnel. o Improve system monitoring and analysis to enhance risk management. o Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Access Control and Security: o Sign surface use agreements with the landowners and give written notice at least 21 calendar days prior to commencement of activities. o Strictly control access in and out of the construction area. o Ensure access to surrounding properties by construction and/or mining employees is prevented. o Identify abandoned buildings and either utilise them safely or ensure they cannot be used for malicious purposes. o Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: o Implement education, training, and development services for the local community to support skills growth and capacity building. o Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.	

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SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
ROAD UPGRADE MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Impact on local infrastructure and traffic during construction.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u> δ Copy of the Wayleave Applicant and Approval. δ Earthmoving equipment to maintain the gravel pavement structure of the roads. δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Widen shoulders and improve access at the proposed mine entrance to accommodate turning movements by heavy vehicles. o Design the access road with a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. o Provide bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. o Include shoulders of at least 1.5 m width on either side of the access road to accommodate vehicle recovery and enhance operational safety.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Install appropriate signage and road markings to improve visibility, particularly at the mine access point. δ Implement a regular road maintenance schedule to repair wear and tear and ensure the safe passage of all vehicles.	
TRAFFIC MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Impact on local infrastructure and traffic during construction.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u> δ Copy of the Wayleave Applicant and Approval. δ Earthmoving equipment to maintain the gravel pavement structure of the roads. δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Detours and Alternative Routes o Designate specific haul routes for mining vehicles. o Clearly mark temporary detours to guide traffic around construction areas and avoid residential or sensitive zones.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Environmental awareness training material.	δ Signage and Traffic Control: o Install clear, consistent signage to warn drivers of construction activities, speed limits, and detours. o Use variable message signs to provide real-time updates on road conditions and traffic changes. δ Working Hours Restrictions: o Limit construction traffic to off-peak hours, such as early mornings or late evenings, to reduce congestion. o Minimise nighttime operations in noise-sensitive areas. o Stagger vehicle movements using shifts to distribute traffic evenly throughout the day. δ Traffic Flow Optimisation: o Employ traffic control personnel at critical points to manage queues and ensure smooth traffic flow. o Stagger vehicle movements to minimise bottlenecks.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			δ Public Awareness and Communication: o Provide local residents and businesses with timely information about traffic patterns, detours, and road closures. o Use websites, mobile apps, or other communication channels to help drivers plan alternative routes. δ Monitoring and Evaluation: o Continuously monitor traffic conditions using cameras or personnel. o Adjust measures as required based on real-time observations. o Establish a feedback mechanism for the public to report traffic issues. δ Traffic Management Plan (TMP): o Implement a comprehensive TMP to coordinate all traffic-related mitigation measures. o Include designated haul routes, signage, scheduling of vehicle movements, and emergency response protocols to ensure safe and efficient movement of all vehicles associated with mining operations.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
MANAGEMENT OF EMPLOYEE TRANSPORT	Existing Infrastructure: Road Network and Traffic Assessment δ Impact on local infrastructure and traffic during construction.	Monitoring Programme δ Traffic Management Plan Requirements δ Road signage to control traffic speed. δ Environmental awareness training material.	Responsible Person δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. Mitigation / Monitoring to be Implemented δ Carpooling and Ride-Sharing Programs: o Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. o Facilitate this through ride-matching services or designated carpool parking areas. δ Shuttle Services: o Provide shuttle buses or vans to transport employees to and from the mining site. o Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously. δ Flexible Work Hours: o Implement staggered work shifts or flexible working hours to reduce peak-time congestion.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			○ Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation ○ Encourage employees to use public transport options where available. ○ Offer subsidies or incentives (if possible) for employees who use buses or other public transport services to reach the site. δ Telecommuting and Remote Work ○ Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. ○ Reduce the need for daily commuting and associated traffic.	
ROAD SAFETY MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Impact on local infrastructure and traffic during construction.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u> δ Earthmoving equipment to maintain the gravel pavement structure of the roads.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading. δ Environmental awareness training material. δ Guardrails or barriers if needed. δ Safety and security lighting. δ Passenger crossings if needed.	<u>Mitigation / Monitoring to be Implemented</u> δ Warning Signs: o Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. o Ensure signs are maintained and easily visible under all conditions. δ Pedestrian Crossings: o Designate safe pedestrian crossings near high-traffic areas or work zones. o Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles. δ Guardrails and Barriers: o Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. o Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring: o Establish speed limits appropriate for specific site conditions.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
			○ Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed. δ Adequate Lighting: ○ Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. ○ Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions. δ Safety Training for Drivers: ○ Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles. δ Emergency Access Routes: ○ Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.	
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS	Waste Management	Monitoring Programme δ Hazardous Substance Register. δ Waste Management Plan	Responsible Person δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Weekly inspection of bunded areas by ECO.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Formal Inspection Programme Register. δ Stormwater Management Plan. δ Emergency Response Plan <u>Requirements</u> δ Formal waste disposal system with waste registers. δ Drip trays. δ Covered refuse bins for both hazardous- and general waste. δ Oil spill kit. δ Bunded areas with impermeable surface. δ Safety Data Sheets	<u>Mitigation / Monitoring to be Implemented</u> δ Chemical and Hazardous Material Storage: ○ All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. ○ Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). ○ Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. ○ Access to chemicals must be controlled, and only authorised staff may handle substances. ○ Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. ○ PPE must be used when handling chemicals or hazardous substances. δ Spill Prevention and Management: ○ Oil spill kits must be present on site, with all relevant employees trained in their use and emergency response procedures. ○ Drip trays must be used under all stationary equipment or vehicles; wastewater from drip	δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
SITE ESTABLISHMENT AND CONSTRUCTION PHASE				
		δ Stormwater control infrastructure.	trays must be collected in oil sumps or removed by a registered hazardous waste contractor. o Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons. o Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. o Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. o No contaminated water may be discharged into the natural environment; containment and safe disposal measures must be implemented. o Any significant chemical, fuel, or hazardous substance spill must be reported to the DWS and other relevant authorities.	

2. OPERATIONAL PHASE

Table 115: Mechanisms for monitoring compliance, assessing performance against the EMPR, and reporting: Operational Phase.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
VISUAL IMPACTS	<u>Visual Characteristics</u> δ Altered landscape and sense of place during construction. δ Visibility of the facility to residents during construction.	δ Parking- and dedicated storage areas for equipment. δ Good housekeeping practices.	<u>Responsible Person</u> δ Site Manager and Environmental Control Officer (ECO) to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent Environmental Assessment Practitioner (EAP) during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Use low-reflectivity materials and natural colours to blend structures into the surrounding landscape. Keep infrastructure as unobtrusive as possible. δ Implement landscaping and natural screening (using native vegetation, topography, or other methods) where feasible, with priority given to sensitive viewpoints such as nearby residents, travellers along the R385, and other key receptors. δ Establish indigenous trees and shrubs at key points of sensitivity to reduce visibility and integrate the site with the natural environment.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Maintain infrastructure, landscaping, and vegetative screening in good condition throughout the life of the project to ensure the site remains visually unobtrusive. δ Conduct regular reviews of the effectiveness of visual impact mitigation measures and adapt them where necessary, particularly given the long operational life of the project. δ Engage with local communities to understand their concerns and, where feasible, incorporate their feedback into the design, landscaping, and operation of the facility.	
LIGHT MANAGEMENT	<u>Visual Characteristics</u> δ Potential visual impact of operational, safety and security lighting during operation.	δ Appropriate lights. δ Motion sensors. δ Light shields. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and Environmental Control Officer (ECO) to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent Environmental Assessment Practitioner (EAP) during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			Mitigation / Monitoring to be Implemented δ Use fixtures that direct light downwards to minimise upward light spill, preserving the night sky. δ Install motion sensors so that lights are only activated when necessary, reducing the duration of light emissions. δ Opt for low-intensity lighting that provides sufficient illumination for safety without being overly bright. δ Use shields on lights to direct illumination to the intended areas and prevent light spill into unintended areas. δ Ensure that staff are aware of the importance of minimising light pollution and are trained to use lighting efficiently. δ Conduct periodic reviews of lighting practices to identify and rectify any unnecessary light emissions.	
DUST MANAGEMENT	Air Quality and Health Impact Assessment δ Potential impact of the proposed mining and	Monitoring Programme δ Dust Management Plan	Responsible Person δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	δ Daily compliance monitoring by site management and ECO.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	materials handling activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. δ Air quality impact on health: all-cause (natural) mortality. δ Air quality impact on health: cardiovascular hospital admissions. δ Air quality impact on health: chronic bronchitis.	δ Fall-out dust monitoring per ASTM D1739 (SANS 1137:2012). <u>Requirements</u> δ Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. δ Signage that clearly reduce the speed on the internal roads. δ Maintenance schedule to remove excess dust from the crusher plant. δ Cover crop to re-vegetate denuded areas.	δ Fallout dust monitoring by qualified service provider. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. If needed, spray haul roads twice daily with water. δ Install windbreaks or three-sided enclosures around ore stockpiles, waste rock dumps, and open pits to reduce wind-blown dust, in line with WRAP Fugitive Dust Handbook efficiencies. δ Seed topsoil stockpiles with indigenous grass species within 30 days of formation to stabilise surfaces and capture wind-blown dust. Limit	δ Weekly cleaning of dust and fines at crusher plant. δ Monthly monitoring of dust suppression equipment by ECO. δ Monthly fallout dust reporting by qualified service provider. δ Bi-annual review of effectivity of dust monitoring measures by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Air quality impact on health: acute bronchitis in children. δ Air quality impact on health: lung cancer in adults. δ Nuisance impact (dust). δ Increased air pollution due to increased traffic on the R385.		vegetation clearing to immediately before mining commences. δ Install and maintain operational water sprayers at the crusher plant and conveyor transfer points. δ Attach strips of used conveyor belts at discharge points to reduce fine particle escape (if needed). δ Remove compacted dust and spillage from the crusher plant on a weekly basis to prevent accumulation and secondary emissions. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place. δ Flatten and securely cover all loads during transport to prevent spillage and wind-blown dust. δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review suppression effectiveness bi-annually and adjust measures as required. δ Consider transitioning to cleaner, more efficient vehicles and equipment (e.g., electric trucks or hybrid machines) to reduce harmful emissions.	
NOISE MANAGEMENT	<u>Noise Ambiance</u> δ Noise nuisance caused by mining machinery and operations (excluding blasting). δ Potential blasting noise and bration nuisance to neighbouring properties. δ Nuisance impact (noise). δ Increased noise pollution due to	<u>Monitoring Programme</u> δ Personal noise exposure monitoring by occupational hygienist (SANS 10083:2004; SANS 10103:2008). δ Blast Design and Monitoring Programme. <u>Requirements</u> δ Personal noise exposure monitoring equipment. δ Signage indicating noise zones.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Noise and blast monitoring by qualified service providers. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area.	δ Daily compliance monitoring by site management and ECO. δ Airblast and vibration monitoring by qualified person with each blast. δ Quarterly monitoring and reporting by qualified service provider. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	increased traffic on the R385.	δ Air blast and vibration monitoring equipment.	δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations. δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Restrict blasting to Monday–Friday during daylight hours (08:00–17:00), unless otherwise authorised. Plan blasting type, duration, and timing with due consideration for nearby land users and structures and notify surrounding landowners in writing prior to each event. δ Design all blasts in accordance with the United States Bureau of Mines (USBM) criteria for ground vibration and airblast. Implement continuous airblast and ground vibration monitoring at sensitive receptors, and if monitoring results indicate exceedance of the USBM criteria, immediately review and amend the blast design to ensure compliance.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Maintain open communication with the local community about operations and blasting schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly. δ Install barriers or planting vegetation around mining sites to help reduce noise pollution. δ Consider employing quieter machinery or retrofitting existing equipment with noise-reduction technologies to lessen noise levels	
SOIL MANAGEMENT	<u>Geology, Soils and Agricultural Sensitivity</u> δ Loss of land capability. δ Soil erosion. δ Soil compaction.	<u>Monitoring Programme</u> δ Erosion Risk Assessment. <u>Requirements</u> δ Earthmoving equipment to strip and stockpile the topsoil. δ Signage to identify Topsoil Stockpiles.	<u>Responsible Person</u> δ Site Manager, ECO and rehabilitation specialist/nursery staff to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Avoid direct disturbance of identified arable soils where possible to reduce loss of productive land.	δ Daily compliance monitoring by site management, ECO, and rehabilitation specialist/nursery staff. δ Monthly recording of topsoil and subsoils volume stripped, stockpiled and returned as part of progressive rehabilitation. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		δ Stormwater control infrastructure. δ Designated team to control invasive and/or alien plant species that may germinate on the topsoil heaps. δ Cover crop to vegetate topsoil heaps (when needed) and reinstated soil.	δ Confine the proposed development and associated surface infrastructure to within the demarcated footprint area. δ Preferably construct surface infrastructure only within the footprint or on areas that are already significantly disturbed. δ Prohibit dumping of waste materials next to or on top of soil stockpiles. δ Confine excavation and long-term soil stockpiling to the demarcated areas. δ Clearly and permanently mark all stockpiles, especially topsoil, and locate topsoil within defined “no-go” areas. δ Separate stockpiles of different soils to maintain post-development land capability and minimise residual loss of agricultural potential. δ Reduce soil handling events wherever possible to limit compaction and structural changes. Use the ‘cut and cover’ technique when feasible to avoid unnecessary stockpiling.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Limit stockpile height to 4–5 m. Apply temporary stabilisation measures such as organic matter to promote aggregation and improve infiltration and use agricultural lime to stabilise soil pH (if needed). δ Keep monthly records of the volumes of topsoil and subsoils stripped, stockpiled and returned as part of progressive rehabilitation. δ Vegetate topsoil stockpiles and implement measures to prevent erosion during rainfall events. δ Install temporary berms around stockpile areas until vegetation is established to prevent soil loss through erosion. δ Prevent contamination of stockpiled topsoil by AIP material; prioritise AIP monitoring of topsoil stockpiles. δ Prohibit vehicle and personnel movement over stockpiles. δ Strip soils when moisture content is as low as possible. If soils must be moved when wet, use trucks and shovels rather than bowl scrapers to reduce compaction.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Appoint a competent ECO to oversee operation phase, with watercourse areas as a priority. δ Focus erosion control on areas identified as highest risk. δ Direct stormwater runoff away from active earthworks and manage surface run-off to prevent sedimentation of downstream watercourses using concreted channels, energy dissipaters, or other erosion control measures. δ Implement temporary and permanent erosion control methods, including silt fences, sediment traps, retention basins, detention ponds, interceptor ditches, seeding, sodding, riprap, erosion mats, and mulching. Address any signs of erosion immediately. δ Develop and implement a Rehabilitation Plan during the life of mine and post-decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
WASTE MANAGEMENT	<u>Waste Management</u> δ Soil contamination δ Waste water from ablutions potentially impacting the groundwater quality. δ Potential for dirty water to enter the surrounding watercourses as a result of operations. δ Potential for domestic waste to enter the surrounding watercourses as a result of operations. δ Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations.	<u>Monitoring Programme</u> δ Waste Management Plan. δ Hazardous Substance Register. δ Formal Inspection Programme Register. δ Stormwater Management Plan. δ Emergency Response Plan. <u>Requirements</u> δ Formal waste disposal system with waste registers. δ Drip trays.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ EMPR Implementation and Awareness o Implement contamination prevention measures as outlined in the EMPR and ensure it is accessible to all sub-contractors and employees for reference on site. o Conduct environmental awareness training covering spill reporting, littering prevention, dust suppression, and fire safety. δ Waste Management o Develop and implement a waste management plan aligned with the NEM:WA waste hierarchy for the operational phase. o Contain hazardous and general waste in separately marked, sealable bins located at designated areas and remove waste to registered disposal facilities when full.	δ Daily compliance monitoring by site management and ECO. δ Weekly inspection of bunded areas by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. δ Leaching of contaminants from the WRD into groundwater. δ Ingestion/use of contaminated groundwater (that originated from the WRD). δ Ingestion/use of contaminated surface water (that originated from the WRD).	δ Covered refuse bins for both hazardous- and general waste. δ Oil spill kit. δ Bunded areas with impermeable surface. δ Safety Data Sheets. δ Stormwater control infrastructure.	○ Domestic waste must be stored in predefined areas, outside floodplains, and maintained in a clean state. ○ Prohibit burial or burning of any waste, apart from inert material from the WRD. ○ Ensure all decommissioned or rehabilitated areas are cleared of waste. δ Vehicle, Equipment, and Fuel Management ○ Conduct all vehicle maintenance, repairs, and servicing at the workshop or designated service area. Emergency on-site repairs must use drip trays, and all waste products must be collected and disposed of as hazardous waste at a registered facility, with disposal proof filed. ○ Diesel bowsers must be equipped with drip trays and nozzles must rest in sleeves after refuelling. ○ Store vehicles and equipment in designated areas outside the 100-year floodline. δ Ablution Facilities ○ Provide adequate ablution facilities for all employees. Ensure they do not cause pollution or health hazards and that waste is removed to approved disposal sites. ○ Conduct routine maintenance of the sewage system to reduce the risk of failure and spillage.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Stormwater and Water Management o Implement a stormwater management plan to manage operational runoff and prevent contamination. o Apply water-use efficiency measures to minimise discharge and promote water re-use within operations. o Bund all dirty water catchment areas and contain dirty water in storage facilities, such as wastewater control dams. o Conduct quarterly surface water quality monitoring (if available) to detect and quantify any operational impacts. δ General Operational Practices o Maintain site housekeeping to prevent environmental contamination and ensure all operational practices comply with EMPR requirements.	
FIRE MANAGEMENT	<u>Geology, Soils and Agricultural Sensitivity</u> δ Increased fire risk.	<u>Monitoring Programme</u> δ Fire Management Plan δ Emergency Response Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		<u>Requirements</u> δ Fire beaters and fire extinguishers. δ Contact number of the fire association/-brigade. δ Environmental awareness training material.	<u>Mitigation / Monitoring to be Implemented</u> δ Prohibit harvesting of surrounding trees, shrubs, or indigenous vegetation for firewood. δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project. δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas. δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other "hot work." Keep a working fire extinguisher immediately at hand. δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control.	
GROUNDWATER MANAGEMENT	<u>Geohydrology</u> δ Potential impact on the water availability in some of the user boreholes to the north. δ The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD **(Positive Impact)**.	<u>Monitoring Programme</u> δ Groundwater Monitoring Programme (Appendix E). δ Emergency Response Plan δ Waste Management Plan δ Stormwater Management Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Groundwater specialist to monitor groundwater level and quality. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of groundwater level and quality by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Water quality impact on health.	<u>Requirements</u> δ Copy of Water Use Authorisation. δ Groundwater monitoring equipment. δ Water quality monitoring results. δ Stormwater control infrastructure.	<u>Mitigation / Monitoring to be Implemented</u> δ Operate the Waste Rock Dump (WRD) in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Undertake all pit dewatering strictly in accordance with the conditions and requirements of the approved Water Use Licence (WUL). δ Where groundwater drawdown has the potential to impact neighbouring boreholes and if required, implement compensatory measures, including either re-injection of abstracted water into approved boreholes outside the affected aquifer system or provision of water to neighbouring farmers with affected boreholes to match the current supply or requirement. δ Conduct quarterly groundwater sampling and water level measurements to continuously assess the impacts of MIOM activities on groundwater quality and quantity. δ Monitor the five areas identified by the specialist (Appendix E) to emphasise different aspects of groundwater monitoring. Use existing exploration	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			boreholes in advantageous positions where possible. δ Include monitoring of active user boreholes within at least a 1 km radius (preferably 2 km) of the planned mining activities. δ Analyse groundwater samples at a SANAS-accredited laboratory for chemical and physical constituents normally associated with iron ore mining and related activities. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
SURFACE WATER MANAGEMENT	<u>Hydrology & Freshwater Ecosystems</u> δ Increased earthworks will result in sediment mobility and increased sediments that may enter the watercourses and cause changes to water quality.	<u>Monitoring Programme</u> δ Surface water sampling and monitoring as part of the SWMP. δ Emergency Response Plan δ Waste Management Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Hydrologist to monitor surface water quality. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of surface water quality (if water available) by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Changes to the surface vegetation are anticipated, as such, the natural hydrological flow regime would be impacted upon. It is anticipated that additional hard standing areas will be developed, resulting in increased flows to the watercourses. δ Potential impact on the Freshwater Habitat: EDL and diversity during the mining phase. δ Potential impact on the Freshwater Habitat: PFP and diversity during the mining phase. δ Potential impact on the Freshwater Habitat:	<u>Requirements</u> δ Copy of Water Use Authorisation. δ Surface water monitoring equipment. δ Water quality monitoring results. δ Stormwater control infrastructure.	<u>Mitigation / Monitoring to be Implemented</u> δ Keep all delineated water resources marked as no-go areas. If unavoidable, limit impacts and confine them to the smallest possible footprint. δ Locate all future mining activities away from water resources (if possible) and associated floodlines. δ Treat instream activities as least favourable options. δ Conduct any required instream activities, such as stream diversions or channel modifications, during the dry period to minimise erosion and inundation risks. δ Implement measures to prevent erosion immediately downstream of activities, such as installing gabions or other appropriate scour protection structures.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	EDL & PFP faunal habitat and diversity during the mining phase. δ Potential impact on the Freshwater Habitat: EDL & PFP faunal SCC during the mining phase.			
STORMWATER MANAGEMENT	<u>Hydrology & Freshwater Ecosystems</u> δ Potential of dirty water to enter the surrounding watercourses as a result of operations.	<u>Monitoring Programme</u> δ Stormwater Management Plan (Appendix F) δ Emergency Response Plan δ Waste Management Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Stormwater control infrastructure.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Implement a stormwater management plan (Appendix F), ensuring continuous operation throughout construction phase. Revisit and update the SWMP after any major operational or design changes.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		δ Surface water monitoring equipment. δ Water quality monitoring results.	δ Ensure stormwater from mining areas does not adversely affect downgradient freshwater ecosystems. Maintain strict separation of clean and dirty water in line with GN704. δ Locate clean and dirty water separation systems, including evaporation ponds, as far as practically feasible outside the GN 4167 100 m Zone of Restriction (ZoR) of Ecological Drainage Lines (EDLs) to minimise spill and contamination risks. δ Bund all dirty water catchment areas and contain dirty water in lined storage facilities, such as wastewater control dams or evaporation ponds, designed with sufficient capacity and a 0.8 m freeboard. δ Ensure ponds are lined to prevent leakage and designed according to the Department of Water Affairs and Forestry Best Practice Guideline A4: Pollution Control Dams (2007). δ Apply mining methods that minimise discharge and promote re-use of water within operations.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Line all dirty water channels, use stone pitching to reduce high runoff velocities, and maintain proper housekeeping to prevent clogging of grated covers. δ Check all channels after major rainfall events to ensure no blockages and unrestricted water flow. Remove accumulated sediment from channels and retention facilities immediately and dispose of it appropriately. δ Operate stormwater attenuation facilities at low storage levels or empty to accommodate inflows while meeting the required spillage frequency (1:50-year Return Period) and freeboard requirements. δ Conduct quarterly surface water quality sampling to detect and quantify any operational impacts. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
MANAGEMENT OF DEVELOPMENT WITHIN BUFFERS OF EDLs	<u>Hydrology & Freshwater Ecosystems</u> δ Undertaking of open cast mining (including	<u>Monitoring Programme</u> δ Surface water sampling and monitoring as part of the SWMP.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of surface water

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	blasting) adjacent to and within the 100 m zone of regulation of the southern EDL (Pit 2). δ Operational reshaping of the Phase 2 open cast pit and associated rehabilitation (topsoil restoration and revegetation) adjacent to and within the 100 m zone of regulation (ZoR) of the southern EDL. δ Operation of the portion of the Pit 2 dirty water channel and sump within the 100 m ZoR of the southern EDL. δ Operation and maintenance of the upgraded road	δ Emergency Response Plan δ Waste Management Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Surface water monitoring equipment. δ Water quality monitoring results. δ Stormwater control infrastructure. δ Structures to demarcate no-go areas.	δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Adhere strictly to all recommendations and mitigation measures outlined in the Stormwater Management Plan (SWMP). δ Undertake regular inspections of the dirty water channel to ensure functionality. δ Prepare and implement an emergency plan to address any tearing or leaks in the dirty water channel lining, preventing inundation of the EDL. δ Use only existing roadways during maintenance and monitoring activities to avoid indiscriminate vehicle movement. δ Maintain portions of the 48 m non-development ecological buffer around the EDL not impacted by Pit 2 to provide residual protection from spill-over and edge effects of mining operations. δ Install and maintain temporary berms and silt traps for the duration of mining operations to prevent polluted sediment and other fines from being	quality (if water available) by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	crossings within the EDLs.		transported by stormwater into the downgradient reach of the system. δ Implement a monitoring programme to detect and prevent pollution of soil, surface water, and groundwater. δ Reduce airborne dust during blasting activities by damping dust generation areas, ensuring that quantities used do not generate runoff. δ Update the numerical and geochemical model against monitoring data every 2-3 years to serve as early warning system for potential contamination.	
MANAGEMENT OF TRANSPORT WITHIN BUFFERS OF EDLs	<u>Hydrology & Freshwater Ecosystems</u> δ Transport of product from Pit 2 to the primary beneficiation plant (offsite) via the upgraded road which bisects the southern EDL and is located within the associated 100 m ZoR.	<u>Monitoring Programme</u> δ Surface water sampling and monitoring as part of the SWMP. δ Emergency Response Plan δ Waste Management Plan δ Traffic Management Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Use only the approved haul routes between extraction areas and screening/crushing plants. Ensure strict compliance monitoring.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting of surface water quality (if water available) by appropriately qualified specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		Requirements δ Copy of Water Use Authorisation. δ Surface water monitoring equipment. δ Water quality monitoring results. δ Stormwater control infrastructure. Structures to demarcate no-go areas.	δ Maintain all vehicles in good working order. Overloading or use of leaking vehicles or machinery on haul roads is prohibited to prevent spillage. δ Enforce speed limits for all vehicles transporting product along haul roads. δ Avoid unnecessary disturbances surrounding the perimeter of surface infrastructure. δ Regularly wash vehicles on non-permeable surfaces or off-site to prevent the dispersal of alien or invasive plant seeds into freshwater ecosystems. δ Conduct routine inspections of instream infrastructure to monitor debris build-up, structure integrity, erosion, sedimentation, vegetation establishment, and presence of alien or invasive plant species. δ Undertake routine maintenance of haul roads and instream infrastructure to prevent concentration of flow and erosion. Maintenance must occur especially after high rainfall events. δ If erosion is observed at road crossings, rehabilitate the affected areas by infilling gullies and	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			revegetating with suitable indigenous species. Use sustainably sourced rocks from outside freshwater ecosystems if needed.	
VEGETATION MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover</u> δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the mining phase. δ Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the mining phase. δ Potential impact on the ESA during the mining phase.	<u>Monitoring Programme</u> δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Alien Invasive Plant Species Management Plan. <u>Requirements</u> δ Visible beacons / fences to demarcate mineable areas. δ Environmental awareness training material. δ Nursery to plant and propagate species harvested from the	<u>Responsible Person</u> δ Site Manager, ECO and nursery staff to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ NCNCA-Protected Floral Species: o No NCNCA-protected species may be removed during mining activities without the required permits from DFFE and the Northern Cape Environmental Department. o All permit conditions must be strictly adhered to. o Where feasible and as per permit conditions, collect propagules and/or seeds for propagation under nursery conditions to support rehabilitation or supplement unsuccessful relocation attempts.	δ Daily compliance monitoring by site management and ECO. δ Weekly monitoring by the nursery manager, staff and/or rehabilitation specialist. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		mining footprint for revegetation during rehabilitation. δ Plant destruction/removal permits.	δ Vegetation Clearing and Footprint Control: o Restrict removal of vegetation to areas within the approved project footprint. o Clearly demarcate footprints to avoid encroachment into adjacent habitats. o Place all proposed infrastructure, including temporary facilities, outside sensitive habitat units wherever possible. δ Vehicles must utilise existing and planned roads and avoid creating unplanned or unauthorised tracks. δ Vegetation Waste Management: o Do not leave cleared vegetation cuttings in freshwater habitats. o Dispose of cleared vegetation, construction waste, and rubble at a registered waste facility or in a designated area identified by the mine. o No waste may be dumped in surrounding natural habitats or unauthorised areas. δ Infrastructure and Footprint Monitoring: o Limit all infrastructure, including future expansions, to authorised footprints. o Prohibit disturbance of habitats outside demarcated and approved areas.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Conduct monthly monitoring and recording of footprint areas by the ECO and annual recording by the Mine Surveyor to prevent footprint creep. δ Vegetation Monitoring Programme ○ Manage and monitor the nursery as stipulated in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). ○ Establish and maintain an annual vegetation monitoring programme to protect and manage biodiversity in the Focus Areas (remaining natural areas). ○ Monitor species composition against reference vegetation types. ○ Continue monitoring relocated Species of Conservation Concern (SCC) until successful establishment is evident. δ Protection of Floral SCC and Indigenous Vegetation: Prohibit the collection of floral SCC or indigenous vegetation outside of planned and authorised footprints by all personnel. δ Limiting Edge Effects: ○ Manage edge effects (erosion, habitat degradation, AIP spread) to reduce cumulative loss of Ecological Support Areas (ESAs).	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Rip, profile, and reseed compacted soils outside the footprint areas (if rehabilitation is needed). ○ Suppress dust to protect flora and prevent sedimentation of freshwater habitats. ○ Limit extent of disturbed vegetation and exposed soils to reduce erosion risks. δ Rehabilitation of Disturbed Areas: ○ Rehabilitate areas no longer required for operational activities. ○ Restore natural areas beyond the direct footprint that were affected by project activities using indigenous species. ○ Reinstate and maintain a vegetation layer to promote soil health, vegetation establishment, habitat connectivity, and fauna support. ○ Use indigenous species from the reference vegetation type or surrounding area for optimal biodiversity outcomes.	
ALIEN INVASIVE PLANT SPECIES MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover</u> δ Potential infestation of the mining footprint	<u>Monitoring Programme</u> δ Alien Invasive Plant Species Management Plan.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by ECO.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	with invasive plant species.	δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Stormwater Management Plan <u>Requirements</u> δ Designated team to control invasive plant species when needed. δ Contact details of a Pest Control Officer. δ Environmental awareness training material. δ Cover crop to seed rehabilitated areas.	<u>Mitigation / Monitoring to be Implemented</u> δ General AIP Control: ○ Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. ○ Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: ○ Conduct ongoing AIP monitoring, clearing, and control throughout construction and operational phases. ○ Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. ○ Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated. δ Cleared Vegetation Disposal ○ Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. ○ Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site.	δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Implementation and Restrictions o Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. o Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping o Conduct annual monitoring of the AIP control plan, stormwater management, and general housekeeping by the mine Environmental Control Officer (ECO), supported by photographic records. o Submit quarterly reports on AIP control to track effectiveness and monitor spread.	
FAUNA MANAGEMENT	Fauna δ Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the mining phase.	Monitoring Programme δ Vegetation Monitoring Plan. δ Fire Management Plan.	Responsible Person δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by ECO.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the mining phase. δ Potential impact on the Kuruman Mountain Bushveld faunal SCC during the mining phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the mining phase. δ Wildlife disruption due to increased traffic on the R385.	δ Waste Management Plan. δ Emergency Response Plan. δ Traffic Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the mining area. δ Environmental awareness training material. δ Snake posters. δ Refuse bins with lids. δ Contact number of a qualified snake handler.	<u>Mitigation / Monitoring to be Implemented</u> δ Vegetation Clearance: Undertake clearing activities in a phased manner to allow faunal species to move out ahead of disturbance. Where necessary, small/slow-moving species must be assisted and safely relocated. δ Species of Conservation Concern (SCC) and Faunal Protection: ○ Prior to and during vegetation clearance, inspect footprint and adjacent areas for SCC, including Temminck's Ground Pangolin (*Smutsia temminckii*), protected burrowing scorpions, and baboon spiders. ○ Safely capture and relocate identified SCC to suitable habitat outside the footprint. For scorpions, conduct night-time UV surveys during summer to aid detection. ○ If avian SCC nests are located, consult a qualified avifaunal specialist to determine appropriate management. Active nests (with eggs or nestlings) must be left undisturbed until fledging, with no mining-related activities within 200 m. ○ All SCC relocation must be carried out by a trained professional/competent staff member,	δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			under the guidance of a biodiversity specialist or ECO, and with required permits where applicable. δ General Fauna Management: o If snakes, scorpions, baboon spiders, or other fauna are found within buildings or pose risks to staff/infrastructure, they must be carefully captured and relocated outside the footprint by a trained snake handler/competent staff member/ECO. o No collection, hunting, or harm to fauna is permitted by staff or contractors. δ Site Practices and Controls: o Keep night lighting to a minimum, with lights directed inward and downward onto the footprint. Avoid bright white/LED lights; use soft yellow (sodium vapour) or red lights where necessary. o Wildlife Corridors: Create wildlife corridors around mining sites to allow animals to move freely and avoid areas of heavy traffic.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
CULTURAL AND HERITAGE MANAGEMENT	<u>Cultural, Heritage and Palaeontological Environment</u> δ Potential physical disturbance of the low-density scatters and exploration trenches and/or its context. δ Potential physical disturbance of the burial sites and/or its context. δ Potential physical disturbance of the historical farmhouse.	<u>Monitoring Programme</u> δ Chance Find Protocol. δ Heritage Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the no-go areas. δ Environmental awareness training material. δ Contact number of a qualified archaeologist.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Protection of Cemeteries and Burial Sites: o Avoid all recorded cemeteries and burial sites by maintaining a 30 m buffer zone. o Provide access to family members for all cemeteries and burial sites within the buffer zone. o Compile a Heritage Management Plan for the recorded cemeteries, including an access protocol for next of kin. δ Include Historical Farmstead (MG003) in the development plans and maintain a 30 m buffer to avoid disturbance. δ Confine all development activities strictly to the approved development footprint.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Chance Find Procedure: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify the SAHRA. o Work may only continue once the go-ahead was issued by SAHRA.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
PALAEONTOLOGY MANAGEMENT	<u>Cultural, Heritage and Palaeontological Environment</u> δ Potential impact to fossil heritage.	<u>Monitoring Programme</u> δ Fossil Chance Find Protocol. δ Heritage Management Plan. <u>Requirements</u> δ Visible beacons / fences demarcating the no-go areas. δ Environmental awareness training material. δ Contact number of a qualified palaeontologist.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ If fossils are found by the Environmental Officer or another responsible person during excavations, they must be rescued, and a palaeontologist must be called to assess and collect representative material. δ Fossil Chance Find Protocol: o When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) must be put aside in a suitably protected place. This way the project activities will not be interrupted. o Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			fossils in the shales and mudstones (see Appendix L). This information must be built into the EMP's training and awareness plan and procedures. ○ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ○ If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, must visit the site to inspect the selected material and check the dumps where feasible. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ○ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ If no fossils are found and the excavations have finished, then no further monitoring is required.	
SOCIO-ECONOMIC ENHANCEMENT MEASURES	<u>Socio-Economic Environment</u> δ Direct and indirect employment opportunities **(Positive Impact).** δ Economic multiplier effect **(Positive Impact).** δ Contribution to local economic development and socio-economic upliftment **(Positive Impact).**	<u>Monitoring Programme</u> δ Social and Labour Plan (Appendix T) <u>Requirements</u> δ Local procurement policy. δ Community Liaison Officer.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Prioritise employment of local community members for all available positions. δ Where highly skilled expertise is required, provide mechanisms for skills transfer to local employees. δ Encourage local businesses to participate in providing materials, goods, and services during the operational phase of the project. δ Maintain open and continuous communication with the local community through the development's designated Community Liaison Officer.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Annual reporting on the implementation of the SLP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Ensure all employment practices align with the development's Social Labour Plan, promoting fair labour practices and safe working conditions for all personnel. δ Explore opportunities for public-private partnerships to fund and implement infrastructure projects.	
SOCIO-ECONOMIC MANAGEMENT	Socio-Economic Environment	Monitoring Programme δ Social and Labour Plan (Appendix T) Requirements δ Local procurement policy. δ Community Liaison Officer. δ Environmental awareness training material.	Responsible Person δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. Mitigation / Monitoring to be Implemented δ Prioritise employment of local communities most in need before outsourcing work. δ Community Awareness and Engagement: o Inform surrounding landowners of potential risks associated with an influx of workers during the construction period.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Annual reporting on the implementation of the SLP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Implement a method of communication for the local community to lodge complaints or grievances regarding the construction process. ○ Appoint a Community Liaison Officer to maintain communication and address community concerns throughout the project. δ Workplace Safety and Risk Management; ○ Encourage employees to cease work when the workplace is considered unsafe or to prevent unsafe actions. ○ Provide safety awareness, training, and positive behaviour reinforcement for all personnel. ○ Improve system monitoring and analysis to enhance risk management. ○ Ensure the contractor provides adequate firefighting equipment on site and conducts firefighting training for selected construction staff. δ Access Control and Security: ○ Strictly control access in and out of the construction area. ○ Ensure access to surrounding properties by construction and/or mining employees is prevented.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Identify abandoned buildings and either utilise them safely or ensure they cannot be used for malicious purposes. ○ Establish clear rules and regulations for site access to control loitering. δ Education, Training, and Development: ○ Implement education, training, and development services for the local community to support skills growth and capacity building. ○ Prepare a comprehensive employee induction programme covering land access protocols, fire management, and road safety.	
ROAD UPGRADE MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Traffic congestion on the R385 due to mining activities. δ Road wear and tear of the R385 due to mining activities.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u> δ Copy of the Wayleave Applicant and Approval. δ Earthmoving equipment to maintain the gravel pavement structure of the roads.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Maintain widened shoulders and access improvements at the mine entrance to safely accommodate ongoing heavy vehicle traffic during operations.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Safety concerns and accidents on R385 due to mining activities. δ Community disruption due to increased traffic on the R385.	δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading. δ Environmental awareness training material.	○ Ensure the access road continues to provide a minimum carriageway width of 7.0 m to allow two 3.5 m wide 36-ton trucks to pass each other comfortably with adequate clearance. ○ Retain bellmouth (entrance flare) radii with a minimum of 15 m on both entry and exit to facilitate smooth turning manoeuvres of heavy trucks and minimize off-tracking. ○ Maintain shoulders of at least 1.5 m width on either side of the access road for vehicle recovery and operational safety. δ Keep all signage and road markings in good condition to support visibility and safe navigation, especially at the mine access point. δ Implement ongoing, regular maintenance of the access road during the operational phase to repair wear and tear and ensure safe passage for all vehicles.	
ROAD AND TRAFFIC MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Traffic congestion on the R385 due to mining activities.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u>	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Road wear and tear of the R385 due to mining activities. δ Safety concerns and accidents on R385 due to mining activities. δ Community disruption due to increased traffic on the R385.	δ Copy of the Wayleave Applicant and Approval. δ Earthmoving equipment to maintain the gravel pavement structure of the roads. δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading. δ Environmental awareness training material.	<u>Mitigation / Monitoring to be Implemented</u> δ Designated Haul Routes: o Maintain clearly defined haul routes for all operational mining vehicles to ensure safe and efficient movement. o Avoid routing operational traffic through residential or sensitive areas. δ Signage and Traffic Control: o Ensure all permanent signage, including speed limits, heavy vehicle routes, and safety warnings, is clearly visible and maintained. o Use variable message signs where needed to provide real-time updates on road conditions or operational changes. δ Traffic Flow Management: o Employ traffic control personnel at critical points where operational traffic mixes with local or public traffic. o Stagger vehicle movements if necessary to prevent congestion during peak operational hours. δ Public Awareness and Communication:	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Keep local residents and businesses informed of operational traffic patterns, heavy vehicle schedules, and any temporary disruptions. ○ Maintain a feedback mechanism for the public to report traffic-related concerns or incidents. δ Monitoring and Evaluation: ○ Continuously monitor operational traffic conditions to ensure safety and efficiency. ○ Adjust traffic management measures based on observations and feedback. δ Traffic Management Plan (TMP) ○ Implement a comprehensive TMP for the operational phase, coordinating all traffic-related measures. ○ Include permanent haul routes, signage maintenance, scheduling of vehicle movements, and emergency response protocols to ensure safe operations.	
MANAGEMENT OF EMPLOYEE TRANSPORT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Traffic congestion on the R385 due to mining activities.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u>	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Road wear and tear of the R385 due to mining activities. δ Safety concerns and accidents on R385 due to mining activities. δ Community disruption due to increased traffic on the R385.	δ Road signage to control traffic speed. δ Environmental awareness training material.	<u>Mitigation / Monitoring to be Implemented</u> δ Carpooling and Ride-Sharing Programs: o Encourage employees to carpool or use ride-sharing services to reduce the number of vehicles on the road. o Facilitate this through ride-matching services or designated carpool parking areas. δ Shuttle Services: o Provide shuttle buses or vans to transport employees to and from the mining site. o Schedule shuttles to align with shift changes and accommodate multiple workers simultaneously. δ Flexible Work Hours: o Implement staggered work shifts or flexible working hours to reduce peak-time congestion. o Minimise traffic bottlenecks by spreading commuting times. δ Promotion of Public Transportation o Encourage employees to use public transport options where available.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Offer subsidies or incentives (if possible) for employees who use buses or other public transport services to reach the site. δ Telecommuting and Remote Work ○ Allow employees, where feasible, to work remotely for part of their shifts or complete administrative tasks off-site. ○ Reduce the need for daily commuting and associated traffic.	
ROAD SAFETY MANAGEMENT	<u>Existing Infrastructure: Road Network and Traffic Assessment</u> δ Traffic congestion on the R385 due to mining activities. δ Road wear and tear of the R385 due to mining activities. δ Safety concerns and accidents on R385 due to mining activities.	<u>Monitoring Programme</u> δ Traffic Management Plan <u>Requirements</u> δ Earthmoving equipment to maintain the gravel pavement structure of the roads. δ Road signage to control traffic speed. δ Proof of load weights to prevent overloading.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Warning Signs: ○ Place clear and visible warning signs at strategic locations to alert drivers about potential hazards, such as steep slopes, sharp turns, or heavy truck traffic. ○ Ensure signs are maintained and easily visible under all conditions.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
	δ Community disruption due to increased traffic on the R385.	δ Environmental awareness training material. δ Guardrails or barriers if needed. δ Safety and security lighting. δ Passenger crossings if needed.	δ Pedestrian Crossings: o Designate safe pedestrian crossings near high-traffic areas or work zones. o Install marked crossings with proper signage and barriers to keep pedestrians separated from vehicles. δ Guardrails and Barriers: o Install guardrails or barriers in high-risk areas, including sharp bends, steep inclines, or near drop-offs. o Protect vehicles and personnel from accidents by preventing vehicles from leaving the road. δ Speed Limits and Monitoring: o Establish speed limits appropriate for specific site conditions. o Enforce speed limits using speed bumps, radar signs, or speed monitoring systems to reduce accidents caused by excessive speed. δ Adequate Lighting: o Provide proper lighting for roads, walkways, and work areas, especially for night-time operations. o Ensure visibility is sufficient to reduce the risk of accidents in low-light conditions.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			δ Safety Training for Drivers: o Ensure all truck and passenger vehicle drivers are trained in safe driving practices, particularly around large mining vehicles. δ Emergency Access Routes: o Clearly mark emergency access routes to enable rapid response by emergency vehicles in case of an accident or incident.	
MANAGEMENT OF HAZARDOUS SUBSTANCES AND/OR CHEMICALS	<u>Waste Management</u> δ Potential for hazardous chemicals and/or materials to enter the surrounding watercourses as a result of operations.	<u>Monitoring Programme</u> δ Hazardous Substance Register. δ Waste Management Plan δ Formal Inspection Programme Register. δ Stormwater Management Plan. δ Emergency Response Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Chemical and Hazardous Material Storage: o All chemicals and dangerous goods must be stored in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary	δ Daily compliance monitoring by site management and ECO. δ Weekly inspection of bunded areas by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
		<u>Requirements</u> δ Formal waste disposal system with waste registers. δ Drip trays. δ Covered refuse bins for both hazardous- and general waste. δ Oil spill kit. δ Bunded areas with impermeable surface. δ Safety Data Sheets δ Stormwater control infrastructure.	containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled, and only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. o PPE must be used when handling chemicals or hazardous substances. δ Spill Prevention and Management: o Oil spill kits must be present on site, with all relevant employees trained in their use and emergency response procedures. o Drip trays must be used under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor. o Vehicle and equipment washing must only occur in designated wash bays with impermeable surfaces draining to oil sumps. Reuse of water is only permitted if verified free of hydrocarbons.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
			○ Any effluents containing oil, grease, or industrial substances must be collected in suitable receptacles for appropriate disposal or resale. ○ Significant spills must be cleaned immediately (within 2 hours), contaminated soil contained in designated hazardous waste bins, and proof of safe disposal filed. ○ No contaminated water may be discharged into the natural environment; containment and safe disposal measures must be implemented. ○ Any significant chemical, fuel, or hazardous substance spill must be reported to the Department of Water and Sanitation and other relevant authorities.	

3. DECOMMISSIONING PHASE

Table 116: Mechanisms for monitoring compliance, assessing performance against the EMPR, and reporting: Decommissioning Phase.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
VISUAL IMPACTS	<u>Visual Characteristics</u> δ Landscape character and visual amenity during decommissioning. δ Site restoration during decommissioning **(Positive Impact).**	<u>Monitoring Programme</u> δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Parking- and dedicated storage areas for equipment. δ Good housekeeping practices.	<u>Responsible Person</u> δ Site Manager and Environmental Control Officer (ECO) to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent Environmental Assessment Practitioner (EAP) during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Develop and implement a plan that includes soil restoration, replanting native vegetation, and monitoring ecological recovery. δ Remove infrastructure gradually to minimise sudden disturbance. δ Where appropriate, re-use infrastructure (e.g., access roads) for community or landowner benefit, subject to agreement.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			δ Apply techniques during dismantling that limit soil and landscape disruption. δ Restore disturbed areas promptly after infrastructure removal, using local/indigenous plant species to enhance biodiversity. δ Implement soil conservation and proper drainage measures to prevent erosion, maintain soil health, and avoid waterlogging. δ Recycle or dispose of all decommissioned materials responsibly, ensuring no remnants are left on site. δ Conduct regular post-decommissioning monitoring of site recovery, with interventions as needed to ensure restoration success. δ Involve local communities in restoration planning, gather feedback, and address concerns to align rehabilitation with local needs.	
DUST MANAGEMENT	<u>Air Quality</u> δ Potential impact of the proposed mining and materials handling	<u>Monitoring Programme</u> δ Dust Management Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	δ Daily compliance monitoring by site management and ECO. δ Weekly cleaning of dust and fines at crusher plant.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	activities on ambient air quality in terms of the daily NAAQS for PM_{10} and $PM_{2.5}$. δ Potential impact of the proposed mining and materials handling activities on ambient air quality in terms of the annual NAAQS for PM_{10} and $PM_{2.5}$. <u>Decommissioning Phase: Residual and/or Latent Environmental Risk</u> δ Dust pollution during the decommissioning phase.	δ Fall-out dust monitoring per ASTM D1739 (SANS 1137:2012). δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Dust suppression equipment such as a water car, water dispenser and sprayers on the crusher plant. δ Signage that clearly reduce the speed on the internal roads. δ Maintenance schedule to remove excess dust from the crusher plant. δ Cover crop to re-vegetate denuded areas.	δ Fallout dust monitoring by qualified service provider. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Suppress dust on all exposed surfaces using water spraying and/or approved environmentally friendly dust-allaying agents (excluding PCBs, e.g., DAS products). Increase application frequency during dry or windy conditions. δ Treat haul roads and stockpile areas with approved chemical suppressants applied according to manufacturer's guidelines to maintain dust levels below acceptable thresholds. δ Implement and maintain a site-specific Dust Management Plan. Conduct fall-out dust monitoring in line with ASTM D1739 (SANS 1137:2012) and GN R827 of 2013. Compile and retain monthly monitoring reports for auditing. δ Enforce speed limits of 30 km/h on all internal access roads, with signage in place.	δ Monthly monitoring of dust suppression equipment by ECO. δ Monthly fallout dust reporting by qualified service provider. δ Bi-annual review of effectivity of dust monitoring measures by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			δ Assess weather conditions daily and pause or reschedule dust-generating activities during strong winds. δ Inspect dust suppression equipment monthly and maintain to ensure functionality. Review suppression effectiveness bi-annually and adjust measures as required.	
NOISE MANAGEMENT	<u>Noise Ambiance</u> δ Noise nuisance caused during the decommissioning phase.	<u>Monitoring Programme</u> δ Personal noise exposure monitoring by occupational hygienist (SANS 10083:2004; SANS 10103:2008). δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Personal noise exposure monitoring equipment.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Noise monitoring by qualified service provider. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Prohibit unnecessary shouting, hooting, and other noise disturbances. Do not allow loud music in the mining area. δ Ensure all mining vehicles and machinery are fitted with silencers and kept in a roadworthy condition to minimise noise and vibrations.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by qualified service provider. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
		δ Signage indicating noise zones.	δ Appoint a qualified occupational hygienist to conduct quarterly monitoring of employee noise exposure in accordance with SANS 10083:2004, NEM:AQA (2004), and SANS 10103:2008. Include night-shift operations in the monitoring regime and implement corrective actions within one month if exceedances are identified. δ Maintain open communication with the local community about decommissioning schedules, particularly before disruptive activities, to allow residents to prepare or adjust accordingly.	
SOIL MANAGEMENT	<u>Geology, Soils and Agricultural Sensitivity</u> δ Loss of land capability δ Soil erosion δ Soil compaction <u>Decommissioning Phase: Residual and/or Latent Environmental Risk</u>	<u>Monitoring Programme</u> δ Erosion Risk Assessment. δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Earthmoving equipment to strip and stockpile the topsoil.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Implement the applicable soil related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H).	δ Daily compliance monitoring by site management, ECO and nursery staff. δ Annual compliance monitoring by independent EAP. δ Monitoring of rehabilitation success up to three years post-closure by the rehabilitation specialist and/or rock engineer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	δ Possible development of subsided areas after rehabilitation. δ Potential for crack development after rehabilitation. δ Insufficient topsoil and subsoil available for rehabilitation. δ Potential of topsoil being diluted and chemically deficient to be used during rehabilitation. δ Potential chemical changes in topsoil and subsoil leading to toxicity. δ Potential for wind and water erosion of the denuded areas.	δ Signage to identify Topsoil Stockpiles. δ Stormwater control infrastructure. δ Nursery to plant and propagate species harvested from the mining footprint for revegetation during rehabilitation. δ Designated team to control invasive and/or alien plant species that may germinate on the topsoil heaps. δ Topsoil and subsoil nutrient baseline results.	δ Use appropriate equipment and replace soils in the greatest possible thickness in single lifts to reduce compaction. δ Minimise heavy equipment movement over replaced soils. δ After placement, rip compacted soils to full rooting depth (at least 60 cm, with 30 cm as a minimum) to allow penetration of plant roots. δ Re-vegetate all disturbed areas with an indigenous grass mix as needed to re-establish protective cover and reduce soil erosion. δ Appoint a competent ECO, and rehabilitation specialist to oversee the rehabilitation phase, with watercourse areas as a priority. δ Develop and implement a Rehabilitation Plan during the life of mine and post-decommissioning to restore ecological integrity and ecosystem services in disturbed aquatic habitats. δ Determine topsoil bulk density, rip topsoil, analyse topsoil nutrient status, apply fertilisers (if needed) to	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			help ameliorate the topsoil physically and chemically. δ Regularly monitor and evaluate the rehabilitation of Pit 1 and 2, and the waste rock area to assess the risk and determine when final shaping, and replacement of subsoils and topsoil must take place. δ Implement chemical testing of the topsoil and subsoils before revegetation of the rehabilitation area to ensure the soils are suitable for plant growth. Remediate affected areas. δ Retain reserve overburden, subsoils, topsoil, mulch and nursery vegetation to remedy subsidence that may occur and maintain free-draining rehabilitated areas (where applicable) to conserve land capability. δ Minimise wind and water erosion: o Create concave slopes rather than linear slopes; o Mimic natural slopes using the geomorphic approach; o Determine the best slope angle for soils; o Minimise slope length; o Minimise runoff velocities;	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			○ Plant stabilising grasses from the nursery without delay; ○ Keep livestock out of the rehabilitation area until revegetation is well established; ○ Conduct ongoing monitoring of the erosion status of the mining footprint and rehabilitated land and identify areas of excessive erosion for remedial action.	
WASTE & HAZARDOUS SUBSTANCE MANAGEMENT	<u>Waste Management</u> δ Soil contamination. δ Contaminated run-off/stormwater from waste rock dump (WRD) into unnamed stream. δ Infrastructure decommissioning and waste management. δ Leaching of contaminants from the WRD into groundwater.	<u>Monitoring Programme</u> δ Waste Management Plan. δ Hazardous Substance Register. δ Formal Inspection Programme Register. δ Stormwater Management Plan. δ Emergency Response Plan.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ EMPR Implementation and Awareness ○ Ensure the EMPR is accessible to all contractors and staff for reference on site. ○ Follow all procedures outlined in the EMPR for contamination prevention, waste management, and emergency response during decommissioning.	δ Daily compliance monitoring by site management and ECO. δ Weekly inspection of bunded areas by ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	δ Ingestion/use of contaminated groundwater (that originated from the WRD). δ Ingestion/use of contaminated surface water (that originated from the WRD). <u>Decommissioning Phase: Residual and/or latent environmental risks</u> δ Potential contamination of soils. δ Potential of surface water pollution flowing into the mining area.	δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Formal waste disposal system with waste registers. δ Drip trays. δ Covered refuse bins for both hazardous- and general waste. δ Oil spill kit. δ Bunded areas with impermeable surface. δ Safety Data Sheets. δ Stormwater control infrastructure.	δ Chemical and Hazardous Material Storage o Store all chemicals and dangerous goods in bunded areas, outside the 100-year floodline where applicable. o Bunds and storage areas must be on level, impermeable surfaces with secondary containment, sized to contain at least 110% of the largest stored volume (per SANS 10228). o Fuel, used oil tanks, and generators must sit on plinths within bunds, with outlet valves closed when not in use. o Access to chemicals must be controlled; only authorised staff may handle substances. o Maintain a Hazardous Substances Register and ensure all Safety Data Sheets (SDS) are current and accessible. o PPE must be worn when handling chemicals or hazardous substances. δ Spill Prevention and Management o Maintain oil spill kits on site and train relevant employees in their use and emergency response procedures. o Use drip trays under all stationary equipment or vehicles; wastewater from drip trays must be collected in oil sumps or removed by a registered hazardous waste contractor.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			○ Vehicle and equipment washing may only occur in designated wash bays with impermeable surfaces draining to oil sumps; water reuse is only permitted if verified free of hydrocarbons. ○ Collect effluents containing oil, grease, or industrial substances in suitable receptacles for appropriate disposal or resale. ○ Clean significant spills immediately (within 2 hours), contain contaminated soil in designated hazardous waste bins, and file proof of safe disposal. ○ No contaminated water may be discharged into the natural environment. ○ Report significant chemical, fuel, or hazardous substance spills to the Department of Water and Sanitation and other relevant authorities. ○ Follow an approved spill prevention and emergency response plan. δ Waste Management ○ Develop and implement a waste management plan in line with the NEM:WA waste hierarchy for the decommissioning phase. ○ Segregate hazardous and general waste into clearly marked, sealable bins and remove to registered disposal facilities when full. ○ Prohibit burying or burning of waste, including rubble, domestic waste, or containers.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			○ Place all domestic waste in predefined storage areas outside floodplains; ensure regular inspection and maintenance of cleanliness. ○ Ensure all decommissioned or rehabilitated areas are cleared of waste at the conclusion of the project. δ Vehicle, Equipment, and Workshop Practices ○ Store vehicles and equipment in designated areas outside the 100-year floodline. ○ Conduct vehicle maintenance, repairs, and servicing only in designated workshop areas. Emergency repairs on immobile equipment must use drip trays and waste must be disposed of immediately as hazardous waste. ○ If a salvage yard is present, drain hydrocarbons from equipment and vehicles, keep the area clean, and remove unwanted materials from site. δ Ablution Facilities ○ Provide adequate ablution facilities for all decommissioning staff. ○ Ensure no pollution or health hazards arise; all waste must be removed to approved disposal sites.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
GROUNDWATER MANAGEMENT	<u>Geohydrology</u> δ Potential impact on the water availability in some of the user boreholes to the north. δ The gradient of groundwater towards the pit will contain any potential contamination from the Stockpile or WRD **(Positive Impact).** <u>Decommissioning Phase: Residual and/or latent environmental risks</u> δ Potential groundwater depletion and/or pollution due to mining activities.	<u>Monitoring Programme</u> δ Stormwater Management Plan (Appendix F) δ Emergency Response Plan δ Waste Management Plan δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Stormwater control infrastructure. δ Ground water monitoring equipment. δ Water quality monitoring results.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Rehabilitate the Waste Rock Dump (WRD) in accordance with the requirements of the NEM:WA and the Waste Regulations, 2015 (as amended). δ Continue with chemical and volume testing of the groundwater in the mining area boreholes and neighbouring farm boreholes for up to three years post-closure.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Monitoring of water quality and -quantity up to three years post-closure by the rehabilitation specialist and/or rock engineer.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
		δ Baseline water quality results for comparison purposes.		
SURFACE WATER MANAGEMENT & REHABILITATION OF MINING FOOTPRINT WITHIN 100 M ZOR OF EDLS	<u>Freshwater Ecosystems</u> δ Ongoing (long term) rehabilitation of the mining footprint areas within the 100 m ZoR of the EDLs. δ Post-closure management activities. <u>Decommissioning Phase: Residual and/or latent environmental risks</u> δ Sedimentation of EDL's and PFPs due to water erosion from denuded areas.	<u>Monitoring Programme</u> δ Waste Management Plan δ Stormwater Management Plan δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Copy of Water Use Authorisation. δ Stormwater control infrastructure. δ Revegetation equipment and plants.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Reshape the western side of Pit 2 within the 48 m buffer to achieve a natural gradient that integrates with the overall landscape. δ Reinstate substrate to allow interflow to follow the natural slope direction. δ Restore subsoil and topsoil immediately after backfilling is complete. Rip all bare areas and re-vegetate with suitable indigenous species. δ Implement post-backfilling alien invasive plant (AIP) control measures. Continue monitoring and control	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Rehabilitation specialist to undertake monitoring of the freshwater ecosystems for up to three years post-closure.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
		δ Baseline water quality results for comparison purposes.	of alien vegetation during post-closure rehabilitation. δ Rehabilitate backfilled areas using a species assemblage similar to the current vegetation, as recommended by a suitably qualified specialist. δ Monitor erosion in backfilled and disturbed areas. Immediately rehabilitate any developing rills, gullies, or bare patches by infilling and revegetation. Use sediment control measures within 100 m of the southern EDL boundary where necessary. δ Infilling and revegetation should increase surface roughness to discourage concentrated flow and promote diffuse flow patterns. δ Conduct follow-up revegetation where initial efforts are unsuccessful to maintain soil protection and prevent sheet and rill erosion. δ Remove and appropriately dispose of contaminated topsoil along roads and immediate vicinities (e.g., hydrocarbons or oils). Contaminated material must not be used for restoration.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			δ Undertake monitoring of the freshwater ecosystems for at least three years post-closure, with particular attention to alien vegetation invasion.	
VEGETATION MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover & Fauna.</u> δ Potential impact on the Kuruman Mountain Bushveld habitat and diversity during the decommissioning phase. δ Potential impact on the Olifantshoek Plains Thornveld habitat and diversity during the decommissioning phase. δ Potential impact on the ESA during the decommissioning phase.	<u>Monitoring Programme</u> δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Alien Invasive Plant Species Management Plan. δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Visible beacons / fences to demarcate mineable areas.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Implement the applicable fauna and flora related matters discussed in the Rehabilitation, Decommissioning and Closure Plan (Appendix H). δ Rehabilitation of Infrastructure and Footprint Areas: o Rehabilitate all infrastructure and footprint areas in accordance with the approved rehabilitation plan. o Appoint an experienced nursery manager that will train nursery staff, establish and manage the nursey and propagate plant species from the pre-mining footprint.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Monitoring of rehabilitation success up to five years post-closure by nursery staff and/or rehabilitation specialist.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	δ Potential impact on the Kuruman Mountain Bushveld faunal habitat and diversity during the decommissioning phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal habitat and diversity during the decommissioning phase. δ Potential impact on the Kuruman Mountain Bushveld faunal SCC during the decommissioning phase. δ Potential impact on the Olifantshoek Plain Thornveld faunal SCC during the	δ Environmental awareness training material. δ Nursery to plant and populate species harvested from the mining footprint for revegetation during rehabilitation. δ Plant destruction/removal permits. δ Baseline soil nutrient results. δ Fences, or other structures/methods to keep livestock away from revegetated areas. δ Equipment to water revegtated areas.	○ Implement and monitor rehabilitation for a minimum of 5 years post-closure, or until habitat and biodiversity reinstatement is achieved to a level that supports natural processes and veld succession. ○ Ensure rehabilitation outcomes are aligned with the designated post-closure land use, aiming to restore natural vegetation resembling pre-mined communities, enhance ecological function, and maintain habitat connectivity. δ Post-Closure Land Use Guidance: ○ Determine and agree upon the post-closure rehabilitation land use prior to finalising the rehabilitation plan. ○ Preferably restore natural vegetation representing pre-mined vegetation communities, prioritising ecological function and habitat connectivity. δ Species Selection and Biodiversity Objectives: ○ Select species that meet biodiversity and land-use objectives, with preference for locally adapted indigenous species. ○ Ensure rehabilitated areas can sustain floral Species of Conservation Concern (SCC), particularly those rescued and propagated for relocation into rehabilitated sites.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	decommissioning phase. <u>Decommissioning Phase: Residual and/or latent environmental risks</u> δ Potential failure of the nursery that may threaten the rehabilitation process. δ Potential impact of livestock browsing/grazing on revegetated areas. δ Potential failure of revegetation of the mined areas. δ Potential hunting, trapping, trafficking and plant harvesting. δ Potential degradation of the surrounding areas.		○ Prohibit the collection of floral SCC or protected flora by rehabilitation and decommissioning teams. ○ Propagate plants from the pre-mining footprint in the nursery. ○ Monitor chemical and physical properties of soil to promote healthy plant growth. ○ Water the revegetated areas daily. δ Site Clearance and Preparation: ○ Remove all temporary structures, waste, rubble, and alien invasive plants (AIPs) before rehabilitation activities commence. ○ Prepare and level sites carefully to avoid disturbance to adjacent natural areas. ○ Backfill pits with excavated waste rock material where feasible and shape remaining disturbed areas to blend with the natural landscape. ○ Shape slopes to gradients conducive to vegetation establishment; where steeper slopes are unavoidable, implement erosion-control measures and provide adequate stormwater management. δ Topsoil and Backfilling Management: ○ Replace stockpiled topsoil to its original depth during rehabilitation.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	δ Potential failure of rehabilitation.		○ Where stockpiled topsoil is insufficient or unsuitable (e.g., contaminated with AIPs), import appropriate soils to support vegetation re-establishment. ○ Monitor backfilled areas for subsidence and erosion; remediate promptly through infilling, re-profiling, and revegetation. δ Rehabilitation of Surrounding Natural Areas: ○ Rehabilitate any natural areas beyond the authorised footprint that were affected by mining or decommissioning activities, using indigenous species. ○ Rip and profile soils compacted during mining and construction activities outside the footprint, with particular focus on suppressing AIP spread. δ Edge Effects and Alien Invasive Plant (AIP) Control: ○ Manage edge effects such as erosion, dust, and AIP spread adjacent to rehabilitated areas. δ Floral SCC Monitoring: ○ Continue monitoring of rescued and relocated floral SCC until successful establishment is confirmed in rehabilitated areas. ○ Prevent livestock browsing/grazing on recently revegetated areas.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
ALIEN INVASIVE PLANT SPECIES MANAGEMENT	<u>Terrestrial, Biodiversity, Conservation Areas and Groundcover</u> δ Potential infestation of the rehabilitated areas with invasive plant species. <u>Decommissioning Phase: Residual and/or latent environmental risks</u> δ Invasive plant species establishing in the rehabilitated areas.	<u>Monitoring Programme</u> δ Alien Invasive Plant Species Management Plan. δ Vegetation Monitoring Plan. δ Fire Management Plan. δ Stormwater Management Plan δ Rehabilitation, Decommissioning and Closure Plan <u>Requirements</u> δ Designated team to control invasive plant species when needed. δ Contact details of a Pest Control Officer.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ General AIP Control: o Strictly manage AIP proliferation to prevent impacts on adjacent natural areas. o Pay particular attention to Category 1b and 2 species as listed in the NEMBA Alien Species Lists (2020), in line with the NEMBA Alien and Invasive Species Regulations (2020). δ Monitoring and Control: o Conduct ongoing AIP monitoring, clearing, and control throughout decommissioning phase. o Regularly monitor a 30 m buffer surrounding proposed activities for AIP proliferation and control instances as they arise. o Inspect disturbed areas and linear infrastructure for AIP spread until such areas are successfully rehabilitated.	δ Daily compliance monitoring by site management and ECO. δ Quarterly monitoring and reporting by ECO. δ Annual compliance monitoring by independent EAP. δ Monitoring of rehabilitation success up to three years post-closure by the rehabilitation specialist.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
		δ Environmental awareness training material. δ Cover crop to seed rehabilitated areas.	δ Cleared Vegetation Disposal o Do not leave cleared alien vegetation on unprotected ground to avoid seed dispersal. o Dispose of all cleared AIP material at a licensed waste facility compliant with legal standards, or at an approved garden refuse site. δ Implementation and Restrictions o Ensure the AIP Management/Control Plan is implemented by a suitably qualified professional with proven AIP management experience. o Prohibit chemical control of AIPs within 32 m of a watercourse, unless the chemical is registered as safe for use in aquatic environments by the Working for Water programme. δ Monitoring, Reporting and Record-Keeping o Submit quarterly reports on AIP control to track effectiveness and monitor spread, during the decommissioning phase.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
SOCIO-ECONOMIC MANAGEMENT	<u>Socio-Economic Environment</u> δ Loss of employment opportunities and economic changes. δ Environmental restoration and land use changes **(Positive Impact).**	<u>Monitoring Programme</u> δ Social and Labour Plan (Appendix T) <u>Requirements</u> δ Local procurement policy. δ Community Liaison Officer. δ Environmental awareness training material.	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Introduce re-skilling and training programmes for employees to facilitate transition into other employment sectors, reducing the impact of potential job losses. δ Facilitate workshops and provide funding support for local businesses to explore and access new markets, promoting economic resilience in the community.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP. δ Annual reporting on the implementation of the SLP.
FIRE MANAGEMENT	<u>Decommissioning Phase: Residual and/or latent environmental risk</u> δ Veld fires affecting sensitive areas such as	<u>Monitoring Programme</u> δ Fire Management Plan δ Emergency Response Plan	<u>Responsible Person</u> δ Site Manager and ECO to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.	δ Daily compliance monitoring by site management and ECO. δ Annual compliance monitoring by independent EAP.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
	the nursery and/or revegetated areas.	<u>Requirements</u> δ Fire beaters and fire extinguishers. δ Contact number of the fire association/-brigade. δ Environmental awareness training material.	δ Compliance to be monitored by the independent EAP during the annual environmental audit. <u>Mitigation / Monitoring to be Implemented</u> δ Implement a Fire Management Plan (FMP) to manage or suppress any fires that may occur during all phases of the project. δ Do not allow open fires in natural areas. Restrict contained fires for heating or cooking (e.g., in fire drums) to designated site camp areas. δ Prevent employees from setting fires outside designated areas. δ Do not store fuel or chemicals under trees. Do not store gas in the same area as liquid fuel. δ Restrict smoking to designated areas located at least 3 m from fuel or chemical storage and provide sand buckets for cigarette disposal. δ Equip all work areas with adequate firefighting equipment, including rubber beaters in veld areas and at least one appropriately rated fire extinguisher at all sites.	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
DECOMMISSIONING PHASE				
			δ Implement specific fire safety precautions during welding, grinding, gas cutting, or other “hot work.” Keep a working fire extinguisher immediately at hand. δ Report any fires observed on site to the responsible SHE representative or fire officer. δ In the event of large fires, assemble all personnel at a safe assembly point for evacuation, and inform the fire department or local fire watch to ensure rapid fire control. δ Should the risk increase, retain a reserve of plants in the nursery for revegetation and create effective firebreaks.	

k) Indicate the frequency of the submission of the performance assessment report.

An Environmental Audit Report, prepared in accordance with Appendix 7 of Regulation 34 of the EIA Regulations, 2014 (as amended), will be submitted annually to the DMPR for compliance monitoring purposes, or as per the frequency specified in the Environmental Authorisation.

l) Environmental Awareness Plan

i) Manner in which the Applicant intends to inform his or her employees of any environmental risk which may result from their work.

Once the Applicant receives the mining right and is authorised to commence with the proposed activity, a copy of the Environmental Impact Assessment Report and Environmental Management Programme, EA and WML will be provided to the site manager for review. An induction meeting will be held with the mining-related employees to inform them of the Basic Environmental Conduct Rules.

In addition to the above, the ECO, supported by appropriately qualified persons, will have to prepare and/or familiarise himself with the following documents prior to commencement of the activities:

- Alien Invasive Plant Species Management Plan;
- Dust Management Plan;
- Emergency Response Plan;
- Erosion Risk Assessment;
- Fire Management Plan;
- Formal Inspection Programme Register (of storage areas);
- Groundwater Monitoring Programme;
- Hazardous Substances Register;
- Heritage Management Plan;
- Noise Management Plan;
- Social and Labour Plan;
- Stormwater Management Plan;
- Surface Water Monitoring Programme;
- Rehabilitation, Decommissioning and Closure Plan;
- Traffic Management Plan;
- Vegetation Monitoring Plan; and

- Waste Management Plan.

ii) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EMPR and its requirement and commitments before any mining takes place.

An independent Environmental Assessment Practitioner must annually check compliance of the mining activity to the management programmes described in the EMPR.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst preforming their tasks.

- **Site Management**
  - Stay within boundaries of site – do not enter adjacent properties.
  - Keep tools and material properly stored.
  - Smoke only in designated areas.
  - Use toilets provided – report full or leaking toilets.

- **Water Management and Erosion**
  - Check that rainwater flows around work areas and are not contaminated.
  - Report any erosion.
  - Check that dirty water is kept from clean water.
  - Do not swim in or drink from excavations and/or dams.

- **Waste Management**
  - Take care of your own waste.
  - Place waste in the correct containers and always close lid.
  - Don't burn waste.
  - Pick-up any litter laying around.

- **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**
  - Never mix general waste with hazardous waste.
  - Use only sealed, non-leaking containers.
  - Keep all containers closed and store only in approved areas.
  - Always put drip trays under vehicles and machinery.
  - Empty drip trays after rain.

- Stop leaks and spills, if safe.
  - ✓ Keep spilled liquids moving away.
  - ✓ Immediately report the spill to the site manager/supervision.
  - ✓ Locate spill kit/supplies and use to clean-up, if safe.
  - ✓ Place spill clean-up wastes in proper containers.
  - ✓ Label containers and move to approved storage area.

δ **Discoveries:**

- Stop work immediately.
- Notify site manager/supervisor.
- Includes – Archaeological/palaeontology finds, Cultural artefacts, Contaminated water, Pipes, Containers, Tanks and Drums, Any buried structures.

δ **Air Quality:**

- Wear protection when working in very dusty areas.
- Implement dust control measures:
  - ✓ Water all roads and work areas according to instructions.
  - ✓ Minimize handling of material.
  - ✓ Obey speed limit and cover trucks.

δ **Driving and Noise:**

- Use only approved access roads.
- Respect speed limits.
- Only use turn-around areas – no crisscrossing through undisturbed areas.
- Avoid unnecessary loud noises.
- Report or repair noisy vehicles.

δ **Vegetation and Animal life:**

- Do not remove any plants or trees without approval of the site manager.
- Do not collect firewood.
- Do not catch, kill, harm, sell or play with any animal, reptile, bird, or amphibian on site.
- Report any animal trapped in the work area.
- Do not set snares or raid nests for eggs or young.

- **Fire Management:**
  - Do not light any fires on site, unless contained in a drum at demarcated area.
  - Put cigarette butts in a rubbish bin.
  - Know the position of firefighting equipment.
  - Report all fires.
  - Don't burn waste or vegetation.

m) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

The Applicant commits to annually reviewing and updating the financial provision calculation, which will then be submitted to the DMPR for review and approval to ensure it is sufficient to cover the environmental liability and mine closure costs at that time.

1. UNDERTAKING

The EAP herewith confirms,

a) the correctness of the information provided in the reports ☒
b) the inclusion of comments and inputs from stakeholders and I&AP's; ☒
c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒ and
d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

Christine Fouché

Signature of the Environmental Assessment Practitioner:

Greenmined Environmental (Pty) Ltd

Name of Company:

18 September 2025

Date:

UNDERTAKING

I,….. ……the undersigned and duly authorised thereto by……*Assmang (Pty) Ltd*…….

Company / ~~Closed Corporation / Municipality or Council~~
(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the ~~BAR and EMPR~~ / EIA and EMPR and accept full responsibility therefore.
(Delete whichever is not applicable)

SIGNED at …… this …… day …… 2025

FINAL DOCUMENT TO BE SIGNED BY APPLICANT

_____

SIGNATURE

WITNESSES:

1……..

2……..

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended.

SIGNED at …… this …… day …… 2025

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REGIONAL MANAGER

NORTHERN CAPE

Undertaking/eg

-END-

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