



## **mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

### **DRAFT BASIC 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).

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**FILE REFERENCE NUMBER SAMRAD: NC30/5/1/3/2/11005MP**

### **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 Authorisation 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 Regulations, 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 taken into account 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 authorisation 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 a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation 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 the 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 basic assessment process**

The objective of the basic assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
  - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - (ii) the degree to which these impacts —
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources; and
    - (cc) can be managed, avoided or mitigated;
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
  - (i) identify and motivate a preferred site, activity and technology alternative;
  - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
  - (iii) identify residual risks that need to be managed and monitored.

## DEFINITIONS

**Alternatives** - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

- i. The property on which or location where it is proposed to undertake the activity;
- ii. The type of activity to be undertaken;
- iii. The design or layout of the activity;
- iv. The technology to be used in the activity, and;
- v. The operational aspects of the activity.

**Baseline** - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

**Basic Assessment Process** – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017). These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

**Biodiversity** - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

**Borehole** - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

**Community** - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

**Construction Phase** - The stage of project development comprising site preparation as well as all construction activities associated with the development.

**Consultation** - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

**Critical Biodiversity Area** - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

**Cumulative Impacts** - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

**Environment** - The surroundings within which humans exist and that are made up of

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

**Environmental Authorisation (EA)** – The authorisation by a competent authority of a listed activity.

**Environmental Assessment Practitioner (EAP)** – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

**Environmental Impact Assessment (EIA)** – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

**Environmental Impact Report (EIR)** - A report assessing the potential significant impacts as identified during the Scoping phase.

**Environmental Management Programme (EMPr)** - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

**Gross Domestic Product (GDP) by region** - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

**Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.**

**Impact** - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

**Interested and Affected Party (I&AP)** – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

**Municipality** –

- (a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
- (b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
  - (i) The district municipality, or
  - (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

**NEMA EIA Regulations** - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

**No-Go Alternative** – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

**Public Participation Process (PPP)** - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

**Registered Interested and Affected Party** – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

**Scoping process** - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

**Scoping Report** – The report describing the issues identified during the scoping process.

**Significant impact** – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Spatial Development Framework (SDF)** - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

**Specialist study** - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

**Stakeholders** - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

**Sustainable development** - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

**Visibility** - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

**Visual Character** - The elements that make up the landscape including geology, vegetation and land-use of the area.

**Visual Quality** - The experience of the environment with its particular natural and cultural attributes.

**Visual Receptors** - Individuals, groups or communities who are subject to the visual influence of a particular project.

## ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EStA	Early Stone Age
FoT	“Free on Truck “: means there is no processing and that it’s a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km <sup>2</sup>	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m <sup>3</sup>	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area

NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RDL	Red Data List
ROM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License
WUL A	Water Use License Application



## Contents

1.	Contact Person & Contact Details EAP.....	1
1.1	Details of EAP.....	1
1.2	Expertise of the EAP.....	1
2.	Location of the overall Activity.....	2
3.	Locality map.....	2
4.	Description of the scope of the proposed overall activity.....	6
4.1	Listed and specified activities.....	7
4.2	Description of the activities to be undertaken.....	9
4.2.1	Construction phase: Development of infrastructure and logistics.....	9
4.2.2	Operational phase.....	10
4.2.3	Decommissioning phase.....	11
5.	Policy and Legislative Context.....	12
6.	Need and desirability of the proposed activities.....	17
6.1	Mining and Biodiversity Guidelines (2013).....	17
6.2	Mining and Employment benefits.....	19
6.3	Gamagara IDP & SDF.....	19
6.4	John Taolo Gaetsewe District Municipality IDP.....	19
6.5	Northern Cape Provincial Spatial Development Framework (NCPSDF).....	21
6.6	Northern Cape Provincial Growth and Development Strategy (NCPGDS).....	21
6.7	DEA Guideline on Need and Desirability (2017).....	21
7.	Motivation for the overall preferred site, activities and technology alternative.....	23
8.	Process to Reach the Proposed Preferred Alternative.....	23
8.1	Details of the development footprint alternatives considered.....	23
8.1.1	Location or Site Alternatives.....	23
8.1.2	Type of activity.....	24
8.1.3	Design or Layout of activity.....	24
8.1.4	The technology to be used in the activity.....	24
8.1.5	Operational alternatives.....	24
8.1.6	The No-go Alternative.....	24
9.	Details of the Public Participation Process Followed.....	25
9.1	Summary of issues raised by I&Aps.....	26
10.	Site sensitivity (Baseline Environment).....	27
10.1	Regional setting.....	27
10.2	Geology.....	27
10.3	Soil and land capability.....	27
10.4	Landscape – Topography.....	29
10.5	Climate.....	29
10.6	Biodiversity, Flora and Fauna.....	29
10.6.1	Biodiversity.....	29
10.6.2	Fauna.....	31
10.6.3	Flora.....	31
10.7	Aquatic biodiversity and Water Resources.....	33
10.8	Emissions.....	35
10.8.1	Air Quality.....	35
10.8.2	Noise.....	35
10.9	Socio-economic.....	35
10.10	Paleontological, Archaeological and Cultural and Heritage Resources.....	35
10.10.1	Archaeological and Cultural and Heritage Resources.....	35
10.10.2	Paleontological Resources.....	36

10.11	Environmental and current land use maps.....	38
10.12	Description of specific environmental features and infrastructure on the site .....	38
11.	Risks and associated Impacts identified .....	38
11.1	Potential Risks/impacts.....	38
11.1.1	Potential risks associated with Soil (contamination, erosion, compaction) & Land capability (viable and sustainable land).....	38
11.1.2	Potential risks associated with Change in topography .....	39
11.1.3	Potential Risks associated with Biodiversity, Flora & Fauna.....	39
11.1.4	Potential Risks associated with Aquatic biodiversity & Water Resources.....	39
11.1.5	Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions.....	40
11.1.6	Potential Risks associated with the socio-economic environment.....	40
11.1.7	Potential Risks associated with regard archaeological, cultural heritage or paleontological sites .....	41
11.1.8	Potential Risks associated with the Preferred Alternative. ....	41
11.1.9	Potential Risks associated with the No-Go Alternative .....	41
11.2	Methodology used in assessing potential environmental impacts .....	44
11.3	Positive and negative impacts of proposed activity and alternatives .....	46
11.3.1	Positive impacts .....	46
11.3.2	Negative impacts.....	46
11.4	The mitigation measures and the level of risk.....	46
11.4.1	Soil and Land Capability: .....	46
11.4.2	Biodiversity Flora and Fauna:.....	48
11.4.3	Assessment of potential cumulative impacts .....	48
11.5	Motivation where no alternative sites were considered.....	49
11.6	Statement Motivating the Preferred Sites.....	49
12.	Environmental impact assessment .....	49
12.1	Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.....	49
12.2	Assessment of each identified potentially significant impact and risk.....	49
12.3	Summary of specialist reports. ....	49
13.	Environmental impact statement .....	75
13.1	Summary of the key findings of the environmental impact assessment.....	75
13.2	Final Site Map.....	75
13.3	Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.....	75
13.3.1	Positive Impacts .....	75
13.3.2	Negative Impacts .....	75
13.4	Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr .....	76
13.4.1	Management Objectives.....	76
13.4.2	Outcomes.....	76
13.5	Description of any assumptions, uncertainties and gaps in knowledge.....	76
13.6	Reasoned opinion as to whether the proposed activity should or should not be authorized	77
13.6.1	Reasons why the activity should be authorized or not.....	77
13.6.2	Conditions that must be included in the authorisation .....	77
13.6.3	Period for which the Environmental Authorisation is required.....	77
13.6.4	Undertaking .....	78
14.	Financial Provision .....	78
14.1	Legal Framework.....	78

14.2	Calculation .....	78
14.3	Explain how the aforesaid amount was derived.....	78
14.4	Confirm that this amount can be provided for from operating expenditure.....	78
15.	Specific Information required by the competent Authority .....	79
15.1	Compliance with sections 24(4)(a) and (b) of NEMA.....	79
15.2	Other matters required in terms of sections 24(4)(a) and (b) of the Act. ....	79
16.	Environmental Management Program .....	79
16.1	Details of the EAP,.....	79
16.2	Description of the Aspects of the Activity .....	79
16.3	Composite Map.....	79
16.4	Description of Impact management objectives including management statements.....	79
16.5	Determination of closure objectives.....	79
16.6	Volumes and rate of water use required for the operation. ....	79
16.7	Has a water use license been applied for? .....	79
16.8	Impacts to be mitigated in their respective phases.....	80
16.9	Impact Management Outcomes .....	88
16.10	Impact Management Actions.....	89
17.	Financial Provision .....	91
17.1	Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation. ....	91
17.2	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.....	92
17.3	Rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities .....	92
17.4	Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives. ....	92
17.5	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.....	92
17.6	Confirm that the financial provision will be provided as determined. ....	92
17.7	Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including.....	93
17.8	Indicate the frequency of the submission of the performance assessment/ environmental audit report. ....	94
18.	Environmental Awareness Plan .....	94
18.1	Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work. ....	94
18.2	Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment. ....	94
18.3	Specific information required by the Competent Authority.....	95
19.	Undertaking .....	95

# PART A

## SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

### 1. Contact Person & Contact Details EAP

#### 1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl  
EAPASA Reg. Number 2019/2034  
Tel No.: 082 8898696; Fax No.: 086 6562942  
e-mail address: vanzyl.eap@gmail.com

#### 1.2 Expertise of the EAP

##### The qualifications of the EAP

Current qualifications in this field were obtained through formal studies at the Cape Town Technicon, Nelson Mandela Metropolitan University and the University of the Orange Free State, which is the following:

- National Diploma Nature Conservation (1986)
- National Higher Diploma (B-Tech) Nature Conservation (1992)
- Master's Degree Environmental Management (MOB 750) (2001)

Further qualifications in this field were also obtained through short courses at the University of the Orange Free State, which is the following:

Environmental Impact Assessment (2001)  
Wildlife Management through Veld Management (2001)  
Resource evaluation and game ranch management (2003)  
Arc GIS (2009)

##### Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

With the implementation of the Mineral and Petroleum Resources Development Act 28 of 2002 Mr. van Zyl has started assisting small scale miners with all facets of applications for mining permits in terms of section 27 and prospecting rights in terms of section 16 of the MPRDA. Mr van Zyl has an excellent knowledge of the relevant acts applicable to the mining sector including the following:

- Mineral and Petroleum Resources Development Act 28 of 2002
- Mineral and Petroleum Resources Development Amendment Act 49 of 2008
- Mineral and Petroleum Resources Regulations 2004
- National Environmental Management Act 107 of 1998 as amended
- National Environment Laws Amendment Act 25 of 2014 as amended
- NEMA: Environmental Impact Assessment Regulations, 2014
- NEMA: Financial Provisioning Regulations, 2015
- NEMA: Waste Act 59 of 2008 as amended
- NEMA: Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015
- National Water Act 36 of 1998 as amended (with special attention to section 21 water uses)

Since 2002 Mr. van Zyl completed more than 150 applications for mining permits and more than 100 applications for prospecting rights. The mineral regulations and environmental management for most of these projects were managed throughout the life of the project including:

- Applications – manual and Samrad
- Prospecting work programs including financial and technical competence
- Public participation process
- EIA and EMP's now BAR and EMP's
- Annual Rehabilitation Plans

- Final Rehabilitation, Decommissioning and Mine Closure Plans including Risk Assessment Reports
- Execution and registration of rights including sec 42 diagrams for MPTR0
- Performance audits including reviews of Annual Closure Plans and Rehabilitation, Decommissioning and Mine Closure Plans together with financial quantum reviews.
- Application for closure certificate

Although Mr. van Zyl specializes in small scale mining operations and prospecting operations that requires investigation, assessment and communication according to the procedure as prescribed in regulations 19 and 20 of the EIA Regulations he also assists 5 mining rights with environmental management. Other sections of the MPRDA that Mr. van Zyl has experience in is:

- Section 102 applications and Section 20 applications
- Section 53 Applications and Section 11 Applications

## 2. Location of the overall Activity

**Table 1**

<b>Farm Name:</b>	Portion of Portion 1 Farm Cropwell No 384
<b>Application area (Ha)</b>	5Ha
<b>Magisterial district:</b>	Northern Cape Province John Taolo Gaetsewe District Municipality Gamagara Local Municipality
<b>Distance from nearest town</b>	21km West from Kuruman on N14
<b>21-digit Surveyor General Code</b>	C0410000000038400001

## 3. Locality map

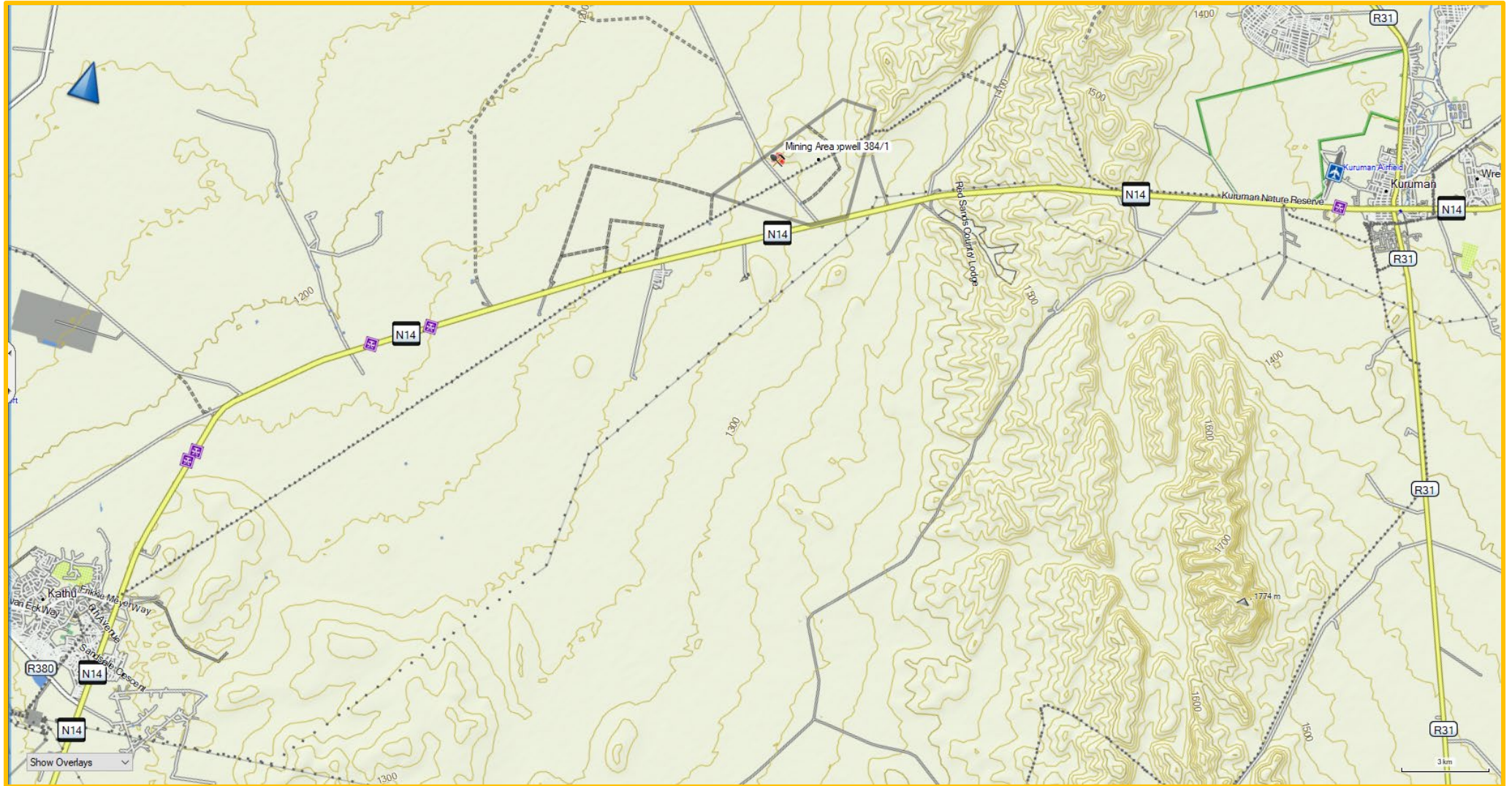
The Mining Area is located on a 5Ha portion of Portion 1 Farm Cropwell No 384 situated in the John Taolo Gaetsewe District Municipality and Gamagara Local Municipality of the Northern Cape Province.

The property is registered in the name of National Government of the Republic of South Africa by virtue of Title deed T3462/2017 filed in the Vryburg Deeds Office. LPI Code C0410000000038400001. The mining area is located approximately 21km West from Kuruman on the N14, untitled paved road and existing farm tracks. Refer to the layout plan **Figure 2** that shows the properties and co-ordinates.

Property	Portion	Size (Ha)		LPI Code	Deed	Owner
		Property	Application			
Cropwell 384	1	1166.1288	5	C0410000000038400001	T3462/2017	National Government of the Republic of South Africa

### Figure 1: Locality map

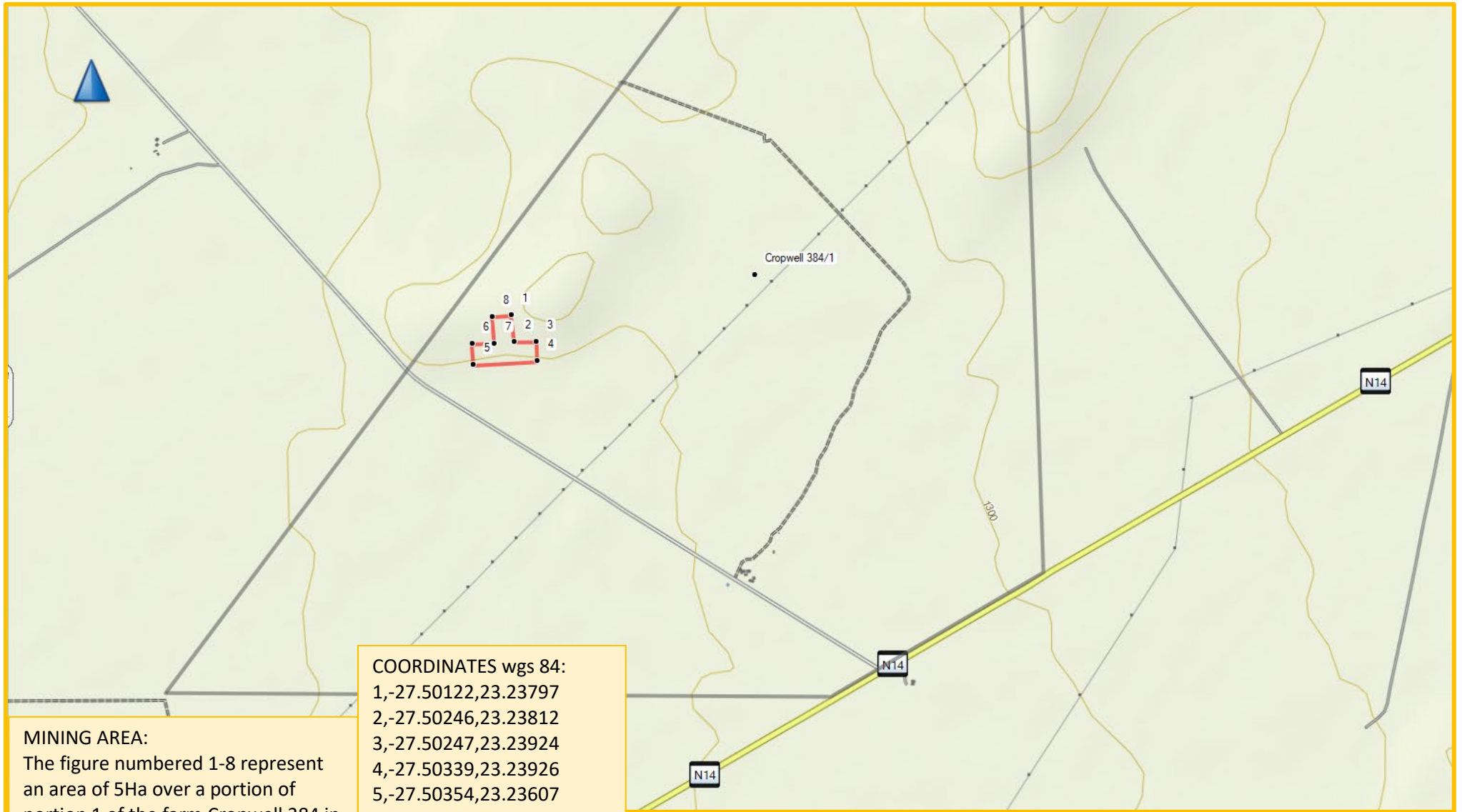
contemplated in regulation 2(2) read with regulation 2(3) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 30 of 2002)



### Figure 2: Layout plan



contemplated in regulation 2(2) read with regulation 2(3) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 30 of 200



**MINING AREA:**

The figure numbered 1-8 represent an area of 5Ha over a portion of portion 1 of the farm Cropwell 384 in John Taolo Gaetsewe of the Northern Cape







#### **4. Description of the scope of the proposed overall activity**

The applicant proposes to open a burrow pit on a 5-ha portion of Portion 1 of the Farm Cropwell No 384, in the John Taolo Gaetsewe District of the Northern Cape Province (“the property”). The property is registered in the name of National Government of the Republic of South Africa by virtue of title deed T3462/2017.

Mining will be in the form of an opencast mine. Disturbed areas will be demarcated as laydown and stockpile areas. Any virgin areas allocated for mining and stockpiling would first be stripped of all available topsoil. This topsoil would be stockpiled separately for later use when the quarry is rehabilitated. Any oversize material and rocks will be removed and stockpiled separately for later use when the quarry is rehabilitated.

The proposed activity will entail blasting using explosives in order to loosen the hard rock from the existing quarry on the property. The loosened hard rock will be crushed and screened using a mobile crusher whereafter it will be transported to be stockpiled until sold.

At final closure all leftover product stockpiles as well as oversize material will be backfilled into the excavation and the sides of the excavation will be profiled to form an even depression.

Natural aggregates are used in its natural state, and does not require concentration and extraction from an ore. It is these latter two processes that usually results in significant environmental impacts such as acid mines drainage and other toxic effects associated with many of the metal extraction industries, and are therefore not applicable to this type of mining. The implementation of the mitigating and management measures prescribed in the annual rehabilitation plan will ensure concurrent rehabilitation and after implementation of the mitigating measures most impacts can be classified as insignificant especially when looking at the current state of the environment.

4.1 Listed and specified activities

**Table 2**

NAME OF ACTIVITY	Aerial extent of Activity Ha or m <sup>2</sup>	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
<b>Mine planning including development of stockpiles and haul roads</b>				
Demarcate mining areas as defined in Mine Plan Using visible poles as demarcation system.	1Km	No	NA	No
Conduct Environmental Induction training	All staff members	No	NA	No
All access roads are already in place and only needs maintenance	1Km	No	NA	No
Prepare areas for infrastructure such as: Mobile containers for site office and secure storage area Waste management facilities (laydown areas, waste scrap salvage yard, petrochemical and hazardous waste storage; bio-cell/soil farm); Product stockpile and dispatch yards; Disturbed areas will be demarcated as laydown and stockpile areas	Laydown and Logistics Approx. 0.5 Ha	Yes	<b>LN1 Notice R 983 (dated 4/12/ 2014), as amended by Notice 327 (dated 7/04/2017), 706 (dated 13/07/2018) and 517 (dated 11/06/2021).</b> <b>Activity 21:</b> Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in Listing Notice 1 or in Listing Notice 3 of 2014, required to exercise the mining permit.	No
Hydrocarbon storage	< 30m <sup>3</sup>	No	NA: Will be less volume than limits for EA	No
Sanitation requirements (chemical toilets)	Part of logistics	No	NA	No
<b>Operational phase including blasting and crushing</b>				
Opencast mine. The proposed activity will entail blasting using explosives in order to loosen the hard rock from the existing quarry on the property. The loosened hard rock will be crushed and screened using a mobile crusher whereafter it will be transported to be stockpiled until sold.	Total footprint is 5 Ha	Yes	<b>LN1 Notice R 983 (dated 4/12/ 2014), as amended by Notice 327 (dated 7/04/2017), 706 (dated 13/07/2018) and 517 (dated 11/06/2021).</b> <b>Activity 21:</b> Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in Listing Notice 1 or in Listing Notice 3 of 2014, required to exercise the mining permit.	Refer to Waste Activities included below where applicable.

Any virgin areas allocated for mining and stockpiling would first be stripped of all available topsoil. This topsoil would be stockpiled separately for later use when the quarry is rehabilitated. Any oversize material and rocks will be removed and stockpiled separately for later use when the quarry is rehabilitated. Overburden and waste rock will be used to level the mine floor and to create an even depression.	Product stockpile ±0.5 Ha	No	NA	<b>GNR 632 (dated 24/07/2015):</b> Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation
<b>Decommissioning phase including safety measures for remaining excavations</b>				
Backfill leftover product in excavations and fence remaining dangerous excavations securely	±1000m <sup>3</sup>	No	Na	<b>GNR 633 (dated 24/07/2015): Category A:</b> Residue stockpiles or residue deposits (15) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
Remove all structures, foundations and footings not required by landowner	±0.5 Ha	No	Na	<b>GNR 921 (dated 29/11/ 2013) Category A:</b> Decommissioning of facilities and associated structures and infrastructure (14) The decommissioning of a facility for a waste management activity listed in Category A or B of this schedule.
Rip all hardened areas and allow to revegetate naturally	± 1Ha	No	Na	
<b>AFTERCARE PERIOD</b>				
Remove alien vegetation, if present	Total area 5Ha	No	Na	No
Conduct final environmental audit	Total area 5Ha	No	Na	No
Lodge Closure Application	Total area 5Ha	No	Na	No.

#### 4.2 Description of the activities to be undertaken

The project is divided into three phases as listed below:

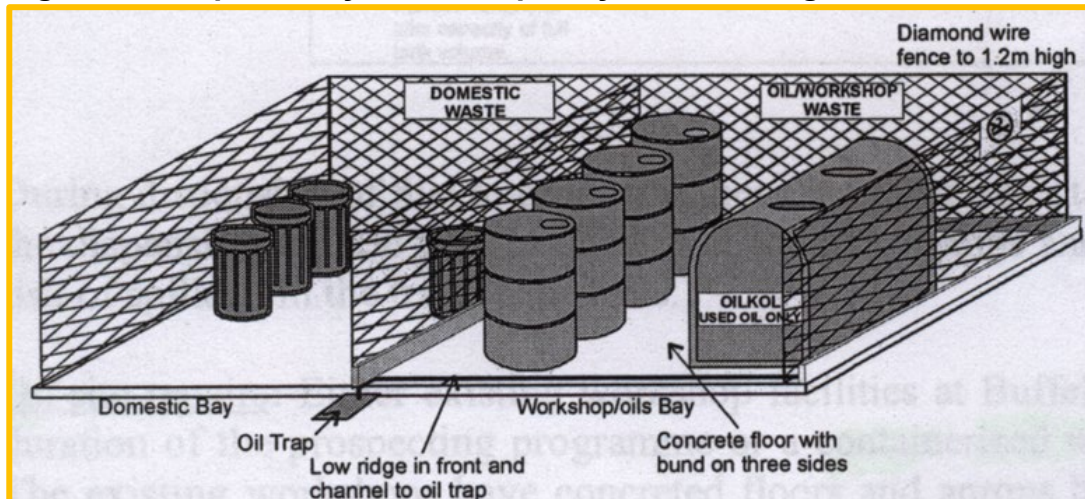
- Construction, including the planning and implementation phases, creation of infrastructure, mine or pit footprint, access ramps and haul roads, waste, residue and product stockpiles, handling areas, water reticulation and provision of power.
- Operation, including daily activities, mine development and expansion.
- Decommissioning and Closure, including scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of the rehabilitation program, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance.

The methodology and technology to be employed in each phase is described below:

##### 4.2.1 Construction phase: Development of infrastructure and logistics

- Access and service roads: Access to the mine works will be via the N14 main road between Kathu and Kuruman and existing farm tracks as shown in Figure 1 to 3. Existing farm tracks will be used as haul roads and no new roads will be developed.
- Water supply: No process water is used in the mining process.
- Electricity supply: No electricity is used in the mining area.
- Logistics: No infrastructure is present or will be required due to the small scale and simple mining method.
- A stockpile area of less than 0.5Ha will be developed that will also serve as parking area and laydown area with service bay for minor repairs and maintenance of machinery.
- Secure storage for stores and equipment will be provided in the form of mobile containers and ablutions will also consist of mobile units.
- Limited waste management facilities will be put in place as part of the laydown area and will consist of the following:
  - Domestic Waste Management (lunch wrappers, containers, food tins, bottles) of daily workers as well as the domestic waste from the mining logistics will be provided for and handled as follows:
    - Provide waste collection drums at strategic points.
    - Demarcate an area for and constructed as "temporary waste storage area" for temporary collection and storage of the drums, prior to delivery to municipal disposal site for disposal. (On-site dumping/burial is not allowed).
  - Industrial Waste Management
    - Identify and demarcate (by fences) the following sites:
      - A salvage yard for temporary storage of scrap steel and equipment prior to sale or removal as scrap.
      - Arrange regular sale and collection of scrap from the site.
      - A used oil collection and temporary storage area
      - Temporary storage area for all used lubrication products and other hazardous chemicals (Refer Figure 4 below)
      - No engines or other equipment parts are to be stored in the scrap yard without either having had the oil drained or suitable measures have been taken to prevent leaking of oil.

**Figure 4: Proposed layout of temporary waste storage area**



- Diesel and Lubricant Handling Program:
  - Refueling either of equipment or of the mobile trailer bowser must make use of a drip tray or PVC lining.
  - Generator bays need to be fitted with a steel tray equipped with a drain along its extremities to collect any oil and diesel contaminated run-off and channel it to the oil trap where separated oil will be collected and disposed of in the oil recycling container. Any oil spills are to be treated with Spillsorb or equivalent as per the product instructions.
- On-site repairs:
  - Drip trays or PVC facility needs to be used when servicing equipment on site to prevent any oil spills. All moving equipment needs to be equipped with permanent drip trays to prevent oil spills. Waste oils from servicing of vehicles will be disposed of in the waste oil collection facility.
  - Contaminated spares, oil filters, gaskets, etc. will be collected in a separate drum at the designated storage facility for disposal at a suitable site off-site.
- Collection of contaminated spares and waste oils:
  - Contaminated spares, oil filters, gaskets, etc. will be collected in a separate drum at the designated storage facility for disposal at a suitable site off-site.
  - Waste oils from servicing of vehicles will be disposed of in the waste oil collection facility.
  - Used oils will be stored in drums provided by the oil recycling companies such as Oilkol.
  - A PVC facility or impervious platform and fence with signposts are to be constructed to store used oil and drums containing used spares, cloths, etc. which are oil contaminated and must be temporarily stored for collection/dispatch to suitable regional disposal site.
  - All waste oils must be collected in the facility for collection by a waste oil recycling company. Instruct the staff in the reasons for good fuel management and the alternative consequences.

#### 4.2.2 Operational phase

Mining will be in the form of an opencast mine and stone aggregate would be mined from the burrow pit. The proposed activity will entail blasting using explosives in order to loosen the hard rock from the existing quarry on the property. The loosened hard rock will be crushed and screened using a mobile crusher whereafter it will be transported to be stockpiled until sold. Virgin areas allocated for mining and stockpiling would first be stripped of all available topsoil. This topsoil would be stockpiled separately for later use when the quarry is rehabilitated. Any

oversize material and rocks will be removed and stockpiled separately for later use when the quarry is rehabilitated.

Processing will take place by crushing and screening making use of a mobile crusher plant. The estimated footprint of the excavation is 3Ha and at final closure the sides of the excavation will be profiled to form an even depression.

The plans as contemplated in regulation 2.2, of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be updated on an annual basis with regard to the actual progress of the establishment of surface infrastructure, mining operations and rehabilitation together with a Performance audit on the implementation of the Environmental Management Plan.

The only surface disturbance except for the mining of the outcrop, will be a small laydown area. This area will also serve as parking area and final sorting and stockpile area.

#### 4.2.3 Decommissioning phase

Planning for closure and restoration from the beginning of an operation makes the process more efficient:

- Waste can be removed as it is created,
- Excavation can be planned so that topography restoration is less complicated, and
- Topsoil can be re-used at shorter interval.
- Establishing a closure strategy (and communicating that activity to the public) can help enhance the company's reputation as a socially-responsible operation.
- Rehabilitation is carried out on a continuous basis as work progresses according to the annual rehabilitation plan. This will be monitored continuously to ensure effective restoration and revegetation of disturbed areas. The rehabilitation work will be conducted in-house under the supervision of an ECO.

The decommissioning and closure phase at the end of the life of the mine will consist of implementing the Final Rehabilitation, Decommissioning and Closure Plan (attached as Annexure 1).

## 5. Policy and Legislative Context

**Table 3: 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 LEGISLATION AND POLICY CONTEXT
<b>Legislation</b>		
Constitution of South Africa, specifically everyone has a right; <ul style="list-style-type: none"> <li>a. to an environment that is not harmful to their health or wellbeing; and</li> <li>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:               <ul style="list-style-type: none"> <li>i. prevents pollution and ecological degradation;</li> <li>ii. promote conservation; and</li> <li>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</li> </ul> </li> </ul>	Mining activities	The mining activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) section 16 (as amended)  MPRDA Regulations as amended by GNR349 of 18 April 2011.	Application to the DMRE for a mining permit in terms of Section 27 for an area not exceeding 5	The conditions and requirements attached to the granting of the Mining Permit will apply to the mining activities. DMRE is the Competent Authority (CA) for this NEMA and NEM: WA application.
Mine Health and Safety Act, 1996 (No. 29 of 1996) (MHSA) and Regulations	Mining activities	Mining operations will be governed by the MHSA and associated Regulations.

<p>National Environmental Management Act, No 107 of 1998 (as amended) (NEMA)</p> <p>Environmental Impact Assessment Regulations, 2014 (EIA Regulations 2014) and Environmental Impact Assessment Regulations Listing notices 1, 2 and 3 published in terms of NEMA in Government Notices 982, 983, 984 and 985 of 4 December 2014 (as amended by GN No. 517 of 11 June 2021)</p> <p>Regulation 16{1}(b)(v) submission of a report generated from the national web based environmental screening tool report will be compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21.</p> <p>"Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Section 24(5) (a) and (h) and 44 of NEMA, 1998, when applying for EA ("the Protocols"), in Government Gazette (GG) 43110 (dated 20 March 2020) and Government Notice (GN) 320. Protocols in GG 43855 of GN No. 1150 dated 30 October 2020 provide for Terrestrial and Animal Plant Species.</p> <p>Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production</p> <p>National Guideline on minimum information requirements for preparing Environmental Impact Assessments for mining activities that require environmental authorisation, published in terms of NEMA in Government Notice 86 of 2018</p>	<p>Application to the DMRE for Environmental Authorisation in terms of the 2014 EIA Regulations</p>	<p>An Application for Environmental Authorisation must be submitted to DMRE for an Environmental Authorisation. The application for EA including screening tool report must be acknowledged by the competent authority before the BAR process can start.</p> <p>The listed activities (Listing Notice 1, Activity 21) that are triggered determine the Environmental Authorisation (EA) application process to be followed and in this case a Basic Assessment Report (BAR) process</p> <p>Refer Section 10.3 Summary of specialist reports</p> <p>These regulations have informed the Final Closure Plan and financial provisioning for the Project. The disturbed area shall be rehabilitated in such a way that is stable, non-polluting, non-eroded, free from alien invasive species and suitable for the agreed post closure land use.</p> <p>The compilation of this Basic Assessment Report including a Final Rehabilitation, Decommissioning and Mine Closure Plan and the Public Participation Process are required in terms of NEMA.</p>
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<p>National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended)  National Waste Information Regulations published in GN 625 of 2012  Waste Classification and Management Regulations in GN 634 of 2013  Waste listed activities in GN 921 of 2013  National Norms and Standards for the Storage of Waste, in GN 926 of 2013  National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste, in GN 1093 of 2017  National Norms and Standards for the Assessment of Waste for Landfill Disposal, in GN 635 of 2013  Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GN 632 of 24 July 2015.</p>	<p>Part B: EMP and Sections 13.8; 13.9; 13.10 &amp; Section 15</p> <p>General waste management measures as part of environmental awareness plan</p>	<p>These regulations have informed the planning and management of waste for the Project.  Listed activities triggered are included as part of the Environmental Authorisation (EA) application process.  The generation of potential waste will be minimized through ensuring employees of the Applicant are subjected to the appropriate environmental awareness campaign before commencement of sand mining.  All waste generated during the mining activities will be disposed of in a responsible legal manner.  Proof of legal disposal will be maintained on site.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA]  National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)</p> <p>Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)</p>	<p>Section 8  Figure 4, 5, 6, 7, 8, 9, 10, 11 &amp; 12.</p>	<p>There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site.  The site is not located within a Critical Biodiversity Area and the Mining and Biodiversity Guidelines identify the area as Cat D with Moderate Biodiversity Importance” and moderate risk for mining</p> <p>Alien invasive vegetation management is included in the EMPr.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004).  National Dust Control Regulations in GN R827 of 1 November 2013  List of Activities which Result in Atmospheric Emissions, published in GN 893 of 2013  National Ambient Air Quality Standards (NAAQS), in GN 1210 of 2009  National Atmospheric Emission Reporting Regulations, in GN 283 of 2015</p>	<p>Section 8</p>	<p>These regulations have informed the planning and management of emissions from the Project.</p> <p>Dust control measures are included in the EMPr</p>
<p>National Heritage Resources Act, 25 of 1999 (“NHRA”)</p>	<p>Section 8</p>	<p>A Heritage Impact Assessment and Paleontological Impact Assessment will be included as part of the Final Bar and all recommendations will be included in the EMPr</p>

<p>National Water Act (Act 36 of 2008)  Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources in GNR 704 of 1999  Several General Authorisations have been published in terms of Section 39 of the NWA (various dates)  Purification of Waste Water or Effluent, published in GNR 991 of 1984  Regulations for the erection, enlargement, operation and registration of Water Care Works, published in GNR 2834 of February 1986</p> <p>Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals in GNR 267 of 2017</p>	<p>Section 8</p>	<p>The DWAS best practice guidelines with regard to water Reuse and Reclamation will be implemented as part of the EMPr  The DWAS best practice guidelines with regard to Storm Water Management will be implemented as part of the EMPr</p> <p>No Water Use activities in terms of Section 21 will be triggered as water will be obtained from the local authority and trucked onto site.</p>
<p>Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]</p>	<p>Decision by the Competent Authority</p>	<p>Gives effect to section 33 of the Constitution that requires that “Everyone has the right to administrative action that is lawful, reasonable and procedurally fair”. All administrative actions must be based on the relevant considerations</p>
<p>Protection of Personal Information Act, 2013 (Act No. 14 of 2013) (POPIA)</p> <p>Clarity On Applicability of The Protection of Personal Information Act, 2013 To Requirements of The Environmental Impact Assessment Regulations, 2014 Relating to Registers of Interested and Affected Parties and The Inclusion of Comments in Reports (circulated on 3 September 2021)</p>	<p>Annexure 2: PPP Report</p>	<p>The guidance document provided by the Department of Forestry, Fisheries and the Environment was used to determine the information to be included or excluded from the public domain to protect private or personal information.</p>
<p>Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)</p>	<p>Comments required from the Gamagarai Local Municipalities.</p>	<p>Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.</p>
<p>Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HAS)</p>		<p>These regulations have informed the planning and management of hazardous substances for the Project.</p>
<p>National Forest Act, 1998 (Act No. 84 of 1998) (NFA)</p> <p>Provincial Environmental Legislation: The Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) (NCNCA)</p>		<p>Permit(s) will be required if any protected species are cut, removed and/or translocated from the Project footprints.</p>
<p>National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM: PAA)</p>		<p>These regulations have informed the planning and management of the Project. The Project footprint does not overlap with any existing protected areas, or any areas identified for protected area buffers.</p>

<b>Municipal Plans and Policies</b>		
John Taolo Gaetsewe District Municipality Integrated Development Plan (IDP) 2022/2023	Section 5.2	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which are included in the EMPr
Gamagara Local Municipality Integrated Development Plan (IDP), 2019/2022	Section 5.3	The Need & Desirability of the project is referenced in terms of the IDP, specifically relating to employment creation and sustainable resource utilisation. Relevant mitigation measures are included in the EMPr.
Northern Cape Provincial Spatial Development Framework (NCPSDF)	Section 5 & 8.	Sustainable development is a key consideration as addressed in this impact assessment report.
Northern Cape Provincial Growth and Development Strategy 2004-2014 (NCPGDS)	Section 5 & 8.	Sustainable development is a key consideration as addressed in this impact assessment report.
<b>Standards, Guidance and Spatial Tools</b>		
Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5.1 & 8. Figure 4	The mitigation measures to address and mitigate the potential impacts of the mining are included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.7	Refer to Section 5.7
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7 & Table 4	Refer to Section 7 & Table 4
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	Refer Impact Assessment Tables
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	Refer Impact Assessment Tables
Namakwa District Biodiversity Sector Plan (2008) BGIS (www.bgis.sanbi.org)	Baseline environmental	Used during desktop research to identify sensitive environments within the mining right area.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants	Management / Monitoring measures	Used to set the standard allowable for noise mitigation measures are included in the EMPr. Standard for dust fallout. Dust mitigation measures are included in the EMPr.

## 6. Need and desirability of the proposed activities

### 6.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)<sup>1</sup> state that: “Sustainable development is enshrined in South Africa’s Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa”.

DMR, as custodian of South Africa’s mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to “prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”<sup>2</sup>.

The primary environmental objective of the MPRDA is to give effect to the “environmental right”<sup>3</sup> contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa’s mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. None of these categories are of relevance to this Mining area as shown in Figure 5.

These categories have since been super-ceded by the Critical Biodiversity Area (CBA) map (refer to **Figure 9b**), which would be interpreted as Category B is now CBA 1, Category C is now CBA 2 and Category D is now Ecological support areas.

These categories basically require an environmental impact assessment process to address the issues of sustainability.

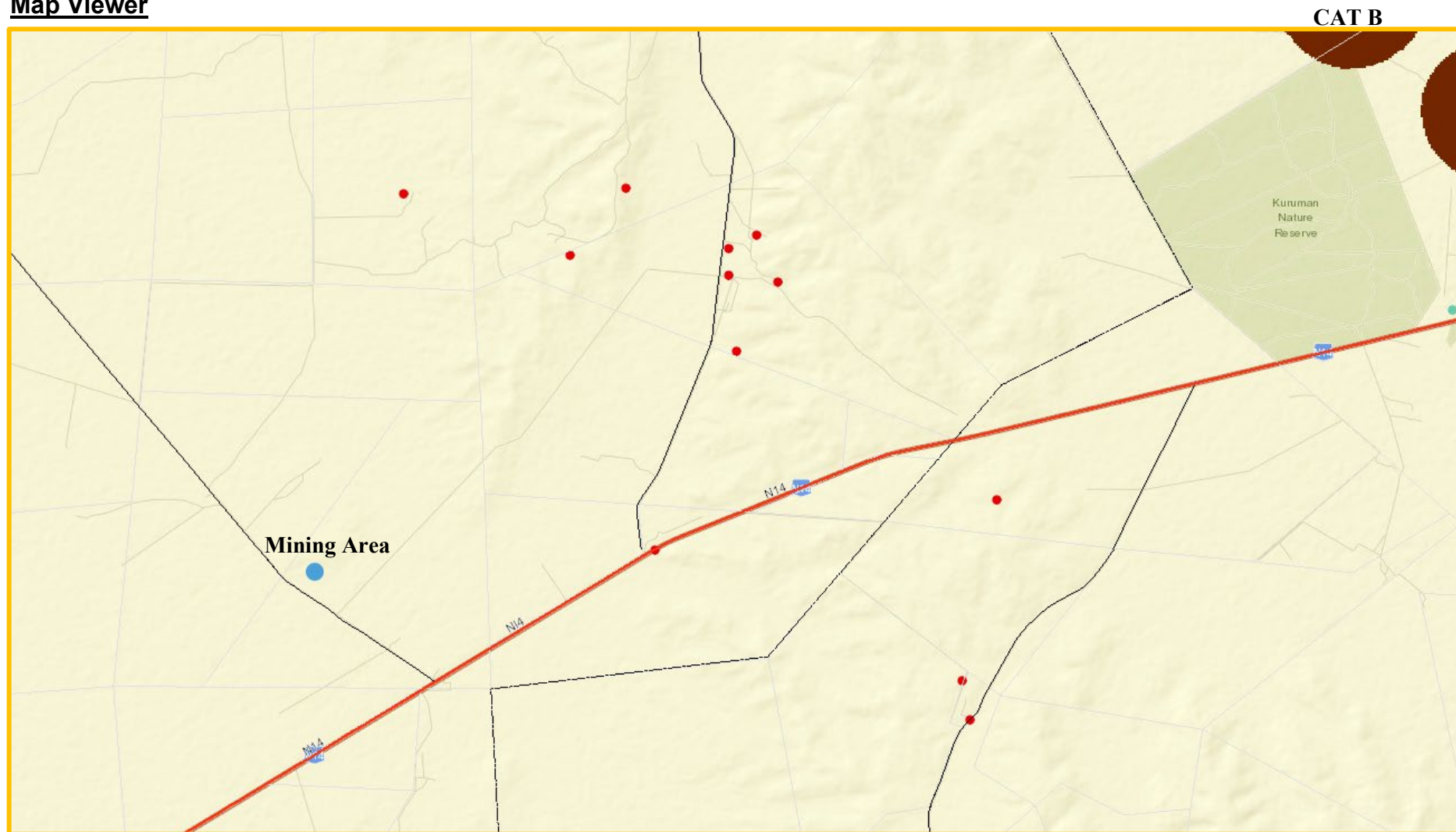
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<sup>1</sup> Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

<sup>2</sup> Constitution of the Republic of South Africa (No. 108 of 1996).

<sup>3</sup> Section 24 of the Constitution states that “everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

**Figure 5: Location of Mining area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer**



## 6.2 Mining and Employment benefits

For years, mining has been the driving force behind South Africa's economy and continues to make a valuable contribution to the country's economy. In addition, it supports Small-medium and micro sized enterprises (SMME's) and it is also one of the sectors that provide employment opportunities for unskilled and semi-skilled people.

The South African mining industry has its origin in small-scale mining activities, with these operations offering much needed employment opportunities and entrepreneurship, as well as contributing to the mineral sector and local economy.

Small-scale mining impact on employment is especially observed in the rural town where there are limited opportunities; providing significant livelihood for rural communities and a means of alleviating poverty. In terms of employment opportunities and job security at this mining area, there is a total of 15 employment opportunities.

## 6.3 Gamagara IDP & SDF

The Gamagara Local Municipality (GLM) comprises an area of about 2619km<sup>2</sup> which is approximately 10% of the total John Taolo Gaetsewe District area. It is located in the north-eastern sector of the Northern Cape on the N14 National Road between Upington and Vryburg. It is approximately 200km north-east of Upington and 280km north-west of Kimberley.

### **Integrated Development Plan (IDP)**

In terms of economic indicators, the Gamagara Municipality has become a significant player in the Northern Cape Province and an important contributor to South Africa's mining sector, and international mining value chain. Thus, making it a center of concentration on the development for providing relevant and up to date infrastructure to accommodate such development. The current growth occurring in these sectors should be exploited to ensure the creation of new job opportunities for local people.

The long-term vision for socio-economic development and environmental sustainability for the municipality is expressed in the SDF, in addition to the guidelines for a land use management.

### **Spatial Development Framework (Draft Report August 2017; Section A)**

The SDF contains "Principle 2: Spatial Sustainability: which states that spatial planning and land use management systems must promote the principles of socio-economic and environmental sustainability through encouraging the protection of prime and unique agricultural land; promoting land development in locations that are sustainable and limit urban sprawl; consider all current and future costs to all parties involved in the provision of infrastructure and social services so as to ensure for the creation of viable communities."

The proposed mining project will provide job security, local employment, local skills transfer, economic upliftment and material supply for the roads and building sector, in a sustainable manner as ensured through this environmental impact assessment process and implementation of the Closure and Rehabilitation Plan.

## 6.4 John Taolo Gaetsewe District Municipality IDP

The John Taolo Gaetsewe District Municipality is the second smallest district in the Northern Cape, occupying only 7% of the province (27 498.9 km<sup>2</sup>) and accounts for about 0.37% of South Africa's economy, and the John Taolo Gaetsewe District Municipality's economy is largely dominated by mining with 65% of GVA generated in the area gained from mining activities. The vision of this DM is: "A global centre of excellence for environmentally

sustainable, innovative and competitive iron ore and manganese mining and steel beneficiation that anchors a diversified and inclusive economy with an empowered and prosperous local community”. The IDP’s strategic objective of relevance to this project is considered to be “To build a resilient and transformed economy”, with Local Economic Development (LED) objectives of business development and support highlighted under this objective.

The provision of job security, employment and skills transfer are identified as positive environmental impacts in this report.

The John Taolo Gaetsewe District Municipality (JTGDM) acknowledges that climate change poses a threat to the environment, its residents, and future development. The mean annual minimum/maximum temperatures in the district range between 8°C and 28°C, with the mean annual temperatures ranging between 16°C and 20°C (EMF, 2011). As alluded to above, the harsh climate is accompanied by high evaporation rates due to the high summer temperatures, which limits the contribution of precipitation to the water reserves in the area (Source: JTGDM SDF Review 2017).

Drought is a frequent occurrence in the Northern Cape Province, with extremely dry years occurring more frequently in the driest regions. Often periods of more plentiful rainfall are followed by severe droughts. This phenomenon of “intermittent extremes” makes (1) trend-analysis and (2) planning for the mitigation of droughts very difficult. These already challenging conditions will, according to future climate change scenarios, get worse, as climate variability is set to increase even more. According to these future scenarios, by 2050, higher temperatures of between 1 and 3°C will occur throughout South Africa, with the greatest increases in the arid zones in the central and western parts of the country, which include the JTGDM. These climatic changes are expected to have a bigger impact on groundwater resources than short-term weather variability, as groundwater is buffered against short-term variations in rainfall. In drier areas, where annual rainfall is less than 500mm per annum, a 10% decrease in rainfall could translate into as much as a 40% decline in the groundwater recharge rate in the area. This has serious implications for a district such as the JTGDM where rainfall is already low, and where groundwater is used as the main source of potable water (Source: JTGDM SDF Review 2017).

The current low levels of rainfall, in combination with the projected future climate changes, and the huge dependence of JTGDM on groundwater, makes the conservation and sustainable management of water resources a key priority. This is also of crucial importance for the future economic development of the area, as the continued depletion of water resources presents a serious challenge to water-intensive activities such as mining and farming. As it stands, current water-utilisation and consumption patterns dictate against the continuation of the current set of economic activities in the area. Equally worrying, should the future projections about climate change materialise and current rates of water resource depletion continue, this could seriously constrain (1) the transformation of agriculture into a larger economic sector in the district; (2) the introduction of a high water-consumer like agro-processing to the area; and (3) the further expansion of mining activities in the wider region (Source: JTGDM SDF Review 2017).

The impact on water resources will be mitigated as per the measures contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles associated with the mining activities is also included in the EMPr.

### 6.5 Northern Cape Provincial Spatial Development Framework (NCPSTDF)

The NCPSTDF states that the: “Northern Cape is not one of South Africa’s richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state”. The NCPSTDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.

The NCPSTDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned.”

The potential for job security, employment and skills transfer are identified as positive environmental impacts in this impact assessment. The potential negative environmental impacts will be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

### 6.6 Northern Cape Provincial Growth and Development Strategy (NCPGDS)

The NCPGDS has the following vision for the province: “Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development.” The strategy for the growth and development of the province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;
- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

### 6.7 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines “evaluation” as “the process of ascertaining the relative importance or significance of information, in the light of people’s values, preferences and judgements, in order to make a decision.” In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, “need and desirability” must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering “need and desirability”, it must also be informed by the sum of all the impacts considered holistically. In this regard “need and desirability” also becomes the impact summary with regard to the proposed activity.

These Guidelines state that: “In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of



the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved”.

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this environmental assessment as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties. I.e., Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 7 in this report.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been proposed to ensure that the impact is mitigated, and these are detailed in Table 14, and included in the EMPr.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site is not identified as a Critical Biodiversity Area (refer **Figure 9b**). The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. The mining process is considered to be a relatively benign type of operation. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the activities progress. This EMPr and Closure Plan (Annexure 1) proposes mitigation measures which will minimise the impacts of the mining on the environment.
- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations are detailed in Table 14 and Table 15, and Closure Plan **Annexure 1** to ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been detailed in Table 14 and Table 15, and Closure Plan Annexure 1 to ensure that the impacts are mitigated. For example, landscape disturbance impacts associated with the mining operation, erosion and dust have been identified and detailed mitigation measures are included in the EMPr to minimise the impacts.
- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into in Table 14 and table 15, and Closure Plan Annexure 1.
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures have been included in Table 14 the EMPr, and Closure Plan Annexure 1.

- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). Comments received from I&APs on the Draft Basic Assessment Report to be included as part of the Final Basic Assessment Report are summarised in Section 7, Table 4.
- **Access of information** – Potential Interested and Affected Parties was notified of the proposal and the availability of the DBAR. Identified potential Interested and Affected Parties were also invited to register as in terms of the NEMA EIA Regulations (Reg 43(1)) only registered interested and affected parties is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.
- **Promotion of community well-being and empowerment** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and potential I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Adequate and appropriate opportunity is being provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

## **7. Motivation for the overall preferred site, activities and technology alternative.**

The preferred and only location of the quarry, overburden dump site, and the dispatch yard, infrastructure, site camp and laydown area are as per the demarcated areas shown in Figure 3.

The preferred and only activity is the mining of industrial minerals for the industrial and infrastructure development market already established. The preferred and only technology will entail blasting using explosives in order to loosen the hard rock from the existing quarry on the property. The loosened hard rock will be crushed and screened using a mobile crusher whereafter it will be transported to be stockpiled until sold.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

## **8. Process to Reach the Proposed Preferred Alternative**

8.1 Details of the development footprint alternatives considered.

With reference to the site plans provided as Figure 1, 2 and 3 showing the location of the individual activities on site, details are provided below of the alternatives considered.

### 8.1.1 Location or Site Alternatives

The design or layout of the mining area is determined by the shape, position and orientation of the outcrop partially mined in the past. Most of the logistics to be used during mining is already available at the nearby business hubs. Satellite infrastructure and waste management facilities at the mine will consist of mobile containers.

Existing farm tracks will be used and upgrading of the tracks will be undertaken as part of the construction phase, and maintenance as part of the operational phase.

No electricity is available on the mine and all electricity will be generated by mobile diesel-powered generators. No process water is required in the mining process and potable water will be obtained from the local authority.

#### 8.1.2 Type of activity

The Applicant is not the land owner, so it would not be realistic for this company to propose another type of activity, as their core business is mining.

The holder of a mining permit is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use. Although the mining activity takes place over a long-time period, the best post-mining land use alternative is to return the site to its natural state taking into account the altered topography due to mining. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine industrial minerals from the identified deposits with the application area. The only other activity required to be assessed in terms of NEMA is the "do-nothing" alternative, as detailed further below.

#### 8.1.3 Design or Layout of activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource exposed as an outcrop. Best practice dictates that it is better to mine the outcrop in 3meter benches as this will reduce the impact on topography. The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar.

#### 8.1.4 The technology to be used in the activity

The ore body occurs in a surface outcrop and the mining method adopted is the opencast one mining into the outcrop employing surface drilling and blasting. A simple mining method will be employed entailing development of the outcrop in terraces from top to bottom. The broken rock will be crushed and screened in the pit. The crushed product will be moved to the stockpile area where it will be sold as a FoT product. There are no reasonable or feasible technology alternatives for further consideration.

#### 8.1.5 Operational alternatives

The Mining Work Plan sets out the operational plan for the mine based on the local demand. There are no reasonable or feasible operational alternatives for further consideration.

#### 8.1.6 The No-go Alternative

The assessment of alternatives must at all times include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative is therefore assessed together with the preferred alternative.

The no-go alternative entails no change to the status quo and is therefore a real alternative that needs to be considered.

The no-go alternative was not deemed to be the preferred alternative as it will mean that there will be no supply of minerals for construction. There will also be no employment opportunities, and no beneficiation for the local community.

The project site has been selected based on the close location to the N14. The layout and technology of the quarry has been determined by the shape, position and orientation of the mineral resource.

The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.

### **9. Details of the Public Participation Process Followed**

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended).

The formal public participation process, which meets the requirements of the NEMA EIA Regulations and the MPRDA were followed and include the following activities:

Potential I&APs was notified about the project and of commencement of the Basic Assessment (BA) process and invited to registration as stakeholders by means of:

- Written notification to
  - the occupiers of the site and the owner or person in control of the site where the activity is to be undertaken;
  - owners, persons in control of, and occupiers of land adjacent to the site where the activity is to be undertaken;
  - the municipal councillor of the ward in which the site is situated
  - the municipality which has jurisdiction in the area;
  - every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation;
  - any organ of state having jurisdiction in respect of any aspect of the activity
- Media advertisements and site notices.
- Registered I&APs including every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation were given the opportunity to review and comment on the Draft Basic Assessment Report and plans submitted to such party during the public participation process.
- Registered I&APs will be notified of the outcome of the environmental authorisation, and if required the appeal process to be followed.

9.1 Summary of issues raised by I&Aps

**Table 4 Summary of issues raised by I&Aps - to be completed in Final Basic Assessment Report**

Interested and Affected Parties, persons consulted is marked with an X	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Reference in this report where the issues and or response were incorporated.
<b>ORGANS OF STATE</b>				
<b>Landowners or Lawful occupier/s of the land</b>				
<b>Landowners or lawful occupiers on adjacent properties</b>				
<b>Municipality</b>				
<b>Interested parties - Reply on advertisement and site notices</b>				

## 10. Site sensitivity (Baseline Environment)

### 10.1 Regional setting

The project site is located West of Kuruman in the Kuruman Thornveld Biome and Eastern Kalahari Bushveld Bioregion. The area is classified as mostly flat terrain with open tree layers and open grass layers with a lot of bare soil.

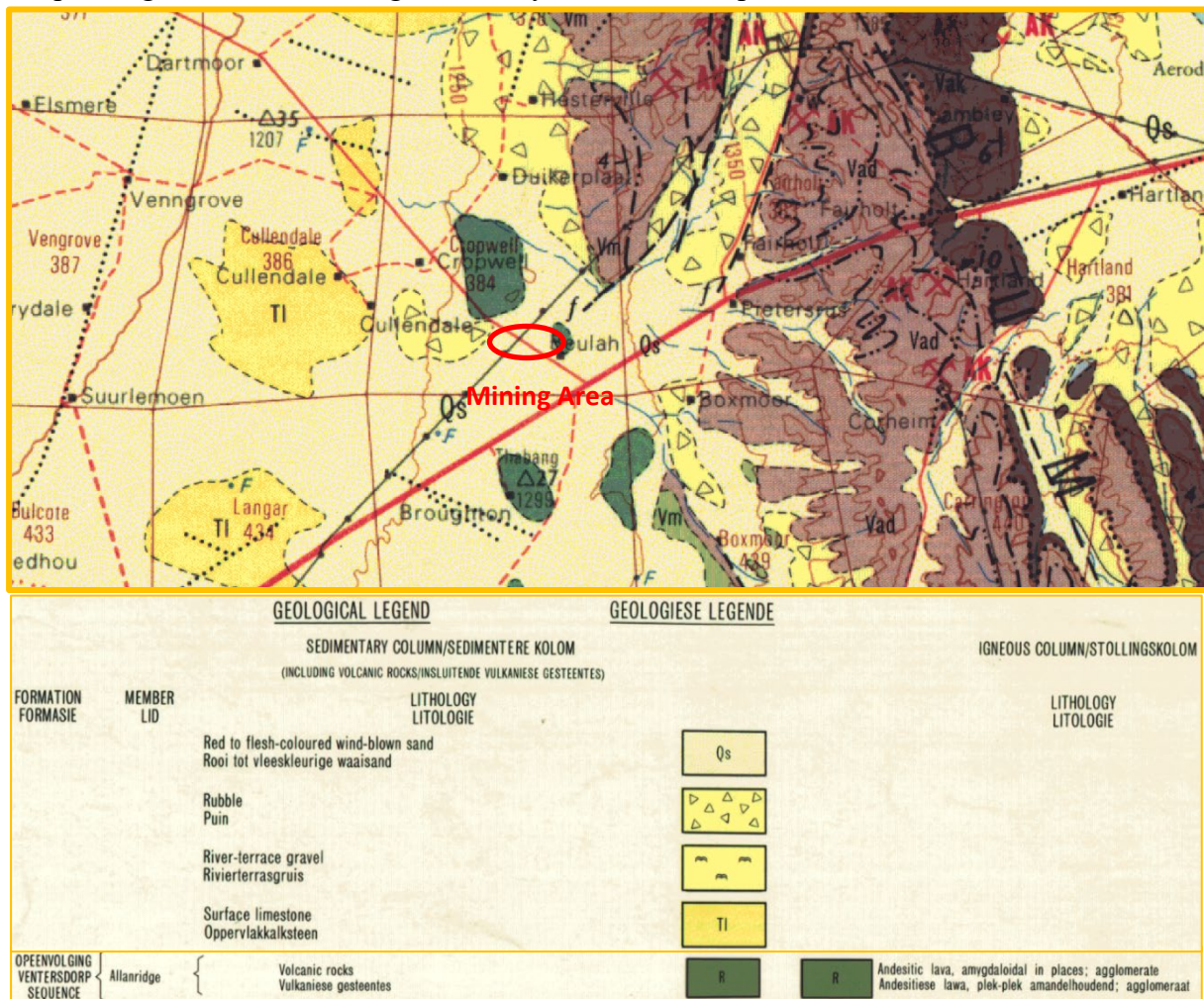
### 10.2 Geology

Some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediments, with wind-blown (0.3-1.2m deep) sand. Locally, rocky pavements are formed in places. Most important land types are Ae, Ai, Ag and Ah, with Hutton soil form.

The proposed area is located in mostly flat rocky plains with some sloping hills that is very well developed. The area consists of a closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba*.

### Figure 6: Geology of Mining area

Map enlarged from the Geological Survey 1: 250 000 map 2722 Kuruman.



### 10.3 Soil and land capability

According to the screening report (DEA) no nearby wind or solar developments or intersections with Environmental Management Framework areas are present. The closest approved Solar PV is 5.3Km from the mining area.

For the Agriculture Theme the sensitivity is regarded as low sensitivity (Refer Figure 7a and Table 5) and is used for livestock grazing and production. The Land Capability map is provided as Figure 7b.

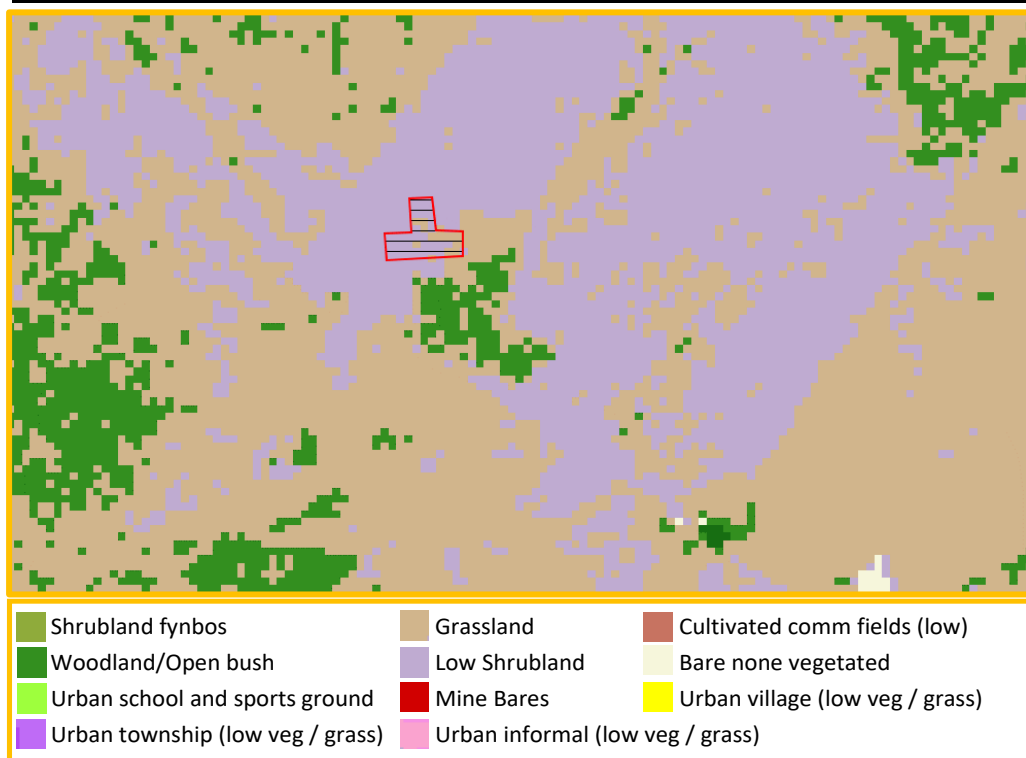
**Table 5: Agriculture theme Sensitivity Features**

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low

**Figure 7a: Map of relative agriculture theme sensitivity**



**Figure 7b: Mining area in terms of Land Cover sourced off SANB BGIS Map Viewer**



As can be seen from Figure 7a the small footprint of mining activities 5Ha will not have an impact on other land uses or agricultural production. No Agro-Ecosystem Specialist Assessment is therefore required due to the fact that no areas were identified as being of “very high” or “high” sensitivity for agricultural resources during the site verification.

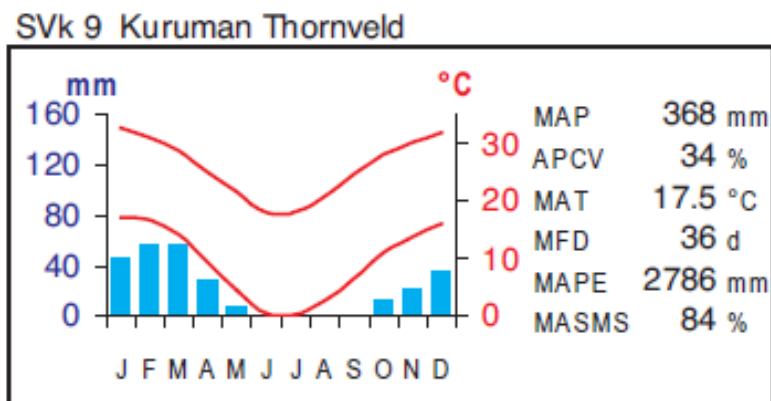
#### 10.4 Landscape – Topography

The proposed area is located in mostly flat rocky plains with some sloping hills that is very well developed. The area consists of a closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba*.

#### 10.5 Climate

Summer and autumn rainfall with very dry winters. MAP about 300-450 mm. Frost frequent in winter. Mean monthly maximum and minimum temperatures for Kuruman 35.9°C and -3.3°C for January and June, respectively. See also climate diagram for SVk 9 Kuruman Thornveld. (Figure 8).

**Figure 8: Climate Figure**



#### 10.6 Biodiversity, Flora and Fauna

##### 10.6.1 Biodiversity

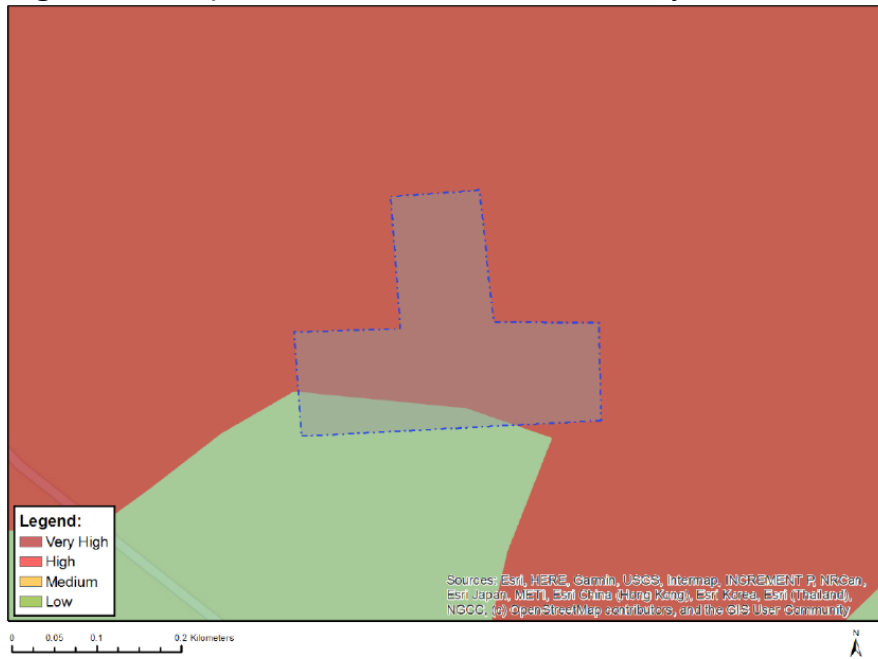
According to the screening report (DEA) the mining area is regarded as very high sensitivity with regard to Terrestrial Biodiversity as it is located within Ecological support areas (Refer Table 6 and Figure 9a).

**Table 6: Terrestrial biodiversity theme Sensitivity Features**

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Ecological support area

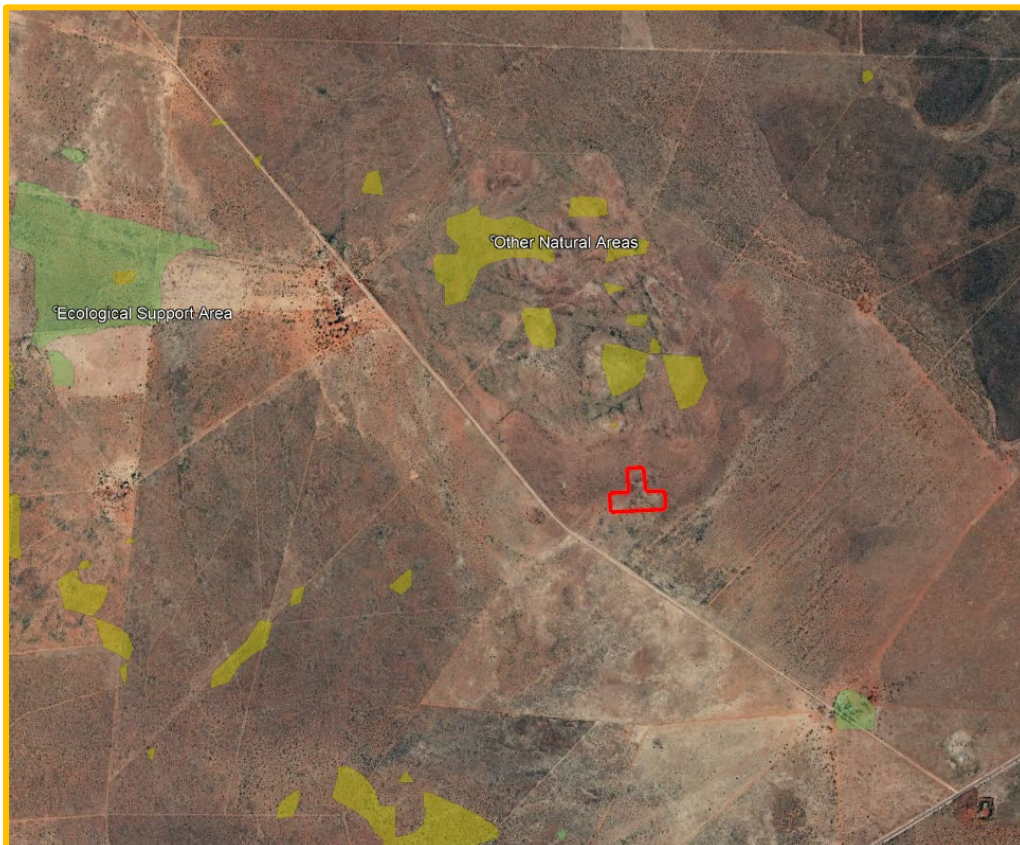


**Figure 9a:** Map of relative terrestrial biodiversity theme sensitivity



The mining area falls within the Kuruman Thornveld (SVk 9) vegetation unit (Mucina and Rutherford, 2006), which is not classified as Critically Endangered, Endangered nor Vulnerable in terms of the NEM:BA listed Ecosystems (GNR 32689). According to the Northern Cape Biodiversity Sector Plan, 2016 the mining area is not located in a Terrestrial CBA and no Aquatic CBA is located in close proximity to the mine (Refer Figure 9b). Taking the above into account no terrestrial biodiversity specialist assessment is deemed necessary as the project footprint and the immediate surrounding area are of a low biodiversity sensitivity.

**Figure 9b: Critical Biodiversity Areas**



### 10.6.2 Fauna

According to the screening report (DEA) the mining area is regarded as low sensitivity with regard to Animal Species (Refer Table 7 and Figure 9)

**Table 7:** Animal Species theme Sensitivity Features

Sensitivity	Feature(s)
Low	Subject to confirmation

**Figure 10:** Map of relative Animal Species theme sensitivity



The only mammal species within the mining area is a Cape ground squirrel *Geosciurus inauris* population but this species is not threatened overall and, in some areas, it is persecuted as an agricultural pest. No terrestrial animal species specialist assessment is necessary as the Cape ground squirrel have a wide distribution range and mining activities will have a medium significant impact on these species due to the small areas to be disturbed and short duration of activities. Species can move to large undisturbed tracts of land adjacent to the mining area. Mitigation of the disturbance is also possible and after mitigation the impact will be regarded as insignificant. Recent mining areas in the surrounding area were quickly re-populated with these species after rehabilitation.

### 10.6.3 Flora

According to the screening report (DEA) the mining area is rated as having a low sensitivity regarding plant species (Refer Table 8 and Figure 11a and 11b). The mining area is dominated by Kuruman Thornveld (SVk 9) vegetation unit (Mucina and Rutherford, 2006), which is not classified as Critically Endangered, Endangered nor Vulnerable in terms of the NEM:BA listed Ecosystems (GNR 32689) (Figure 11b).

**Table 8:** Plant Species theme Sensitivity Features

Sensitivity	Feature(s)
Low	Low Sensitivity

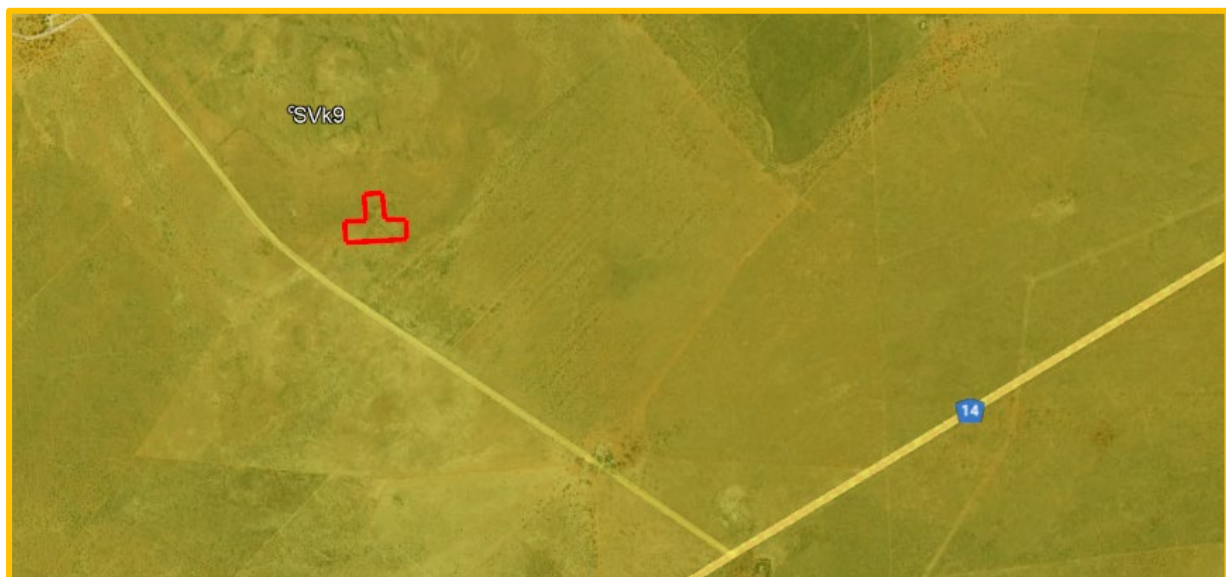
**Figure 11a:** Map of relative Plant Species theme sensitivity



**Kuruman Thornveld (SVk 9)**

According to (Mucina and Rutherford, 2006 this vegetation typically forms flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba*. Distribution in the North-West and Northern Cape Provinces: On flats from the vicinity of Postmasburg and Danielskuil (here west of the Kuruman Hills) in the south extending via Kuruman to Tsineng and Dewar in the north. Altitude of approximately 1 100-1 500 m. This vegetation is regarded as least threatened but and a small area has been transformed around 2% and erosion is very low.

**Figure 11b: Vegetation**



### 10.7 Aquatic biodiversity and Water Resources

The project footprint falls within the D41K quaternary catchment that include the Sishen / Kathu National Strategic Water Source Area regarding Ground Water and therefore identified as an Upstream NFEPA (Code 4). The project footprint is located within an arid region with a relatively low rainfall. As a result, natural wetland features are absent with the nearest FEPA rivers the Ga-Mogara to the west and Kuruman river to the east (Figure 12b).

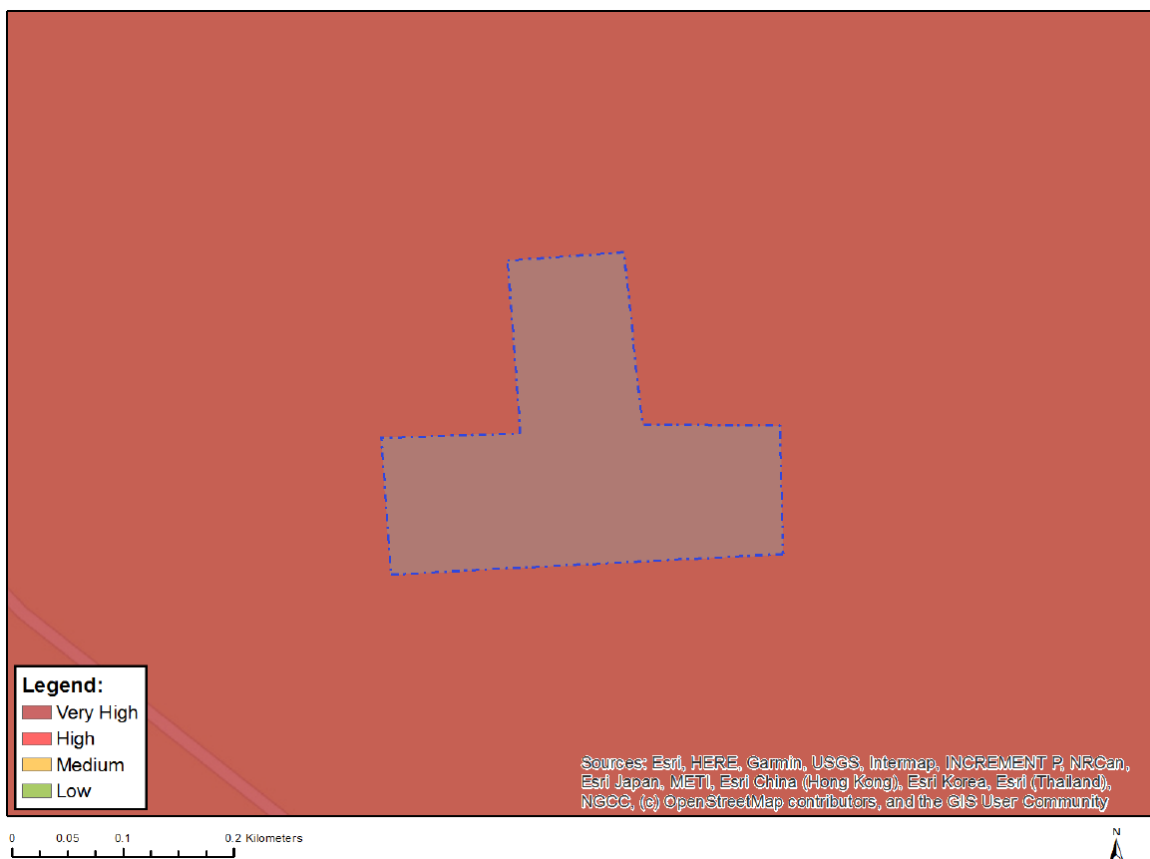
According to the screening report (DEA) the mining area is rated as having a very high sensitivity regarding Aquatic biodiversity due to this National Strategic Water Source Area (Table 9 & Figure 12a).

Mining activities will however be very shallow maximum 5m deep and will therefore have no impact on groundwater. No groundwater will be abstracted as part of the mining operation.

**Table 9:** Aquatic biodiversity theme Sensitivity Features

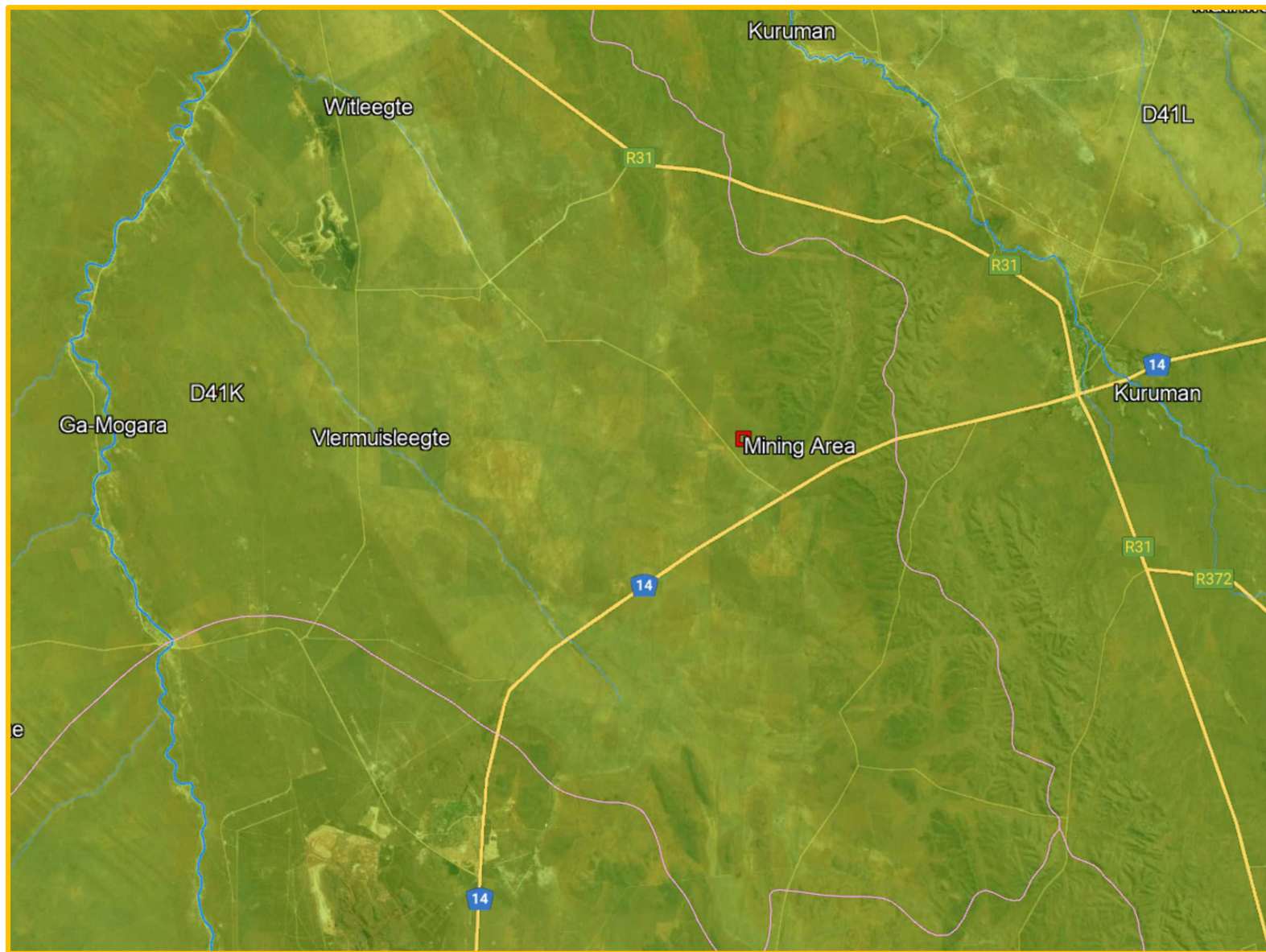
Sensitivity	Feature(s)
Very High	Strategic water source area

**Figure 12a:** Map of relative Aquatic biodiversity theme sensitivity





**Figure 12b: Location of Mining area in relation to Aquatic biodiversity**



## 10.8 Emissions

### 10.8.1 Air Quality

Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of semi-desert dust generation is high under windy conditions (dust storm). Dust is generated off un-surfaced roadways on site and during the existing mining operations from the adjacent mines which has transported the finer sand over the adjacent areas. Mining activities will take place in a very remote area and dust generation will be limited to a small radius around the operation.

### 10.8.2 Noise

Farm traffic-generated noise occurs in the area and such noise levels are low (observed estimate at  $\pm 55$  dBA). Noise from earth moving equipment and machinery associated with the existing mining operation on the adjacent mine will be within the norm and due to the remote locality of the operation will have no impact.

## 10.9 Socio-economic

Key constraints/problems/issues in terms of the development of Gamagara Municipality include a shortage of job opportunities and job creation in the area. The natural resource base and economy does not have the capacity to support the total population, forcing the labour force to seek employment opportunities outside of the Municipality (e.g. Kimberley), etc. Furthermore, low levels of income obtained in the area imply low levels of buying power and, therefore, few opportunities for related activities such as trade. This in turn also supports the “leakage” of buying power.

With regards to the socio-economic characteristics of the local population, the employment rate for the Municipality is relatively high, with as much as 75% of people of working age being able to secure a job. The Municipality’s economy is centred on the mining sector, leaving the local economy fairly vulnerable for any significant changes in this industry.

Furthermore, the majority of the employed population is found in elementary occupations, which require little or no skills. This is also reflected in the low education levels of the local population, with as much as 12% of the population aged 20 years and older having no form of education whatsoever. This, to some extent, constrains the development potential of the Municipality in the development of more advanced industries.

## 10.10 Paleontological, Archaeological and Cultural and Heritage Resources

### 10.10.1 Archaeological and Cultural and Heritage Resources

All aspects of the proposed development are relevant, since excavations/sumps and or clearing may impact on archaeological and/or paleontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

An Archaeological/Heritage Impact Assessment (HIA) will be commissioned and submitted to the South African Heritage Resources Agency (SAHRA) for comment.

According to the DEA screening tool the relative archaeological and cultural heritage sensitivity is rated as low (Refer Table 10 and Figure 13a) and the overall, heritage impacts will be minimal and there are no areas that require avoidance or mitigation.

Recommendations from the report will be included as part of the EMPr including the following general requirement:

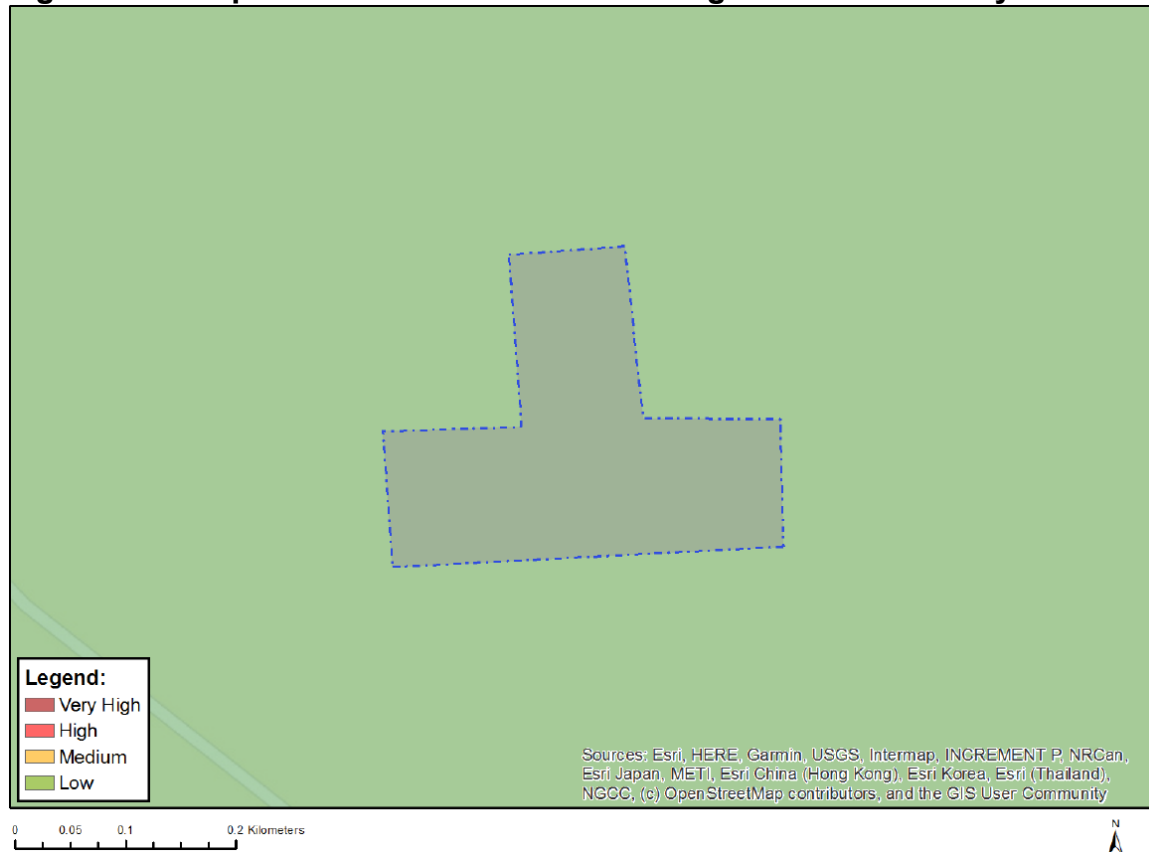
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be

reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

**Table 10a:** Cultural and Heritage theme Sensitivity Features

Sensitivity	Feature(s)
Low	Low sensitivity

**Figure 13a:** Map of relative Cultural and Heritage theme sensitivity



### 10.10.2 Paleontological Resources

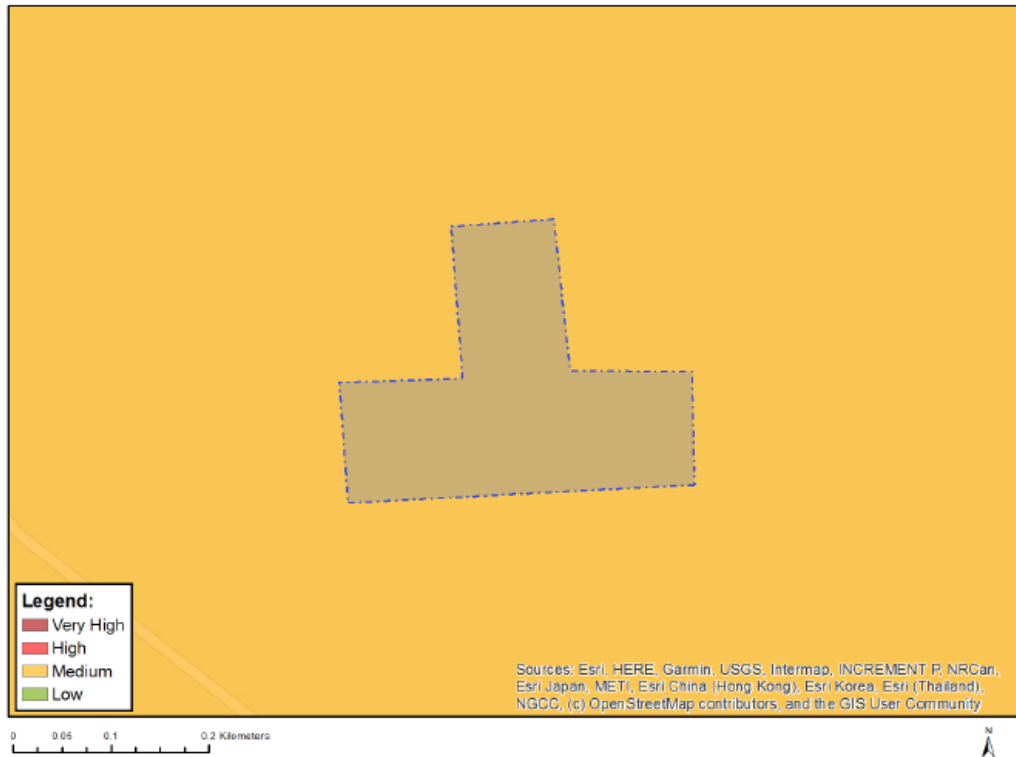
According to the screening tool the relative Palaeontological sensitivity is rated as medium as is the case according to the SAHRA Paleontological (fossil) Sensitivity Map (Refer Table 10b and Figure 13b & 13c). A Desktop PIA specialist assessment was therefore required and mitigation measures is included as part of the EMPr (Table 14 and Table 15).

The field assessment (Annexure 4) provided no above-ground evidence of in situ paleontological sites within the study area. The proposed site lies on the lavas and andesites of the Ongeluk Formation (Postmasburg Group, Transvaal Supergroup) that might preserve trace fossils such as microscopic fungal mycelia or stromatolites if there is any carbonate. None of these traces is likely to be visible, nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations, drilling or mining activities have commenced. Since the impact will be very low, as far as the palaeontology is concerned, the project should be authorised.

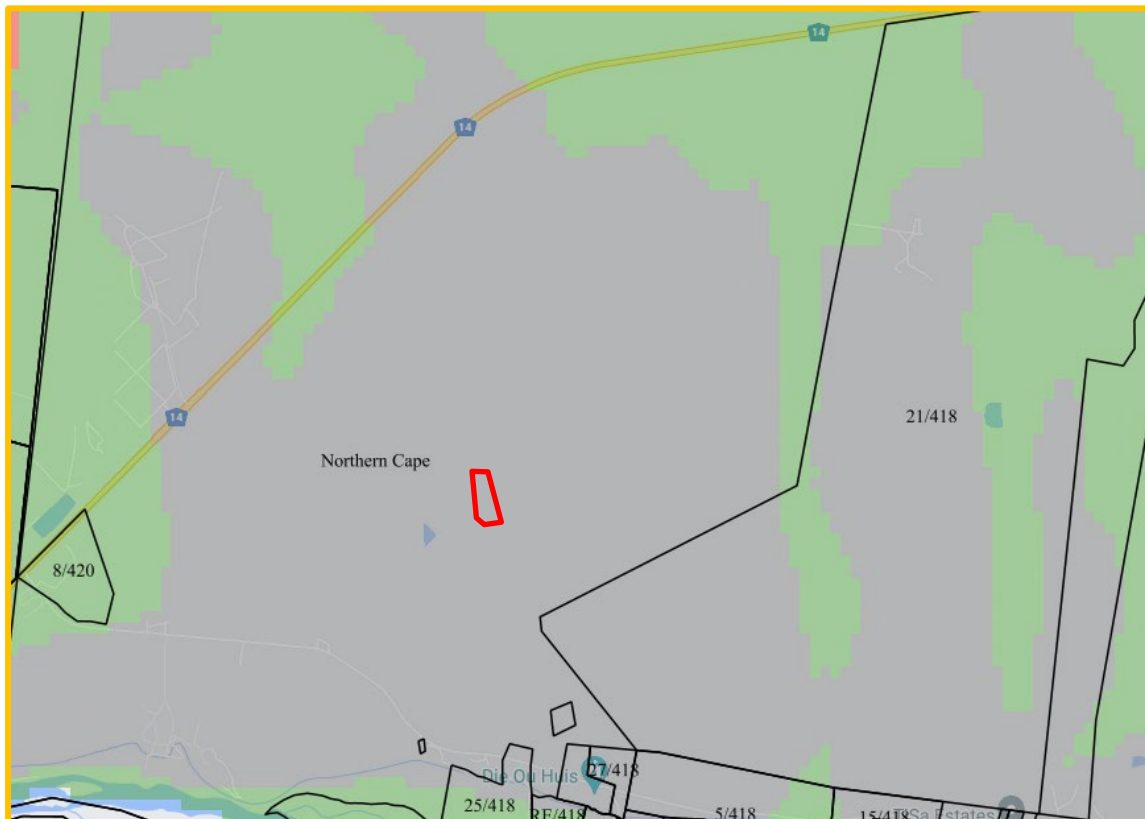
**Table10b:** Paleontological theme Sensitivity Features

Sensitivity	Feature(s)
Medium	Features with a Medium paleontological sensitivity

**Figure 13b:** Map of relative Paleontological theme sensitivity



**Figure 13c:** Map of relative Palaeontological theme Sensitivity (Extract from the SAHRIS Palaeosensitivity Map)





### 10.11 Environmental and current land use maps

There is extensive livestock farming in the area. Refer to Figure 4 to 13 provided as part of the specific attributes and sections above.

### 10.12 Description of specific environmental features and infrastructure on the site

Refer to Figure 3 to 12 which provides an overview of the position of the propose project site, the existing access tracks, and the extent of the vegetation.

The area also has a number of farm tracks that traverse the site from the N14. The invasive activities will seek to use existing roads in order to access the property and it is not expected that any new access roads will be opened up. The map Figure 1 to 3 above gives an overview of the mining area, settlements and roads that traverse the site.

## **11. Risks and associated Impacts identified**

The impact assessment focuses only on the invasive aspects (associated activities) as these will have the potential to impact on the biophysical and social environment. The impact assessment (Table 14) is furthermore separated into three distinct phases, namely:

- Construction phase (Site establishment);
- Operational phase (Mining), and.
- Decommissioning

### 11.1 Potential Risks/impacts

#### 11.1.1 Potential risks associated with Soil (contamination, erosion, compaction) & Land capability (viable and sustainable land)

- Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure, resulting in loss of land with agricultural potential.
- Uncontrolled development of roads, where existing farm roads are not used for mining operations and redundant internal roads are left behind.
- Post-mining landform not compatible with the surrounding landscape and not capable of productive land use that achieves a land capability equal to that of pre-mining conditions.
- The post-mining landscape increases the requirement for long-term monitoring and management.
- Destruction of vegetation will lead to increased soil erosion causing loss of topsoil.
- Long term changes in land use are caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of the annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.
- The potential risks related to waste management practices that will require implementing of mitigation and management actions to limit the residual impact after mine closure.
- Sub-surface infrastructure remaining behind, limiting the intended post-closure land use including footings and foundations, power supply and water installations including pumps and pipelines.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Equipment and other items used during the mining operation were left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.

- No industrial or mine waste is generated during the mining process and all material will be removed from the site and sold as a FoT product. Processing will include crushing and screening but no mining waste or overburden and fine residue dumps will remain after mining and will be backfilled into the excavation. Temporary product stockpiles will also be developed but this is not classified as waste.

#### 11.1.2 Potential risks associated with Change in topography

- Change in topography due to excavations and stockpiles remaining after mining.
- Potentially dangerous areas like excavations incorrectly rehabilitated including uncontrolled access to potentially unsafe post-mining areas.
- The risk of deep and unstable excavations that can be detrimental to the safety and health of humans and animals can be regarded as insignificant given the extremely low rainfall in the area and small size of the excavations.
- Any remaining excavations will be profiled to create an even depression and no unsafe areas like steep slopes that would require demarcation to prevent access by humans and animals will remain.
- No infrastructure, sub-surface voids, fine residue dams or evaporation ponds will be developed that can lead to potentially unsafe post-mining areas; therefore, no post mining access control would be required.
- To prevent significant negative effects the post-mining topography must be adjusted where possible to minimise the effect on water flow and increase potential for re-vegetation.

#### 11.1.3 Potential Risks associated with Biodiversity, Flora & Fauna

- Disturbance to sensitive environments such as Critical Biodiversity areas and any associated biodiversity corridors, land with historical or conservation value part of NPAES, Wetlands and other Aquatic Ecosystems, terrestrial habitats for species of conservation concern (SCC) and high potential agricultural land.
- Impact on biota would most likely be a result of the clearing of vegetation.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas.
- Inadequate control of alien invasive vegetation species can result in the establishment of populations or seed sources that threaten adjacent areas.
- Loss of indigenous vegetation due to disturbed footprints at mining area.

#### 11.1.4 Potential Risks associated with Aquatic biodiversity & Water Resources

- Compacted areas such as roads and operational footprint areas would result in an increase of sheet runoff.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from infrastructure areas is erosive, causing sheet, rill and donga erosion features.
- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Potential contamination of groundwater from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances.
- Oil fuel leaks onto soil through the earthmoving and transport equipment and machinery or spillage of fuel during the transfer from fuel bowser to equipment.
- Chemical contaminants impacting surface and/or groundwater quality or resulting in

discharge that exceeds the concentrations permitted.

- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Waste classes are not kept in separate streams and incomplete removal of waste.
- The potential risks arising after mine closure are changes in the quantity of surface water compared to pre-mining quantities that may negatively affect the area.

#### 11.1.5 Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions.

- Terrain morphology plays a critical role in defining the visual envelope of mine developments and can either reduce or enhance visual impact. Apart from visual intrusion, there is also the risk of a reduced sense of place. The visual intrusion impact of mining activity would be on nearby roads, homesteads, settlements, tourist accommodation, and along tourism routes or corridors.
- The visual disturbance would be caused by mining activities such as excavations. Buildings provide a colour contrast, as do disturbed areas against adjacent natural areas.
- Nuisance effects of air emissions due to a lack of implementation of dust suppression activities could impact on communities.
- Dust generated on haul roads reduces visibility, representing a safety hazard.
- Dust can retard vegetation growth and reduce the palatability of vegetation.
- The cumulative effect of a rise in the ambient noise levels or high noise levels in specific areas that exceed specified levels would impact on communities in close proximity.
- Noise disturbance and light pollution would result from night-time activities (if applicable) in areas that are in close proximity to communities.

#### 11.1.6 Potential Risks associated with the socio-economic environment.

- Disturbance of local communities in urban and rural areas caused by noise and dust emissions and increase in heavy vehicles along transport routes.
- Safety of personnel operating large earth-moving equipment.
- Dust, noise and vibration associated with mining activities, in relation to surrounding communities.
- An influx of people into the local communities looking for work, with an increase in demand for housing, schooling and services. Such an influx of workers into a community often results in a change in social dynamics.
- Positive impacts include, for example, the creation of both formal and informal businesses to supply additional needs, whilst negative social impacts include, for example, an increase in substance abuse, HIV transmission and unwanted pregnancies.
- Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income.
- Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
- Lack of compliance with the approved EMPr and a lack of auditing of the EMPr.
- Closure stalled due to non-compliance with relevant legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

11.1.7 Potential Risks associated with regard archaeological, cultural heritage or paleontological sites

- Disturbance of identified surface, or unknown sub-surface sites, if mitigation and monitoring is not implemented as per mitigating measures in the specialist assessments.
- Progressive development can encroach upon or disturb identified sites.

11.1.8 Potential Risks associated with the Preferred Alternative.

Refer to Section 3, Section 5 and Section 6 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the preliminary result of having a preferred and only alternative. The potential impact from this preferred and only alternative are listed in Table 11 below.

11.1.9 Potential Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The No-Go Alternative implies that the Applicant would forgo an opportunity to provide employment opportunities in an area and sector identified for opportunities for job provision and economic growth, and the sourcing of minerals. This potential would not be reached with the "no-go" option.

**Table 11: Preferred Alternative: Potential Risks per Phase and Activity**

Phase	Activities	Potential Impacts
CONSTRUCTION PHASE	Site access	Dust generation from vehicles using existing access and haul roads
		Disturbance of vegetation and fauna
		Soil compaction from repeated use of access track
	Site Establishment Activities (Including associated infrastructure, Water and wastewater infrastructure, Electricity infrastructure, Waste management, Storm water control, Topsoil stripping and stockpiling for lay down areas, Waste generation and management)	Contamination and disturbance of soil from compaction and soil disturbance due to topsoil stockpiling
		Soil contamination from hydrocarbons
		Change in topography due to excavations and stockpiles
		Biodiversity (wildlife and vegetation) disturbance from vehicles and offroad driving
		Removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Destruction of Aquatic biodiversity from water abstraction and groundwater pollution from hydrocarbons.
		Emissions (Dust and light), Noise and Vibration causing nuisance from topsoil stripping, site establishment activities and vehicles & visual intrusion from development
Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)		
No impact on heritage artefacts, heritage sites or grave yards – <b>Refer to Annexure 3 and 4</b>		
OPERATIONAL PHASE	Removal aggregate to a depth of max 5 metres; movement of trucks on site to collect sand for removal; waste generation and management	Soil contamination from hydrocarbon spills
		Compaction of soil on access tracks due to mining activities
		Wildlife and vegetation disturbance from front end loader and trucks
		Ongoing removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Dust emissions from general site activities (vehicle entrained dust)
		Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)
		No impact on heritage artefacts, heritage sites and grave yards – <b>Refer Annexure 3 and 4</b>

<b>DECOMMISSIONING PHASE</b>	Rehabilitation of the mining area, scarifying compacted areas and vehicle tracks	Profiling of remaining excavations after backfilling of waste and replacing topsoil
		Ongoing removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Closure stalled due to non-compliance with relevant legislation (national, provincial and local).
		Insufficient funds for complete rehabilitation
		Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income.
		Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
		Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)

## 11.2 Methodology used in assessing potential environmental impacts

Refer to Table 12 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed mining activity for the Preferred and Only Alternative.

**Table 12: Impact Assessment Criteria**

ASSESSMENT CRITERIA	
<b>Nature</b>	
Rating	Criteria
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
<b>Severity</b>	
Rating	Criteria
6 Very High	The impact is result in a complete loss of all resources. Irreparable damage to highly valued species, habitat or ecosystem.
5 High	The impact will result in significant loss of resources. Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate.. Very serious widespread social impacts. Irreparable damage to highly valued items.
4 Medium	The impact will result in marginal loss of resources. Serious medium term environmental effects. Environmental damage can be reversed in less than a year. On-going social issues. Damage to structures/items of cultural resources of low significance, mostly repairable.
3 Low	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires no intervention of external specialists and can be done in less than a month. On-going social issues. Some damage to insignificant cultural resources.
2 Very low	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Low-level repairable damage to commonplace historical structures
1 None	The impact will not result in the loss of any resources. Limited damage to minimal area of low significance, (e.g. ad hoc spills within plant area). Will have no impact on the social environment. Cultural functions and processes not affected.
<b>Spatial Scale</b>	
Rating	Criteria
6 Very High	Will affect areas across international boundaries
5 High	Will affect the entire country
4 Medium	Will affect the entire province or region
3 Low	Will affect the local area or district
2 Very low	The impact will only affect the site
1 None	The impact will only affect portions of the site
<b>Duration</b>	
Rating	Criteria
6 Very High	Permanent no mitigation possible
5 High	Permanent but mitigation possible
4 Medium	Long term (6-15 years)
3 Low	Medium term (1-5 years)
2 Very low	Short term (Less than 1 year)
1 None	Immediate (Less than 1 month)

Probability																	
Rating	Criteria																
6 Very High	Certain/Definite Impact will certainly occur (100% probability of occurring)																
5 High	Almost certain/ High probability Impact will occur (>75% probability of occurring)																
4 Medium	Impact likely to occur (50 - 75% probability of occurring)																
3 Low	Impact may occur (25-50% probability of occurring)																
2 Very low	Unlikely/ Low probability. Impact unlikely to occur (0 - 25% probability of occurring)																
1 None	Highly Unlikely/ None Impact unlikely to occur (0% probability of occurring)																
SIGNIFICANCE Consequence x Probability Presented as a score out of 108																	
Rating	Criteria																
84-108 High	Long-term environmental change with great social importance.																
50-83 Medium	Medium to long term environmental change with fair social importance.																
27-49 Low	Short to medium term environmental change with little social importance.																
12-26 Very low	Short-term environmental change with no social importance																
3-11 None	No environmental change																
Unknown	Due to lack of information																
Consequence = Severity + Spatial Scale +Duration Presented as a score out of 18																	
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Probability	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
	3	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
	4	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
	5	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
	6	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108
CUMULATIVE EFFECTS																	
Rating	Criteria																
High	The impact would result in significant cumulative effects																
Medium	The impact would result in moderate cumulative effects																
Low	The impact would result in minor cumulative effects																
REVERSIBILITY																	
Rating	Criteria																
Reversible	Impacts can be reversed through the implementation of mitigation measures																
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures																
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED																	
Rating	Criteria																
High	The impact could be significantly avoided/managed/mitigated.																
Medium	The impact could be fairly avoided/managed/mitigated.																
Low	The impact could be avoided/managed/mitigated to a limited degree.																
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact																



### 11.3 Positive and negative impacts of proposed activity and alternatives

#### 11.3.1 Positive impacts

- Creation of employment and job security and economic spin-offs (positive impact)
- Provision of materials for construction industry to support local and regional economic growth related to the renewable energy industry.

#### 11.3.2 Negative impacts

The key potential negative impacts associated with the mining activity include the following:

- Site access:
  - Disturbance of onsite fauna and flora
  - Soil compaction from repeated use of access track
- Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary equipment laydown area, waste generation and management)
  - Noise Generation
  - Visual intrusion
  - Dust falls and nuisance from activities, dust emission from top soil stripping
  - Wildlife and vegetation disturbance from site preparation
  - Soil contamination from hydrocarbons
  - Contamination and disturbance of soil from compaction due to topsoil stockpiling
- Removal of aggregate to an average depth of 5 metres; movement of trucks on site; waste generation and management:
  - Noise caused by the machinery and vehicles on site, and by vehicles going to and from the mining site
  - Visibility of the mining operations
  - Dust emissions from general site activities (vehicle entrained dust)
  - Wildlife and vegetation disturbance from front end loader and trucks
  - Vegetation clearing.
  - Proliferation of alien and invasive plant species.
  - Impact of storm water run-off during infrequent rainfall events
  - Soil contamination from hydrocarbon spills
  - Compaction of soil on access tracks and in river bed due to mining activities. Sheet runoff from hardened surfaces.
- Rehabilitation of the mining area, scarifying compacted areas and vehicle tracks
  - Dust emission from decommissioning activities (vehicle entrained dust)
  - Soil erosion of topsoil
  - Ongoing removal of alien invasive plant species such as *Prosopis* sp. (positive impact)
  - Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)

### 11.4 The mitigation measures and the level of risk.

The mitigation of significant risks identified is provided below, also Refer to Table 14 for the impact assessment and Table 15 for the key measures to mitigate all identified potential impacts.

#### 11.4.1 Soil and Land Capability:

The impacts of soil and land capability have been assessed as being of medium significance before mitigation. The activities and actions associated with achieving a stable, free draining post mining landform, which is compatible with the surrounding landscape and which is capable of a productive land use that achieves a land capability equal to that of pre-mining conditions are discussed below. It is important to note that for the mine to meet the key

objective of economically viable and sustainable grazing, it is imperative that its other key objectives, viz. a safe post-mining area with limited residual impacts and optimal post-mining social opportunities are met.

The building block of viable and sustainable small stock production on the disturbed areas created by excavations is the shaping of the slope and ripping of compacted areas. All remaining unsafe areas like excavations needs to be profiled to form an even depression to prevent injury to humans and animals.

The risks associated with stability are the formation of erosion gully's and a collapsing slope of any remaining excavations. The risk can be regarded as insignificant given the extremely low rainfall in the area (outside forces) and small size and even slope of any remaining excavation. The risk will be mitigated by the shaping of excavation and ripping of compacted areas due to stockpiling and movement to facilitate natural re-vegetation. Furthermore, no overburden or product stockpiles will remain on site.

The impact on soil compaction can be reduced to very low by limiting the activities and clearance to the smallest area that is necessary. No clear scraping (dozing) will be carried out unless absolutely necessary and in this case the compacted area will be scarified and any topsoil stockpiled removed will be spread over the disturbed area immediately after completion of the activity. Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. Where clear scraping (dozing) or removal of vegetation cannot be avoided areas should be kept to an absolute minimum. All compacted areas that are not required for aftercare access shall be scarified. All tracks (twee-spoor) will be scarified and any topsoil stockpiled removed to be spread over the disturbed area. Dual use access roads must be handed back to the landowner in a good state of repair. The impact can be further reduced only using existing farm roads and tracks.

The impact on soil contamination can be reduced to very low by the mitigating measure applicable to waste management. In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes. Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. Implementation of the following tasks to manage the risks associated with mining activities will ensure that waste management practices do not create and/or leave legacies and will limit the residual impact of mine closure. Regular inspections and audits will be used as management system to ensure compliance.

All equipment and other items used during the mining operation needs to be removed from the site. Waste material of any description, including receptacles, scrap, rubble and tires, will be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be buried or burned on the site. Implementing screening as part of the cleaning activities before materials are moved from the mine. The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. Any compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. Redundant structures will be removed for use elsewhere or demolished and discarded. All steel structures and reinforcing will be discarded or sold as scrap. All equipment and other items used during the mining operation needs to be removed from the site. Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA. Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site.

#### 11.4.2 Biodiversity Flora and Fauna:

Limited loss of natural vegetation and ecological functioning in a critical biodiversity area: The vegetation group is listed as Least Threatened, therefore the loss of vegetation within the project footprint is not considered as significant.

Impact on biota would most likely be a result of the clearing of vegetation prior to mining taking place.

It is deemed likely that seeds will be transported by wind into the project footprint after mining activities have been concluded and that the vegetation will re-establish naturally.

The probability of impact on faunal species is not considered as high when compared to vegetation, mainly as a result of the area not providing diverse habitat for faunal species.

According to the Northern Cape PAES the area is not included as primary focus area for protected area expansion and is not located within 5Km from any protected area.

Mitigation measures for soil erosion & soil compaction will also be applicable to promote natural revegetation. The project footprint must be rehabilitated to resemble pre-mining conditions, as best as possible.

Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Existing farm tracks will be used as access and haul roads. Ensure that the area to be disturbed as part of the development is as small as practically possible

Identify existing access tracks and the mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area. Delineation of the area via geophysical characterisation in order to limit the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible

Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged. Identify protected tree species, and leave these intact.

Ongoing monitoring and management will be required to ensure that alien vegetation does not proliferate within disturbed areas and that an indigenous vegetation community does indeed establish.

Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted. Vehicles speed must take into account the possibility of collisions with fauna. Should any animals be encountered, these should be moved away by the ECO, if necessary

Provide all workers with environmental awareness training. Ensure all workers comply with the requirements of the EMPr. Unnecessary destruction of vegetation should be avoided by ensuring that traffic and personnel movement be restricted to demarcated areas.

The annual rehabilitation plan must be implemented. Movement and stockpile areas must be rehabilitated by scarifying trampled and compacted areas to a depth of  $\pm 300$ mm. Windrows created by scarifying needs to be left in place to create a rough surface that can act as seed trap and create a micro-habitat to promote natural re-vegetation. No traffic should be allowed on the rehabilitated areas.

#### 11.4.3 Assessment of potential cumulative impacts

Cumulative impacts are the successive, incremental and combined impacts of one, or more, activities on society, the economy and the environment. Cumulative impacts result from the aggregation and interaction of impacts on a receptor and may be the product of past, present or future activities.

Due to the isolation of the mining area, existing/historical impact is marginal. None the less, it is still considered important to effectively mitigate the direct impacts, as identified for the operational phase.

The duration of impact during the rehabilitation phase has the potential to remain long term or even permanently in severe circumstances. Therefore, if rehabilitation is not successful, there is a possibility that the proposed mining activities could contribute to the present impact on the habitat already present due to overgrazing.

#### 11.5 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives are not likely to be considered in the Impact Assessment Phase, reasons have been provided in Section 6 above.

#### 11.6 Statement Motivating the Preferred Sites

The site was selected as it contains good quality building sand and stone aggregate located in a convenient position in close proximity to transport routes. The layout and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan attached as Figure 2 and 3.

### **12. Environmental impact assessment**

#### 12.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

This BAR and EMPr were compiled through a detailed desktop investigation and site assessment in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process also assist the EAP in the identification of impacts associated with the proposed mining activities.

The methodology described above was used to assess the significance of the potential impacts of the mining activities. The assessment of impacts is based on the experience of the EAP.

The mitigation measures proposed are considered to be reasonable and based on the location of the mining area and must be implemented in order for the outcome of the assessment to be accurate.

#### 12.2 Assessment of each identified potentially significant impact and risk

The supporting impact assessment is provided in Table 14.

#### 12.3 Summary of specialist reports.

The Screening Report in terms of Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014 was developed to allow a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity and enable the applicant to manipulate the development footprint on a site to avoid environmental sensitivities before submitting the application. The Screening Report also identify specialist assessments for inclusion in the assessment report based on the environmental sensitivities of the proposed development footprint.

It is however the responsibility of the EAP to confirm the list of specialist assessments and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation. The site sensitivity assessment report form part of section 8.2 in this BAR and the specialist studies identified is listed in table 13. For mining operations, the position of the mineral resource to be mined is fixed therefore the Screening Report required to accompany any application for Environmental Authorisation is not applicable as there are no alternative footprints for screening and comparison.

For small scale mining and prospecting operations where there will be no permanent infrastructure development and where the location of development is informed by historical prospecting and production records for the area, as well as the most likely position of potential mineral deposits no reasonable and feasible alternatives can be investigated.

In the case of prospecting the location of these sample sites will also not be known at the time that the application for EA is lodged. For prospecting areas, that normally covers a large area it is accepted that some areas will be of high or even very high sensitivity and no specialist assessments is needed to verify this. For this reason, mining operations that is a short-term change in land use must provide mitigation measures and financial provision to return the site to as close as possible to its pre-mining state during the closure phase not applicable to other development.

For this mining operation, the initial list of environmental attributes was compiled based on experience of the EAP in similar development types and through site visits and appraisals, desktop screening via Geographical Information System (GIS) and aerial photography, incorporating existing information from previous studies, and input received from authorities and I&APs.

Further to this, the Screening Tool identifies related exclusions e.g., industrial development zones that is not applicable to minerals as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.

**Table 13: Summary of specialist studies**

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	RECOM. INCLUDED	SECTION WHERE INCLUDED
PIA Annexure 4	<p>The proposed site lies on the lavas and andesites of the Ongeluk Formation (Postmasburg Group, Transvaal Supergroup) that might preserve trace fossils such as microscopic fungal mycelia or stromatolites if there is any carbonate. None of these traces is likely to be visible, nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.</p> <p>Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations, drilling or mining activities have commenced. Since the impact will be very low, as far as the palaeontology is concerned, the project should be authorised.</p>	Yes	Section 8 Table 14 Impact Assessment

Heritage Impact Assessment	To be included as part of Final BAR	To be included as part of Final BAR	Section 8 Table 14 Impact Assessment
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**Table 14: Impact Assessment per Activity per Phase**

<p>No Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 2 km of the proposed area identified. No intersection with Environmental Management Frameworks relevant to the application. Development incentives, restrictions, exclusions or prohibitions and their implications are not applicable to mining operations as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.</p> <p>The impact on Civil Aviation and Defence are rated as low sensitivity and there will be no impact by this mining operation as no high structures will be constructed and no defence installations or test areas are present in close proximity to this project.</p> <p><u>Indirect impacts:</u> None</p> <p><u>Residual impacts:</u> None</p>	<b>Nature</b>	Neutral	Neutral
	<b>Severity</b>		
	<b>Spatial Scale</b>		
	<b>Duration</b>		
	<b>Consequence</b>	NA	NA
	<b>Probability</b>		
	<b>Significance</b>	NA	NA
	<b>Cumulative Effects</b>		NA
	<b>Reversibility</b>		NA
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		NA
<p><u>Mitigation</u></p> <ul style="list-style-type: none"> <li>• None as mining will only be a temporary change in land use</li> </ul>			
<p><b>Site Access and Site Establishment - Potential Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b></p>			
<p>Regarding Land capability for Agriculture the sensitivity of the area is regarded as low and is used for livestock grazing and production. The clearing of laydown areas for site establishment and clearing of site access will result in the removal of existing vegetation, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from repeated use of access tracks.</p> <p>Potential contamination of soil from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances. Accidental spills not cleaned up immediately.</p> <p><u>Indirect impacts:</u> Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning. A lack of waste food management encourages vermin. Dust impacting on adjacent vegetation and causing a nuisance to workers. Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates.</p> <p><u>Residual impacts:</u> Recycling of waste material creates employment. Potential loss of invertebrates that live in the top layers of the soil.</p>	<b>Significance</b>	<b>Before</b>	<b>After</b>
	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	2
	<b>Spatial Scale</b>	2	1
	<b>Duration</b>	5	1
	<b>Consequence</b>	12	4
	<b>Probability</b>	5	1
	<b>Significance</b>	60	4
	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High	

### Mitigation

- Existing farm roads and tracks must be used as far as possible;
  - Where new access tracks are required, such tracks must be scarified during decommissioning;
  - Dual use access roads must be handed back to the landowner in a good state of repair.
  - A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit.
  - Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted.
  - Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
  - After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly.
  - Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off.
  - Top soil shall be removed separately and stockpiled separately from other soil base layers.
  - Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis.
- 
- Topsoil storage areas must be convex and should not exceed 2m in height.
  - Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction.
  - In particular, topsoil must not be subject to compaction greater than 1 500 kg/m<sup>2</sup> and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles.
  - Temporarily halt material handling in windy.
  - Reduce drop height of material to a minimum.
  - Dual use access roads must be handed back to the landowner in a good state of repair.
  - Where new access tracks are required, such tracks must be scarified during decommissioning;
  - Compacted areas that are no longer required shall be scarified after use as part of the annual rehabilitation plan.



- Implement and follow water saving procedures and methodologies.
- Drinking and process water to be brought on site.
- No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).
- Waste water (i.e., including process water and grey water) must be kept separate from clean water.
- Establishing controlled runoff from washing bays,
- The flow and end destination of decontamination washing water will be controlled.
- Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum vegetation coverage.
- Soil erosion is to be regularly monitored and repaired.
- Slow storm water runoff with storm water diversion and erosion control contour berms
- Separate clean and contaminated water systems around the pit and infrastructure areas.

#### Waste Management

- Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, people will be trained on the different waste classes. Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment.
- All waste should be stored in a temporary waste storage area with pollution prevention measures and unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard.
- Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company.
- All waste in the temporary storage area for used lubrication products and other hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company.
- Clean out content of oil traps and dispose of waste at registered and purpose designed landfill sites.
- Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc.
- Batteries to be return to supplier or dispose at a permitted hazardous waste facility.

- Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility.
- Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities).
- Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. These liquid wastes cannot be disposed of on the waste dumps.
- Domestic waste (i.e., waste that is generated from the accommodation and offices) separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). Domestic waste generated by workers needs to be sorted

- Minimise storage of hazardous substances onsite
- Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages
- Only re-fuel machines at fueling station, construct structures to trap fuel spills at fueling station
- Mobile generators or fuel bowser to be supplied with bunded facility or necessary pollution control measures (drip trays).
- Oils and lubricants must be stored within sealed containment structures.
- Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil.
- When not in use, a drip tray must be placed beneath mechanical equipment and vehicles.
- Ensure vehicles and equipment are in good working order and regularly inspected for leaks and drivers and operators are properly trained.
- Immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required.
- A spill kit will be available on each site where activities are in progress. Petrochemical spillages to be collected in a drum and store excavated spill affected soil for disposal at a registered facility or onsite treatment.
- The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants.

<b>Site Access and Site Establishment - Potential Impacts on topography</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
No change in topography during Site Access and Site Establishment	<b>Nature</b>	Neutral	Neutral
<b>Indirect impacts:</b>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<b>Residual impacts:</b>	<b>Duration</b>		
None	<b>Consequence</b>	NA	NA
	<b>Probability</b>		
	<b>Significance</b>	NA	NA
	<b>Cumulative</b>		

Site Access and Site Establishment - Potential Impacts on Biodiversity, Flora & Fauna	Significance	Before	After
Limited loss of natural vegetation and ecological functioning in an critical biodiversity area: The vegetation group is listed as Least Threatened, therefore the loss of vegetation within the project footprint is not considered as significant.	Nature	Negative	Negative
Impact on biota would most likely be a result of the clearing of vegetation prior to mining taking place.	Severity	5	2
It is deemed likely that seeds will be transported by wind into the project footprint after mining activities have been concluded and that the vegetation will re-establish naturally.	Spatial Scale	2	1
The probability of impact on faunal species is not considered as high when compared to vegetation, mainly as a result of the area not providing diverse habitat for faunal species.	Duration	2	1
According to the Northern Cape PAES the area is not included as primary focus area for protected area expansion and is not located within 5Km from any protected area.	Consequence	9	4
<u>Indirect impacts:</u>	Probability	6	2
Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation.	Significance	54	8
Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.	Cumulative Effects	Medium	Insignificant
<u>Residual impacts:</u>	Reversibility	Reversible	
Laydown areas have been earmarked for existing disturbed areas where clearing would be minimal, resulting in little impact on ecological functioning at a local level during the construction process.	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium

Mitigation

- Mitigation measures for soil erosion & soil compaction will also be applicable to promote natural revegetation:
- The project footprint must be rehabilitated to resemble pre-mining conditions, as best as possible.
- Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Existing farm tracks will be used as access and haul roads.
- Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged.
- The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g. snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained specialist, if necessary.

<b>Site Access and Site Establishment - Potential Impacts on Aquatic biodiversity &amp; Water Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Mitigated impact of the proposed facility on the groundwater quality is deemed insignificant during all phases although surface and groundwater contamination from hydrocarbons is a possibility.	<b>Nature</b>	Negative	Negative
No permanent surface water resources are in close proximity to the quarries or mining logistics.	<b>Severity</b>	2	1
Due to semi-arid conditions the opencast pits will not intercept shallow groundwater table zones. Any hydrocarbon spillages have low potential to contaminate groundwater.	<b>Spatial Scale</b>	1	1
<u>Indirect impacts:</u>	<b>Duration</b>	2	1
None	<b>Consequence</b>	5	3
<u>Residual impacts:</u>	<b>Probability</b>	6	2
None	<b>Significance</b>	30	6
	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High
<u>Mitigation</u>			
• Mitigation measures for soil erosion & soil compaction especially waste management will also be applicable to Aquatic biodiversity & Water Resources			

<b>Site Access and Site Establishment - Potential Impacts from Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Visual intrusion caused by the front end loader, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site access and site establishment. The site is however, remote and rural in nature with no receptors (people). Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u>	<b>Severity</b>	2	1
There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site.	<b>Spatial Scale</b>	3	1
<u>Residual impacts:</u>	<b>Duration</b>	1	1
Good housekeeping will ensure a neat and well-maintained construction area reducing visual impact.	<b>Consequence</b>	6	3
	<b>Probability</b>	4	2
	<b>Significance</b>	24	6
	<b>Cumulative</b>	Low	Insignificant

- Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material and incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
- Temporarily halt material handling in windy conditions. Health and safety equipment is required for workers.
- Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.
- The earth moving equipment and other visually prominent items on the site will be located in consultation with the landowner.
- Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.
- The wetting of the exposed areas including roads roads helps reduce dust generation as will applying dust suppression and/or hardening compound.

<b>Site Access and Site Establishment - Potential Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Conflict with landowner and other land users	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u>	<b>Severity</b>	3	1
Upskilling	<b>Spatial Scale</b>	5	1
Local economic spin-offs through increased income earned, and through purchasing of local materials	<b>Duration</b>	6	1
Income generation for landowners in a time of severe drought where livestock farming is not sustainable.	<b>Consequence</b>	14	3
<u>Residual impacts:</u>	<b>Probability</b>	3	1
The upliftment of unemployed people, with positive impact on standard of living for their families.	<b>Significance</b>	42	3
Local and regional economic spin-offs from investment through Social Labour Plan.	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

Mitigation

- All access will be arranged beforehand with landowner.
- Indemnity will be signed by all mining personnel entering the property to cover the landowner against any claims regarding injuries or damage to equipment.
- Any other mining companies or land users operating legally will be regarded as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed or agreements regarding environmental liabilities need to be put in place.
- Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation.
- All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution.
- There will be a strict requirement to treat local residents with respect and courtesy at all times.
- ~~Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)~~

<b>Site Access and Site Establishment - Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
The archaeological resources were identified during a field assessment and their heritage significance is rated as low-moderate. Some mitigation has been proposed.	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u>	<b>Severity</b>	5	1
Loss of archaeological resources, graves and precolonial cultural landscape	<b>Spatial Scale</b>	5	1
The material fossil evidence of “deep time” is embedded in the creation of the sacred landscape and contributes to the “sense of place” cultural aesthetic of the region. The loss of fossils and concomitant interpreted knowledge impoverishes the tangible testimony of the prehistoric landscape and ecological context of ancient humans.	<b>Duration</b>	1	1
<u>Residual impacts:</u>	<b>Consequence</b>	11	3
Negative residual impact arises from the unavoidable loss of fossils of unknown significance in spite of mitigation efforts.	<b>Probability</b>	1	1
Positive residual impact arises from the successful rescue of fossil material for posterity, resulting in material for future	<b>Significance</b>	11	3
	<b>Cumulative Effects</b>	Insignificant	Insignificant
	<b>Reversibility</b>		Irreversible

<b>Operational Phase - Potential Impacts on other land uses</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Refer Site Access and Site Establishment	<b>Nature</b>	Neutral	Neutral
<u>Indirect impacts:</u>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<u>Residual impacts:</u>	<b>Duration</b>		
None	<b>Consequence</b>	NA	NA
	<b>Probability</b>		
	<b>Significance</b>	NA	NA
	<b>Cumulative Effects</b>		NA
	<b>Reversibility</b>		NA
	<b>Degree to which the impact can be avoided, managed or</b>		NA

<b>Operational Phase - Potential Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b>			
	<b>Significance</b>	<b>Before</b>	<b>After</b>
Refer Site Access and Site Establishment	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u>	<b>Severity</b>	5	2
Refer Site Access and Site Establishment	<b>Spatial Scale</b>	2	1
<u>Residual impacts:</u>	<b>Duration</b>	5	1
Refer Site Access and Site Establishment	<b>Consequence</b>	12	4
	<b>Probability</b>	5	1
	<b>Significance</b>	60	4
	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

#### Mitigation

The same mitigating measures as for Site Access and Site Establishment and topography below will be applicable as well as the following:

- After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly.
- Incremental clearing of vegetation should take place to avoid unnecessary exposed surfaces.
- Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off.
- Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.
- Reduce drop height of material to a minimum.
- Temporarily halt material handling in windy conditions.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit.
- Compacted areas that are not required for access shall be scarified and rehabilitated as part of the annual rehabilitation plan.
- To ensure long-term stability, the restored topsoil cover should attempt to mimic the pre-mining distribution of soil texture and thickness.



<b>Operational Phase - Potential Impacts on topography</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability. Very slight visual change in landscape and topography following rehabilitation.	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u> Increase in habitat creation for fauna (rock hyrax and lizards) on waste rock dumps.	<b>Severity</b>	2	1
<u>Residual impacts:</u> Visual change in landscape and topography following rehabilitation. Creation of new habitats	<b>Spatial Scale</b>	1	1
	<b>Duration</b>	1	1
	<b>Consequence</b>	4	3
	<b>Probability</b>	6	1
	<b>Significance</b>	24	3
	<b>Cumulative Effects</b>	Very low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium

#### Mitigation

- The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans.
- Manage the risks associated with high wall stability and slope stability of the excavation to ensure a safe post mining landscape without the requirement for long term monitoring and management.
- During production no highwalls will be created by removing the outcrop in benches to increase stability.
- The mine floor will be kept level and overburden and oversize rock will be backfilled on a continuous basis as the quarry developed.
- Slope pit floor to prevent pooling of rainwater.
- Regular inspections and audits will be used as management system to ensure compliance.
- At final closure of the operation all remaining product from the demarcated stockpile will be restored to pits to fill any remaining deep excavations if any.
- The main closure objective therefore is to leave the site in as safe and self-sustaining condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
- The aesthetic value of the area will also be reinstated.

Operational Phase - Potential Impacts on Biodiversity, Flora & Fauna	Significance	Before	After
<p>Refer site establishment above regarding potential impact on CBA's and SCC</p> <p><u>Indirect impacts:</u> Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.</p> <p><u>Residual impacts:</u> The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	2
	<b>Spatial Scale</b>	2	1
	<b>Duration</b>	2	1
	<b>Consequence</b>	9	4
	<b>Probability</b>	6	2
	<b>Significance</b>	54	8
	<b>Cumulative Effects</b>	Medium	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium

<p><u>Mitigation</u></p> <p>Mitigation measures for soil erosion &amp; soil compaction will also be applicable to promote natural revegetation:</p> <ul style="list-style-type: none"> <li>• The project footprint must be rehabilitated to resemble pre-mining conditions, as best as possible.</li> <li>• Ensured that the area to be disturbed as part of the development is as small as practically possible</li> <li>• Identify existing access tracks and the mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area.</li> <li>• Delineation of the area via geophysical characterisation in order to limit the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible</li> <li>• The annual rehabilitation plan must be implemented.</li> <li>• Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing in the area.</li> <li>• No indigenous plants outside of the demarcated work areas may be damaged.</li> <li>• Identify protected tree species, and leave these intact.</li> <li>• Ongoing monitoring and management will be required to ensure that alien vegetation <sup>63</sup> does not proliferate within disturbed areas and that an indigenous vegetation community does indeed establish.</li> </ul>
<ul style="list-style-type: none"> <li>• Should any animals be encountered these should be moved away by the ECO, if necessary</li> </ul>

<b>Operational Phase - Potential Impacts on Aquatic biodiversity &amp; Water Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Refer Site Access and Site Establishment	<b>Nature</b>	Negative	Negative
<u>Indirect impacts:</u>	<b>Severity</b>	2	1
Refer Site Access and Site Establishment.	<b>Spatial Scale</b>	1	1
<u>Residual impacts:</u>	<b>Duration</b>	2	1
Refer Site Access and Site Establishment	<b>Consequence</b>	5	3
	<b>Probability</b>	6	2
	<b>Significance</b>	30	6
	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

Mitigation

- Mitigation measures for soil erosion & soil pollution especially waste management will also be applicable to Aquatic biodiversity & Water Resources
- No water will be abstracted in terms of section 21(a) of the National Water Act, 1998 (Act no. 36 of 1998) without the necessary permission. Potable and process water to be obtained from legal source and brought on site.
- No Water Use Authorisation (License or GA) in terms of Sec 21 of the NWA for Impeding or diverting the flow of water in a watercourse (Sec 21c) and Altering the Bed, Banks, Course or Characteristics of a Watercourse (Sec 21i) is required.
- Implement and follow water saving procedures and methodologies.
- Landscaping, with the aim to re-instate natural terrain units
- Shaping of excavation to avoid diversion of stormwater, and to prevent channeling of water that would increase erosive capacity of stormwater.

<b>Operational Phase - Potential Impacts from Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>Visual intrusion caused by the front end loader, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site access and site establishment. The site is however, remote and rural in nature with no receptors (people) as it is located on private property. Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.</p> <p><u>Indirect impacts:</u></p> <p>There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site. Carbon emissions from vehicle exhausts have a negative impact on the ozone layer. Residents and occupants of work places along the access tracks and roads would be impacted on by noise, dust and vehicle</p> <p><u>Residual impacts:</u></p> <p>Good housekeeping will ensure a neat and well-maintained construction area reducing visual impact.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	2	1
	<b>Spatial Scale</b>	3	1
	<b>Duration</b>	1	1
	<b>Consequence</b>	6	3
	<b>Probability</b>	4	2
	<b>Significance</b>	24	6
	<b>Cumulative Effects</b>	Low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

Mitigation

- The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.

<b>Operational Phase - Potential Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Conflict with landowner and other land users	<b>Nature</b>	Negative	Negative
Creation Of Employment & Job Security During Operational Phase with Local And Regional Economic Spin-Offs	<b>Severity</b>	3	1
<u>Indirect impacts:</u>	<b>Spatial Scale</b>	5	1
Upskilling	<b>Duration</b>	6	1
Local economic spin-offs through increased income earned, and through purchasing of local materials required for operational activities.	<b>Consequence</b>	14	3
Income generation for landowners in a time of severe drought where livestock farming is not sustainable.	<b>Probability</b>	3	1
	<b>Significance</b>	42	3
<u>Residual impacts:</u>	<b>Cumulative Effects</b>	Low	Insignificant
The upliftment of unemployed people, with positive impact on standard of living for their families.	<b>Reversibility</b>		Reversible
Local and regional economic spin-offs from investment through Social Labour Plan.	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

Mitigation

- Co-ordinate invasive activities with existing mining activities or land uses to reduce the time of disturbances
- All operations will be carried out under the guidance of strong, experienced manager and ECO with proven skills in public consultation and conflict resolution.
- All personnel will be made aware of the local conditions and sensitivities in the mining area and the requirements of the local residents.

Operational Phase - Potential Impacts on Paleontological, Archaeological and Cultural and Heritage Resources	Significance	Before	After
<p><b>Cultural and Heritage Resources</b></p> <p>Direct impacts to archaeological resources would occur primarily during the construction phase y (e.g. if an excavator drives beyond the demarcated area during construction).</p> <p>The impact on paleontological resources takes place during all earthmoving activities.</p> <p><u>Indirect impacts:</u></p> <p>Loss of archaeological resources, graves and precolonial cultural landscape</p> <p>The material fossil evidence of “deep time” is embedded in the creation of the sacred landscape and contributes to the “sense of place” cultural aesthetic of the region. The loss of fossils and concomitant interpreted knowledge impoverishes the tangible testimony of the prehistoric landscape and ecological context of ancient humans.</p> <p><u>Residual impacts:</u></p> <p>Negative residual impact arises from the unavoidable loss of fossils of unknown significance in spite of mitigation efforts. Positive residual impact arises from the successful rescue of fossil material for posterity, resulting in material for future research, employment opportunities for budding, young researchers and enhanced insights into the prehistory of the Northern Cape</p>	<p><b>Nature</b></p> <p><b>Severity</b></p> <p><b>Spatial Scale</b></p> <p><b>Duration</b></p> <p><b>Consequence</b></p> <p><b>Probability</b></p> <p><b>Significance</b></p> <p><b>Cumulative Effects</b></p> <p><b>Reversibility</b></p> <p><b>Degree to which the impact can be avoided, managed or mitigated:</b></p>	<p>Negative</p> <p>5</p> <p>5</p> <p>1</p> <p>11</p> <p>1</p> <p>11</p> <p>Insignificant</p> <p>Irreversible</p>	<p>Negative</p> <p>1</p> <p>1</p> <p>1</p> <p>3</p> <p>1</p> <p>3</p> <p>Insignificant</p> <p>Insignificant</p> <p>High</p>
<p><u>Mitigation</u></p> <p>The same mitigating measures as for Site Access and Site Establishment will be applicable.</p>			

<b>Decommissioning and closure - Potential Impacts on other land uses</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
No Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 2 km of the proposed area identified.	<b>Nature</b>	Neutral	Neutral
No intersection with Environmental Management Frameworks relevant to the application	<b>Severity</b>		
Development incentives, restrictions, exclusions or prohibitions and their implications are not applicable to mining operations as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.	<b>Spatial Scale</b>		
The impact on Civil Aviation and Defence is also not applicable to this application as no high structures will be constructed and no defence installations or test areas are present in close proximity to this project.	<b>Duration</b>		
<u>Indirect impacts:</u>	<b>Consequence</b>	0	0
After closure certificate has been issued the area will once again be available for other land uses	<b>Probability</b>		
<u>Residual impacts:</u>	<b>Significance</b>	0	0
None	<b>Cumulative Effects</b>		
<u>Mitigation</u>	<b>Reversibility</b>		
• None	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		

<b>Decommissioning and closure - Potential Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<u>Indirect impacts:</u>	<b>Severity</b>		
None.	<b>Spatial Scale</b>		
<u>Residual impacts:</u>	<b>Duration</b>		
Increase in natural habitat following rehabilitation processes.	<b>Consequence</b>	0	0
	<b>Probability</b>		
	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		

Mitigation

- Compacted areas that are not required for aftercare access shall be scarified. Dual use access roads must be handed back to the landowner in a good state of repair.
- Implementing screening as part of the cleaning activities before materials are moved from the mine. The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. Any compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.
- Redundant structures will be removed for use elsewhere or demolished and discarded.
- All steel structures and reinforcing will be discarded or sold as scrap.
- All equipment and other items used during the mining operation needs to be removed from the site.
- Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.
- Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site.

<b>Decommissioning and closure - Potential Impacts on topography</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<b>Indirect impacts:</b>	<b>Severity</b>		
Historic disturbances rehabilitated	<b>Spatial Scale</b>		
<b>Residual impacts:</b>	<b>Duration</b>		
Increase in natural habitat following rehabilitation processes.	<b>Consequence</b>	0	0
	<b>Probability</b>		
	<b>Significance</b>	0	0



Mitigation

- All mitigation will be addressed as part of the annual rehabilitation plan as part of the operational phase.
- The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Final Rehabilitation, Decommissioning and Closure Plan must be reviewed periodically for continued relevance in the light of changed mining path or long-term plans.

<b>Decommissioning and closure - Potential Impacts on Biodiversity, Flora &amp; Fauna</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<u>Indirect impacts:</u> Biodiversity of area will improve due to removal of alien invasive vegetation.	<b>Severity</b>		
Fauna will return to the disturbed areas.	<b>Spatial Scale</b>		
<u>Residual impacts:</u> Restoration of mining area.	<b>Duration</b>		
	<b>Consequence</b>	0	0
	<b>Probability</b>		
	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		

Mitigation

- All outstanding rehabilitation not completed as part of the Annual Rehabilitation plan needs to be completed as part of the final Rehabilitation, Decommissioning and Mine Closure Plan
- Compacted areas shall be scarified after use during decommissioning and rehabilitation.
- Any stored topsoil shall be spread over the scarified surface.
- Shaping of high walls avoid steep profiles
- Ongoing removal of alien invasive vegetation

<b>Decommissioning and closure - Potential Impacts on Aquatic biodiversity &amp; Water Resources</b>		<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities		<b>Nature</b>	Neutral	Neutral
<u>Indirect impacts:</u>		<b>Severity</b>		
None		<b>Spatial Scale</b>		
<u>Residual impacts:</u>		<b>Duration</b>		
None		<b>Consequence</b>	0	0
		<b>Probability</b>		
		<b>Significance</b>	0	0
		<b>Cumulative Effects</b>		
		<b>Reversibility</b>		
		<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<u>Mitigation</u>				
None				

<b>Decommissioning and closure - Potential Impacts from Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b>		<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities or less than for operational phase	71	<b>Nature</b>	Neutral	Neutral
<u>Indirect impacts:</u>		<b>Severity</b>		
None		<b>Spatial Scale</b>		
<u>Residual impacts:</u>		<b>Duration</b>		
None		<b>Consequence</b>	0	0



<b>Decommissioning and closure - Potential Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Staff losing their jobs	<b>Nature</b>	Negative	Negative
Contractual agreements with service providers surpassing mine closure date	<b>Severity</b>	4	4
Poorly defined transition from mining to farming activities within different legislation	<b>Spatial Scale</b>	3	3
Not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management system.	<b>Duration</b>	3	3
Insufficient funds for complete rehabilitation	<b>Consequence</b>	10	10
<u>Indirect impacts:</u>	<b>Probability</b>	3	3
Job losses of secondary industries, businesses and contractors	<b>Significance</b>	30	30
Mine closure stalled due to non-compliance with South African legislation (national, provincial and local)	<b>Cumulative Effects</b>	Low	Low
<u>Residual impacts:</u>	<b>Reversibility</b>		Irreversible
Closure standards not accepted and/or are changing Mine closure being jeopardised by other land uses	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium
<u>Mitigation</u>			
<ul style="list-style-type: none"> <li>• Contract durations with service providers will be limited to address the risk of contractual agreements with service providers surpassing the mine closure date.</li> <li>• Maintain positive and transparent relationships with stakeholders and maintaining communication channels.</li> <li>• Undertaking environmental management in accordance with the approved EMPr and Closure Plan.</li> </ul>			

<b>Decommissioning and closure - Potential Impacts on Paleontological, Archaeological and Cultural and Heritage</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities or less than for operational phase	<b>Nature</b>	Neutral	Neutral
<u>Indirect impacts:</u>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<u>Residual impacts:</u>	<b>Duration</b>		
None	<b>Consequence</b>	0	0



### 13. Environmental impact statement

#### 13.1 Summary of the key findings of the environmental impact assessment

The assessed impact ratings are as follows:

##### Site Access and Site Establishment

- Potential Impacts on other land uses - No impact (Neutral)
- Potential Impacts on Soil (contamination, erosion, compaction) & Land capability – Medium significance, reduced to Very Low with mitigation
- Potential Impacts on topography - No impact (Neutral)
- Potential Impacts on Biodiversity, Flora & Fauna - Medium significance, reduced to Insignificant with mitigation
- Potential Impacts on Aquatic biodiversity & Water Resources – Low significance, reduced to insignificant with mitigation
- Potential Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation) – Low significance, reduced to Insignificant with mitigation
- Socio - economic impact - Low significance, reduced to Insignificant with mitigation
- Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources – Insignificant, stay Insignificant with mitigation

##### Operational Phase

- Potential Impacts on other land uses - No impact (Neutral)
- Potential Impacts on Soil (contamination, erosion, compaction) & Land capability - Medium significance, reduced to insignificant with mitigation
- Potential Impacts on topography - Very Low, reduced to Insignificant with mitigation
- Potential Impacts on Biodiversity, Flora & Fauna - Medium significance, reduced to insignificant with mitigation
- Potential Impacts on Aquatic biodiversity & Water Resources - Low significance, reduced to insignificant with mitigation
- Potential Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation) - Low significance, reduced to Insignificant with mitigation
- Socio - economic impact – low significance, reduced to Insignificant with mitigation
- Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources – Low significance, reduced to Insignificant with mitigation

All of the identified impacts will occur for a limited period and the extent of the impacts will be localised. All of the identified impacts can be suitably mitigated with the residual impact ratings being of Insignificant to Very Low. The main impacts associated with mining can be suitable mitigated. After mining have been completed and rehabilitated, the impacts will cease to exist.

#### 13.2 Final Site Map

Please refer to **Figure 4 to 13** for the Environmental Sensitivities Map including the target area of interest for proposed mining activities.

#### 13.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

##### 13.3.1 Positive Impacts

Mining would contribute to employment in the building and road sector of the Local Municipality.

##### 13.3.2 Negative Impacts

- Noise Generation from construction / set-up and operational activities;

- Visual intrusion caused by the mining activities in the largely rural setting;
- Dust fall & nuisance from construction and site establishment;
- Wildlife and vegetation disturbance during the construction / set-up and operational phase;
- Surface water and groundwater contamination from hydrocarbons during the construction/set-up and operational activities; and
- Socio-Economic impact due to conflicting land uses during the construction / set-up and operational phase.

#### 13.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

##### 13.4.1 Management Objectives

The impact management objectives are listed below:

- Objective 1 - To create a safe and rehabilitated post-mining environment.
- Objective 2 - To minimise pollution or degradation of the environment
- Objective 3 – To minimise impacts on the community and to provide optimal post-mining social opportunities

##### 13.4.2 Outcomes

- By providing sufficient information to strategically plan the mining activities, unnecessary social and environmental impacts be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary.
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads.
- Wildlife disturbance and clearance of vegetation will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible.
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refueling with care to minimise the chance of spillages and by having a spill kit available on each site where sand mining activities are in progress.

#### 13.5 Description of any assumptions, uncertainties and gaps in knowledge.

This report has been completed to the best of the EAPs ability, based on his experience and on information currently available to the EAP as well as provided by the applicant.

- The desk-top research included reference to the SANBI BGIS database map viewer for the various baseline environmental attributes, and any assumptions or gaps in knowledge expressed by SANBI in the provision of this information would be applicable to this information as referenced.
- The latest Google Earth™ reference available is outdated (2016) for purposes of current land use identification in close proximity to the proposed site on adjacent properties upstream and downstream of the site.
- It is assumed that the proposed mitigation measures as listed in this report and included in the EMPr will be implemented and adhered to. Mitigation measures are proposed which

are considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.

### 13.6 Reasoned opinion as to whether the proposed activity should or should not be authorized

#### 13.6.1 Reasons why the activity should be authorized or not

It is the opinion of the EAP that the proposed mining activity should be authorised. In reaching this conclusion the EAP has considered that:

- The “preferred alternative” takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible.
- It is also the opinion of the EAP that the underlying biodiversity objectives and ecological functioning of the area will not be compromised, subject to the strict adherence to the EMPr and Closure Plan.
- No negative impacts have been identified that are so severe as to prevent the proposed mining activity from taking place. The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of materials at a local and district level for the construction and road sector.
- Provided the recommended mitigation measures are implemented and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Mine Closure Plan (Annexure 1), in an environmentally sound manner, the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

#### 13.6.2 Conditions that must be included in the authorisation

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (Annexure 1).
- Concurrent mining and rehabilitation must be done according to the annual rehabilitation plan.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- Eradicate all alien vegetation in the area regularly during and after mining.
- The mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
- Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road off the N14 where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

#### 13.6.3 Period for which the Environmental Authorisation is required

The authorisation is required for the duration of the mining permit which is an initial 2 years plus a potential to extend the permit by an additional 3 years. Normally there is also a time delay in the granting of applications for renewal therefore a total period of 10 years may be



required.

#### 13.6.4 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report (BAR) and the Environmental Management Programme report (EMPr).

### **14. Financial Provision**

#### 14.1 Legal Framework

Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.

According to the Financial Provisioning regulations, 2015 as amended (Reg. 7) the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11.

In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

#### 14.2 Calculation

Financial provision in terms of Regulation 6 of the Financial Provisioning Regulations, 2015 as amended, is covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan attached as Annexure 1.

#### 14.3 Explain how the aforesaid amount was derived.

According to regulation 6 an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for— (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report (Refer Annexure 1).

#### 14.4 Confirm that this amount can be provided for from operating expenditure.

The amount needed for the implementation of the final rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the Nema Financial Provisioning Regulations 2015 as amended.

Provision for implementation of annual rehabilitation plan to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) will be provided as part of the operational budget and proof of access to the necessary

fund were provided as part of the PWP together with proof of access to the necessary financial resources.

## **15. Specific Information required by the competent Authority**

### 15.1 Compliance with sections 24(4)(a) and (b) of NEMA

According to the National Environmental Management Act (Act 107 of 1998), the EIA report must include the impact on:

#### The socio-economic conditions of any directly affected person

A full consultation process was implemented during the environmental authorisation process. The purpose of the consultation is to provide affected persons the opportunity to raise any potential concerns. Concerns raised have been captured and addressed within the public participation section of this report to inform the decision-making process.

#### Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

The potential impact on heritage resources is unlikely due to the nature of the mining activity but needs to be confirmed by a specialist reports. There will be no impact relating to paleontological resources refer PIA attached at annexure 4.

### 15.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act.

A motivation for not investigating reasonable and feasible alternatives is provided in Section 9.4 above.

## **16. Environmental Management Program**

### 16.1 Details of the EAP,

This has already been covered. Refer Section 1 of this document.

### 16.2 Description of the Aspects of the Activity

This has already been covered. Refer Section 9 & 10 of this document.

### 16.3 Composite Map

This has already been covered. Refer Figure 1 to 3.

### 16.4 Description of Impact management objectives including management statements

This has already been covered. Refer Section 10 of this document.

### 16.5 Determination of closure objectives.

This has already been covered. Refer Annexure 1 and Section 15 of this document.

### 16.6 Volumes and rate of water use required for the operation.

The proposed mining activity does not require water for operation.

### 16.7 Has a water use license been applied for?

No water use that require authorisation in terms of section 21 of the NWA (36, 1998) are required.

16.8 Impacts to be mitigated in their respective phases

**Table 15:** Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITY 1	SITE ACCESS (use of existing farm tracks; access points to river bed) & SITE ESTABLISHMENT	PHASE CONSTRUCTION	SIZE AND SCALE of disturbance Total footprint is 5ha
<b>COMPLIANCE WITH STANDARDS</b>	NEMA Section 2 Principles Environmental Authorisation	<b>TIME PERIOD FOR IMPLEMENTATION</b>	Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities) Upon cessation of each activity where applicable. Immediately in the event of spills
<b>MITIGATION MEASURES</b>	<p><b>Impact 1: Soil (contamination, erosion, compaction) &amp; Land capability</b></p> <ul style="list-style-type: none"> <li>• After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly.</li> <li>• Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.</li> <li>• Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater runoff.</li> <li>• Top soil shall be removed separately and stockpiled separately from other soil base layers.</li> <li>• Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.</li> <li>• Topsoil storage areas must be convex and should not exceed 2m in height.</li> <li>• Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g., by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction.</li> <li>• In particular, topsoil must not be subject to compaction greater than 1 500 kg/m<sup>2</sup> and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles.</li> <li>• Reduce drop height of material to a minimum. Temporarily halt material handling in windy conditions.</li> <li>• A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit.</li> <li>• Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.</li> <li>• Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required.</li> <li>• Petrochemical spillages to be collected in a drum and store excavated spill affected soil for disposal at a registered facility or onsite treatment.</li> <li>• Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages</li> <li>• The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants.</li> </ul>		

<b>MITIGATION MEASURES</b>	<p><b>Impact 2: Biodiversity, Flora &amp; Fauna</b></p> <ul style="list-style-type: none"> <li>• Mitigation measures for soil erosion &amp; soil compaction will also be applicable to promote natural revegetation:</li> <li>• The project footprint must be rehabilitated to resemble pre-mining conditions, as best as possible.</li> <li>• Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Existing farm tracks will be used as access and haul roads.</li> <li>• Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged.</li> <li>• The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress. Should any animals be encountered, these should be moved away by a suitably trained nature conservation officer, if necessary.</li> <li>• Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted. Vehicles speed must take into account the possibility of collisions with fauna.</li> <li>• Provide all workers with environmental awareness training. Ensure all workers comply with the requirements of this EMPr.</li> </ul>
<b>MITIGATION MEASURES</b>	<p><b>Impact 3: Aquatic biodiversity &amp; Water Resources</b></p> <ul style="list-style-type: none"> <li>• Provide mobile ablution facilities and take care that temporary onsite sanitation facilities are well maintained and serviced regularly.</li> <li>• Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials and ensure that good housekeeping rules are applied. Minimise storage of hazardous substances onsite</li> <li>• Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.</li> <li>• Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages</li> <li>• Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil.</li> <li>• A spill kit will be available on each site where mining activities are in progress.</li> <li>• Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling.</li> <li>• The applicant shall ensure that domestic waste and hazardous waste generated on site is removed from site and disposed at a registered disposal facility and a signed copy of service agreement must be submitted to the DWS to demonstrate that provision will be made to render such service.</li> <li>• The temporary waste storage at the construction camp must be designed in a way that the waste does not spill into groundwater or surface water or mix with storm water to avoid pollution of surface water resources.</li> <li>• The applicant must ensure that fluids are stored and handled properly in a concrete or cement lined surface with berm walls to avoid any seepage into the groundwater resources and ensure that the design of the storage area is such that any leakages or spillages can be contained.</li> <li>• Provide all workers with environmental awareness training and comply with the requirements of this EMPr.</li> <li>• By keeping contaminated and clean water separate and establishing controlled runoff at washing bays, the flow and end destination of decontamination washing water will be controlled.</li> </ul>

<p><b>MITIGATION MEASURES</b></p>	<p><b>Impact 4: Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b></p> <ul style="list-style-type: none"> <li>• The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.</li> <li>• The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations and limit noise levels (e.g., install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding “built-up” area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.</li> <li>• Activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise on neighbours. No amplified music shall be allowed on site. Engines shall be turned off when the vehicle is temporarily parked or stationary for long periods.</li> <li>• Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition.</li> <li>• Minimise use of reverse alarms by proper route planning</li> <li>• If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.</li> <li>• On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. At the mining area a speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. The wetting of the roads helps reduce dust generation as will applying dust suppression and/or hardening compound.</li> <li>• Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material and incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.</li> <li>• Temporarily halt material handling in windy conditions. Health and safety equipment is required for workers.</li> <li>• Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.</li> <li>• The earth moving or sampling equipment and other visually prominent items on the site will be located in consultation with the landowner.</li> <li>• Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.</li> </ul> <p><b>Impact 5: Socio-economic features</b></p> <ul style="list-style-type: none"> <li>• All access will be arranged beforehand with landowner and a supervisor will be present at all times and will report to the landowner when accessing and leaving the property.</li> <li>• Indemnity will be signed by all mining personnel entering the property to cover the landowner against any claims regarding injuries or damage to equipment.</li> <li>• Any other mining companies or land users operating legally will be regarded as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed or agreements regarding environmental liabilities need to be put in place.</li> <li>• Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation.</li> <li>• Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)</li> </ul>
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<b>MITIGATION MEASURES</b>	<p><b>Impact 6: Paleontological, Archaeological and Cultural Heritage Resources</b></p> <ul style="list-style-type: none"> <li>• If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.</li> <li>• A fossil Chance Finds Procedure must be implemented in the event of any chance finds of fossils</li> <li>• Regardless of the above archaeological opinion the following mitigation measures will also be implemented:</li> <li>• All development sites should be carefully inspected by project staff to ensure that no heritage features especially unmarked graves are present;</li> <li>• Equipment moving on site will, where ever possible, be confined to established roads and tracks.</li> <li>• Any identified heritage feature will be cordoned off. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them.</li> <li>• Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.</li> <li>• A safe distance of at least 100 metres will be maintained between identified heritage resource and any development associated with the mining activities.</li> </ul>
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ACTIVITY 2	Mining (extraction, loading and hauling)	PHASE OPERATION	SIZE AND SCALE of disturbance Total footprint is 5ha: average depth of 5 metres
<b>COMPLIANCE WITH STANDARDS</b>	NEMA Section 2 Principles Environmental Authorisation	<b>TIME PERIOD FOR IMPLEMENTATION</b>	During the estimated 5-year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.
<b>MITIGATION MEASURES</b>	<p><b>Impact 1: Soil (contamination, erosion, compaction) &amp; Land capability</b></p> <ul style="list-style-type: none"> <li>• After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly.</li> <li>• Incremental clearing of vegetation in river bed should take place to avoid unnecessary exposed surfaces.</li> <li>• Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater runoff.</li> <li>• Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.</li> <li>• Reduce drop height of material to a minimum.</li> <li>• Temporarily halt material handling in windy conditions.</li> <li>• A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit.</li> <li>• Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.</li> <li>• To ensure long-term stability, the restored topsoil cover should attempt to mimic the pre-mining distribution of soil texture and thickness.</li> </ul> <p><b>Impact 2: Topography</b></p> <ul style="list-style-type: none"> <li>• All spoils and leftover product need to be returned to the excavations for backfilling.</li> <li>• Remaining excavation slopes needs to be profiled to form an even depression 18°</li> </ul>		

<p><b>MITIGATION MEASURES</b></p>	<p><b>Impact 3: Biodiversity, Flora &amp; Fauna</b></p> <ul style="list-style-type: none"> <li>• The project footprint must be rehabilitated to resemble pre-mining conditions, as best as possible.</li> <li>• Ensured that the area to be disturbed as part of the development is as small as practically possible</li> <li>• The mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area.</li> <li>• Delineation of the area via geophysical characterisation in order to limit the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible</li> <li>• The annual rehabilitation plan must be implemented.</li> <li>• Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing in the area.</li> <li>• No indigenous plants outside of the demarcated work areas may be damaged.</li> <li>• Identify protected tree species, and leave these intact.</li> <li>• Ongoing monitoring and management will be required to ensure that alien vegetation does not proliferate within disturbed areas and that an indigenous vegetation community does indeed establish.</li> <li>• Should any animals be encountered, these should be moved away by the ECO, if necessary</li> <li>• Unnecessary destruction of vegetation should be avoided by ensuring that traffic and personnel movement be restricted to demarcated areas.</li> <li>• Movement and stockpile areas must be rehabilitated by scarifying trampled and compacted areas to a dept of ±300mm areas. Windrows created by scarifying needs to be left in place to create a rough surface that can act as seed trap and create a micro-habitat to promote natural re-vegetation.</li> <li>• No traffic should be allowed on the rehabilitated areas and vehicle's speed must take into account the possibility of collisions with fauna.</li> </ul> <p><b>Impact 4: Aquatic biodiversity &amp; Water Resources</b></p> <ul style="list-style-type: none"> <li>• No water will be abstracted in terms of section 21(a) of the National Water Act, 1998 (Act no. 36 of 1998) without the necessary permission. Potable and process water to be obtained from legal source and brought on site.</li> <li>• Implement and follow water saving procedures and methodologies.</li> <li>• Landscaping, with the aim to re-instate natural terrain units</li> <li>• Shaping to avoid diversion of stormwater towards banks to prevent erosion, and to prevent channelling of water that would increase erosive capacity of stormwater.</li> </ul>
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<p><b>MITIGATION MEASURES</b></p>	<p><b>Impact 5: Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b></p> <ul style="list-style-type: none"> <li>• The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.</li> <li>• Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads. Minimise use of reverse alarms by proper route planning</li> <li>• Temporarily halt material handling in windy conditions and or reduce drop height of material to a minimum.</li> <li>• Incremental clearing of ground cover should take place to minimise exposed surfaces.</li> <li>• No amplified music shall be allowed on site.</li> <li>• On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits.</li> <li>• Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.</li> <li>• Trucks shall have tarpaulins to prevent sand from blowing off in transit.</li> </ul> <p><b>Impact 6: Socio-economic features</b></p> <ul style="list-style-type: none"> <li>• Co-ordinate invasive activities with existing mining activities or land uses to reduce the time of disturbances</li> <li>• All operations will be carried out under the guidance of strong, experienced manager and ECO with proven skills in public consultation and conflict resolution.</li> <li>• All personnel will be made aware of the local conditions and sensitivities in the mining area and the requirements of the local residents.</li> <li>• There will be a strict requirement to treat local residents with respect and courtesy at all times.</li> <li>• Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)</li> </ul> <p><b>Impact 7: Paleontological, Archaeological and Cultural and Heritage Resources</b></p> <ul style="list-style-type: none"> <li>• Cemeteries must be protected by a buffer zone of at least 20 meters</li> <li>• If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.</li> <li>• A fossil Chance Finds Procedure must be implemented in the event of any chance finds of fossils</li> <li>• Regardless of the above archaeological opinion the following mitigation measures will also be implemented:</li> <li>• All development sites should be carefully inspected by project staff to ensure that no heritage features especially unmarked graves are present;</li> <li>• Equipment moving on site will, where ever possible, be confined to established roads and tracks.</li> <li>• Any identified heritage feature will be cordoned off. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them.</li> <li>• Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.</li> </ul>
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	<ul style="list-style-type: none"> <li>A safe distance of at least 100 metres will be maintained between identified heritage resource and any development associated with the mining activities.</li> </ul>		
<b>ACTIVITIES 3</b>	Final Rehabilitation and removal of temporary infrastructure	<b>PHASE DECOMMISSIONING</b>	<b>SIZE AND SCALE of disturbance</b> Less than 5ha
<b>COMPLIANCE WITH STANDARDS</b>	NEMA Section 2 Principles Environmental Authorisation	<b>TIME PERIOD FOR IMPLEMENTATION</b>	During the estimated 5-year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.
<b>MITIGATION MEASURES</b>	<p><b>Impact 1: Soil (contamination, erosion, compaction) &amp; Land capability</b></p> <ul style="list-style-type: none"> <li>Compacted areas that are not required for aftercare access shall be scarified. Dual use access roads must be handed back to the landowner in a good state of repair.</li> <li>Implementing screening as part of the cleaning activities before materials are moved from the mine. The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. Any compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.</li> <li>Redundant structures will be removed for use elsewhere or demolished and discarded.</li> <li>All steel structures and reinforcing will be discarded or sold as scrap.</li> <li>All equipment and other items used during the mining operation needs to be removed from the site.</li> <li>Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.</li> <li>Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site.</li> </ul> <p><b>Impact 2: Topography</b></p> <ul style="list-style-type: none"> <li>All mitigation will be addressed as part of the annual rehabilitation plan as part of the operational phase.</li> <li>The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Final Rehabilitation, Decommissioning and Closure Plan must be reviewed periodically for continued relevance in the light of changed mining path or long-term plans.</li> </ul>		

<b>MITIGATION MEASURES</b>	<p><b>Impact 3: Biodiversity, Flora &amp; Fauna</b></p> <ul style="list-style-type: none"> <li>• All outstanding rehabilitation not completed as part of the Annual Rehabilitation plan needs to be completed as part of the final Rehabilitation, Decommissioning and Mine Closure Plan</li> <li>• Compacted areas shall be scarified after use during decommissioning and rehabilitation.</li> <li>• Any stored topsoil shall be spread over the scarified surface.</li> <li>• Shaping of excavations to avoid steep profiles.</li> <li>• Ongoing removal of alien invasive vegetation</li> </ul> <p><b>Impact 4: Socio-economic features</b></p> <ul style="list-style-type: none"> <li>• Contract durations with service providers will be limited to address the risk of contractual agreements with service providers surpassing the mine closure date.</li> <li>• Maintain positive and transparent relationships with stakeholders and maintaining communication channels.</li> <li>• Undertaking environmental management in accordance with the approved EMPr and Closure Plan.</li> </ul>
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### 16.9 Impact Management Outcomes

**Table 16:** Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site access	Disturbance of fauna and flora	Biodiversity	Construction	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil compaction and erosion	Soil resource		Control through monitoring and management	
Site establishment, including waste generation and management	Visibility	Visual intrusion	Construction	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity		Remedy through restriction and rehabilitation	
	Soil and water contamination, general waste management	Soil and water resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by relocation of activity if required. Refer to <b>Annexure 3</b> – no mitigation required for project site assessed	Impact avoided

Removal of	Visibility	Visual	Operation	Control through monitoring and	Impacts minimised and mitigated.
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				management	End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity		Remedy through restriction and rehabilitation	
	Soil and water contamination, general waste management	Soil and water resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Refer to <b>Annexure 3</b> – no mitigation required for project site investigated.	Impact avoided
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Soil resource	Decommissioning	Control through monitoring and management	Impacts minimised and mitigated.  End use objectives achieved through rehabilitation.
	Soil erosion due to slow recovery of vegetation	Soil resource & biodiversity		Remedy through restriction and rehabilitation & control through monitoring and management	

#### 16.10 Impact Management Actions

**Table 17:** Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Site access	Disturbance of fauna and flora	Remedy through restriction and rehabilitation Control through monitoring and management	Concurrently with site access activities  Upon cessation of activity	Remain within the ambit of the Annual Rehabilitation Plan and Environmental Authorisation
	Soil compaction and erosion			
Site establishment, including waste generation and management	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)	Control through monitoring and management		
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and water contamination, general waste management	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Avoidance by relocation of activity if required		
Removal of ore, loadi	Visibility	Control through monitoring and management	Concurrently with mining activities	Remain within the ambit of the Annual Rehabilitation Plan and

	Emissions (dust, noise & vehicles)	Control through monitoring and management	Upon cessation of activity	Environmental Authorisation
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and water contamination, general waste management	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Refer to <b>Annexure 3</b> - none required.		
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Control through monitoring and management	Upon cessation of activity	Remain within the ambit of the Environmental Authorisation and Final Rehabilitation, Decommissioning and Closure Plan
	Soil erosion due to slow recovery of vegetation	Remedy through restriction and rehabilitation & control through monitoring and management		

## 17. Financial Provision

17.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

- Objective 1 - To create a safe and healthy post-mining environment
  - Safe mining area
    - Maintain affected environment in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
    - No potentially dangerous areas; secured if required
  - Limited residual environmental impact
    - No surface and/or groundwater contamination
    - Waste management practices not creating or leaving legacies
    - Develop a landscape that reduces the requirement for long term monitoring and management
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
    - Improve Land use with an increased production with regard to grazing.
    - Minimise disturbance of ecology due to loss of habitat and noise/visual/dust
    - Minimise risk of erosion from either increased base flow or prospecting operations:
    - Management of air emissions to minimise nuisance effects; implementation of dust suppression activities.
    - Increase of land with agricultural potential: profiling and sloping of remaining drill sumps and removal of all drill spoils and ripping of all compacted areas to facilitate recovery of natural vegetation through colonization by dispersing species (patch dynamics)
    - Prevent long term changes in land use: revert back to mainly stock farming (grazing).
    - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
    - Maintain positive and transparent relationships with stakeholders: maintaining communication channels to all stakeholders and forums.
    - Provide stakeholders with relevant information: making all information available to stakeholders and providing information to authorities as per legislative requirements.
    - Undertaking environmental management in accordance with the implementation, maintenance and auditing of an environmental management system.
  - Minimal negative aesthetic impact
    - Maintain affected environment in an improved state containing no foreign debris or other materials.

The legal framework within which all the above lies entails:

- Defining and meeting closure standards.
- Complying with legislation.

- Sufficient financial provision for mine closure activities.
- Monitoring and plan for latent environmental impact.

17.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The closure objectives were reported in the draft BAR as well as the Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment and was made available to all registered interested and affected parties.

17.3 Rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities

Refer Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment Annexure 1.

17.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The closure objectives are to return the land disturbed by mining activities back to its original condition. The rehabilitation plan provides the detail on how this will be achieved as detailed in Annexure 1

17.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

As per Paragraph 11 of this report and Annexure 1.

17.6 Confirm that the financial provision will be provided as determined.

As per Paragraph 11 of this report and Annexure 1.

17.7 Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including

**Table 18: Mechanisms for Monitoring Compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All mining activities	All commitments contained in the BA Report and accompanying EMPr.	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Site Manager and EAP.	Annual Undertake and submit an environmental performance audit to DMR
Site access and site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	Weekly, and after rain-fall events Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Open Pit Mining	Visual inspection of biodiversity impacts	Visual inspection of mining activities and other possible secondary impacts <ul style="list-style-type: none"> <li>Control and prevent the development of new access tracks.</li> <li>Control and prevent growth of alien vegetation in cleared areas and on stockpiles.</li> <li>Standard waste management practices must be implemented to prevent contamination and littering.</li> <li>All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.</li> </ul>	Site Manager & Contractor (or sub-contractors)	Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
	Visual inspection of water resource functionality			
	Visual inspection of waste management, housekeeping and maintenance.			
Closure & Rehabilitation	Revegetation; Stability; Soil erosion; Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	A final audit report for site closure must be submitted to the DMR for approval.



17.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

An external environmental performance audit shall be conducted annually by an independent environmental assessment practitioner that include an annual rehabilitation plan for implementation during the next reporting period. A review of the Final decommissioning, rehabilitation and mine closure Plan will also be done on an annual basis together with an update of the quantum calculations for financial provision for rehabilitation.

## **18. Environmental Awareness Plan**

18.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Training is part of its Induction process and environmental Management System (EMS). The induction includes:

- Awareness training for contractors and employees;
- Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts;
- EMS training;
- Comprehensive training – on emergency response, spill management, etc;
- Specialised skills; and
- Training verification and record keeping

Before commencement of the mining activities all employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.

The training course should include key information abstracted from the EMP pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.

The full EMP document is also made available to attendees.

18.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Environmental risks and how to manage them are dealt with in the induction course referred to in section (m) (i) above. If an incident of environmental pollution or damage does occur it is analysed and appropriate prevention and/or mitigation measures are developed. These measures are added to the EMP and conveyed to the relevant personnel.

All unplanned incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

### **Hydrocarbon Spills**

Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m<sup>2</sup>), resulting from situations such as; a leaking diesel bowser, an oil drum that is knocked over, large spillages from equipment, etc.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill,
- The removal of all contaminated material, and
- The disposal (at a licenced hazardous disposal facility) or bioremediation (at a licenced facility) of this material.

## **Fire**

There is the potential for fire to occur in the following locations of the drill site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

**Veld fires:** Any person who observes the fire must report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

**Vehicles and Equipment:** Fire extinguishers will be available at the site where drilling activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

### 18.3 Specific information required by the Competent Authority

Not applicable at this stage

## **19. Undertaking**

The EAP herewith confirms

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:



**N.J. van Zyl**  
**Reg. EAP (EAPASA 2019/2034)**  
**March 2023**

**-END-**

**Annexure 1: Final Rehabilitation, decommissioning and mine closure plan  
Including Environmental Risk Assessment and quantum calculations**

**Annexure 2: PPP summary**

**Annexure 3: Phase 1 HIA**

**Annexure 4: Desktop PIA**