

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND  
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR  
THE APPLICATION OF A MINING RIGHT SITUATED ON A  
PORTION OF THE REMAINING EXTENT OF THE FARM  
ZANDFONTEIN 259 IN THE MAGISTERIAL DISTRICT OF  
SASOLBURG,  
FREE STATE**

**FOR  
JONGILIZIWE SAND MINE (PTY) LTD**

**DMR REF. NO. FS 10069 MR**



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## mineral resources

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

### **ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

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

**NAME OF APPLICANT:** JONGILIZIWE SAND MINE (PTY) LTD

**TEL NO:** N/A

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**POSTAL ADDRESS:** P.O BOX 26587, Vaal Park, Sasolburg

**PHYSICAL ADDRESS:** N/A

**FILE REFERENCE NUMBER:** FS 30/5/1/1/2/10069 MR

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## 1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a mining 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.

## 2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
  - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - (ii) degree to which these impacts—
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources, and
    - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

## PROJECT DETAILS

**Name of Project:** Portion of the remaining extent of the Farm  
Zandfontein 259

**Mining Right:** FS 10069 MR

**Name of Applicant:** Jongiliziwe Sand Mine (Pty) Ltd

**Responsible person:** R. Mabefu

**Physical Address:** P.O BOX 26587, Vaal Park, Sasolburg

**Postal Address:** P.O BOX 26587, Vaal Park, Sasolburg

**Telephone:** N/A

**E-mail:** [rmabefu@gmail.com](mailto:rmabefu@gmail.com)

**Environmental Consultant (EAP):** Tshimangadzo Mulaudzi

**Responsible Person:** Tshimangadzo Mulaudzi

**Physical Address:** 15 Barnes Street, Langebaan building,  
Bloemfontein 9301

**Postal Address:** P.O. Box 29567, Danhof, 9310

**Telephone:** 079 362 6046

**Facsimile:** 086 556 2568

**E-mail:** [info@engedime.com](mailto:info@engedime.com)

**Expertise of EAP:** Refer to Part A (3) (a) (ii) on the expertise of  
EAP



## PART A

### SCOPE OF ASSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

#### 3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

##### a) Details of

##### i. Details of the EAP

**Name of the Practitioner:** Tshimangadzo Mulaudzi  
**Tel No.:** 079 362 6046  
**Fax No. :** 086 556 2568  
**E-mail address:** [mulaudzit@engedime.com](mailto:mulaudzit@engedime.com)

##### ii. Expertise of the EAP

###### (1) The qualifications of the EAP

(with evidence).

Tshimangadzo hold an Honours Degree in Mining and Environmental Geology from the University of Venda. Have since been working as an environmental geologist and environmental practitioner. He has 5 years' experience in Environmental Science, 3 years' experience in Geology, and 5 years' experience in public participation.

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

(In carrying out the Environmental Impact Assessment Procedure)

Tshimangadzo has been carrying out Environmental Impact Assessment Procedure since 2012, managing a construction company called Tshedza Concrete Art in Limpopo Province, Makhado town.

In 2014, he joined a large mining consulting company in Kimberly called Breeze Court Investments 47 (Pty) Ltd (Geologist and Mining Consulting firm). This is where Mr Mulaudzi acquired in-depth experience and know how in the mining consulting business by assisting the large to small scale mining companies to obtain mining right, mining rights, mining permits, technical co-operate permits, reconnaissance permits, exploration rights, production rights, integrated water use license, and environmental authorisation among other licenses.

Tshimangadzo has five years working experience in environmental management, geology and public participation process.

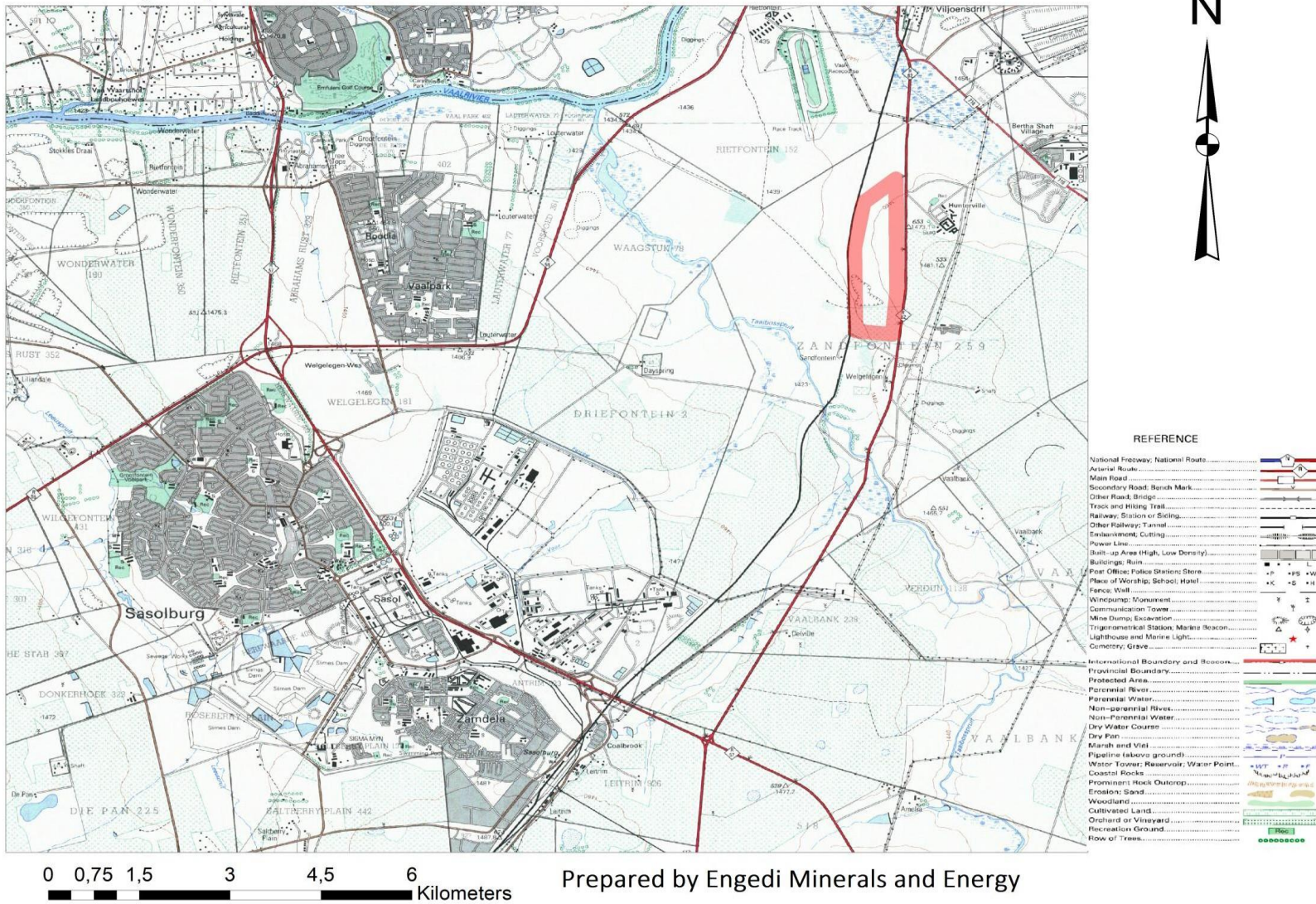
##### b) Description of the property

<b>Farm Name:</b>	A Portion of the Remaining Extent of the Farm Zandfontein 259
<b>Application area (Ha)</b>	144.30 Ha
<b>Magisterial district:</b>	Sasolburg
<b>Distance and direction from nearest town</b>	± 6 km east of the town of Sasolburg.
<b>21 digit Surveyor General Code for each farm portion</b>	F01600000000025900000

**c) Locality map**

(shows nearest town, scale not smaller than 1:250000 attached as **Appendix 2**).

**Locality Map of a Portion of the Remainder of the Farm Zandfontein 259**



**d) Description of the scope of the proposed overall activity**

(Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site)

**Mining Right**

Open cast/roll over mining will be used to access sand. Trucks will be used to transport sand to the plant and market. All available topsoil from position of the first excavation area will be removed and stored separately in a demarcated area for the final rehabilitation.

**Backfilling and rehabilitation:**

The sand will be sifted at the grizzly screen, waste after the minerals have been recovered will be put back into open excavations. During this process of backfilling, variation in the dumping sequence of materials will be followed to obtain better compaction and stability of the reclaimed overburden. This will ensure that the voids surrounding the coarse materials will be filled up with finer sediments. Compaction will be achieved through heavy vehicles during the backing stage.

The topsoil of all excavations will be stockpiled on a demarcated area. The excavated material from pits will be screened inside or close to the excavation area. Topsoil will be replaced once the ground has been leveled during rehabilitation phases.

The following equipment will be used: front end-loader, dumper and 1xChieftan screening/crushing plant

**a) Description of the scope of the proposed overall activity**

**i) Listed and specified activities**

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as **Appendix 4**

<b>NAME OF ACTIVITY</b>  (All activities including activities not listed)  (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	<b>AERIAL EXTENT OF THE ACTIVITY</b>  Ha or m <sup>2</sup>	<b>LISTED ACTIVITY</b>  Mark with an X where applicable or affected.	<b>APPLICABLE LISTING NOTICE</b>  <i>(GNR 544, GNR 545 or GNR 546)/ NOT LISTED</i>
Excavation Area	144.068 Ha.	X	Listing Notice 2

			Activity No. 17
Existing Crushing plant, Jaw-crusher, Cone-crusher, conveyors, Transformer room-Electricity	0.05 Ha	X	Listing Notice 2 Activity No. 17
Stockpiles and Dumps	0.04 Ha.	X	Listing Notice 2 Activity No. 17
Loading, hauling and transport		X	Listing Notice 2 Activity No. 17
Access road	0.04 Ha	X	Listing Notice 2 Activity No. 17
Slime dam	0.02 Ha.	X	Listing Notice 2 Activity No. 17
Two Underground Diesel storage (37 m <sup>3</sup> in volume)	0.002Ha	X	Listing Notice 2 Activity No. 17
Offices, Ablution, Workshop area, Boiler shop and Storage (tyre, oil, paint, flammable and used oil)	0.08 Ha	X	Listing Notice 2 Activity No. 17



**ii) DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN**

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

The method of mining that will be adopted for this operation will be open cast mining. The equipment that will be required for the mining operation will be a front end loader, dump trucks, conveyor belts and sizing plant. Access to the site will be controlled by means of property fence and gate. There are existing access road used to link the proposed mine dump and main road. Portable water will be obtained from the municipality, brought to the site daily and stored in a storage tank. The workforce will not reside at the premises as most of them will be from the nearby community. A chemical toilet will also be made available on site. No maintenance yard will be established since all vehicles will be maintained off site at the contractor’s workshop. There will be parking space provided closer to the entrance of the mine area.

**e) Policy and Legislative Context**

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</p>	<p><b>REFERENCE WHERE APPLIED</b></p>	<p><b>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.</b></p> <p>(E.g. in terms of the National Water Act a Water Use License has/has not been applied for)</p>
<p>National Environmental Management Act (NEMA), No. 107 of 198, as amended</p>	<p>Section 24</p>	<p>In terms of the National Environmental Management Act, an application for an Environmental Authorisation</p>

		has been applied for.
Regulation 982. National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014	Regulation 19	In terms of the NEMA EIA Regulations a Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) were prepared to submit to the competent authority.
Regulation 983. National Environmental Management Act (Act No. 107 of 1998): Listing notice 1: List of activities and competent authorities identified in terms of sections 24(2) and 24D	Regulation 20	In terms of NEMA EIA Regulations R.983, Listing notice 1, the activity triggers regulation 21 which refers to a mining permit application and therefore needs an Environmental Authorizations to proceed as well as follow procedures as prescribed in regulation 19 of R.982 (EIA Regulations, 2014).
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 16	In terms of the MPRDA, any person who wishes to apply for a mining permit must lodge the application in the prescribed manner.
Mineral and Petroleum Resources Development Amendment Act (Act No. 49 of 2008)	Section 12	In terms of the MPRDA, any person who wishes to apply for a mining permit must simultaneously apply for an environmental authorisation and must lodge the



		application to requirements contemplated by competent authority.
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**f) Need and desirability of the proposed activities**

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

**Project need and desirability**

Mining is of great importance to the South African economy. With the increasing demand in construction, Sandmining has become one of the lucrative small scalemining opportunities. Not only does it meet market demand but the economic contribution tothe local economy is significant. Potential impact on the social, social, cultural and environmental aspects was identified. These impacts were assessed for their effect on the social, cultural and environmental aspects. The significance of the impacts was also determined.

Mitigation measures are aimed at lessening negative consequences of the proposed mining operation. The mitigation measures include designs and management practices that will be embarked on, to prevent the identified impacts on the social, cultural and environmental aspects. For each significance identified, mitigation measures were specified. These mitigation measures are described in more detail in the environmental management programme.

Opportunities that exist within mining are as follows:

- Constant demand on the market for commodities;
- Establishment of a permanent working group between the Municipality and the mine managers responsible from developing local economic development initiative;
- Encourage local SMME's and entrepreneurs to take advantage of procurement;
- Develop a database of available labour and skills to encourage the employment of local people;
- Provide skills training and support programmes;
- Instigate mining procurement opportunities in consultation with the mines, develop a database of such opportunities and ensure that this information is made available to local businesses and communities.

For these to be achievable, investment and skills development, technology and infrastructure, as well as broadening of the supplier base, will need to be addressed. Due to the increased mechanization of mining activities, there has been an overall jobless growth within this sector. Rand volatility of late has not made things easier. The lack of diversification within the industry has led to a mainly commodity export driven industry.

### **Benefits of the project**

Benefits of the project may include increased employment of local residents in the area, greater economic input into the area allowing better development of the towns and surrounding area, and greater socio-economic stability.

#### **b) Period for which the environmental authorisation is required**

The required period is 30 years.

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

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

- The comparison of the originally proposed site plan,
- The comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and
- The consideration of alternatives to the initially proposed site layout as a result

#### **i) Details of the development footprint alternatives considered.**

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

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

If the project were not to proceed, the additional economic activity, skills development and available jobs would not be created, the reserves would remain unutilised, the current land uses and economic activities would continue as at present, with little or no economic growth developing in the region. There are currently no foreseeable significant environmental impacts that will outweigh the economic benefits that would be generated by the project; however this will be further assessed during the Environmental Impact Assessment (EIA).

If the proposed mining activities were not to proceed, mining activities would not necessarily be avoided, as another application in terms of the MPRDA (Act no. 28 of 2002) can be made by another company. Unless the government declares the area off limits to mining, mining houses will continue to attempt to mine the resources found on the property

d) The main activities is the proposed mining of sand.

e) The historic land use is one of crop farming. The mining activities option will result in the continuation of such land use after rehabilitation.

Although it could probably remain economically viable, the continuation of agriculture will not provide the level of economic growth to the area that mining activities would offer. After mine closure and rehabilitation of mined area, the land capability may return to grazing, allowing the continuance of certain agricultural practices. The mine will also promote sustainable local economic development, to give communities the skills required to remain economically viable and successful after mine closure.

If the project were not to proceed, the additional economic activity, skills development and available jobs would not be created, the sand and reserves would remain unutilised, the current land uses and economic activities would continue as at present, with little or no economic growth developing in the region. There are currently no foreseeable significant environmental impacts that will outweigh the economic benefits that would be generated by the project; however this will be further assessed during the EIA.

If mining activities on the Farm Zandfontein 259 were not to proceed with the proposed project; mining activities of the sand will not necessarily be avoided, as another application in terms of the MPRDA (Act no. 28 of 2002) can be made by another company. Unless the government declares the area "off limits" to mining activities, mining activities houses will continue to attempt to mine the sand



## **ii) Details of the Public Participation Process Followed**

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

Engedi Minerals was appointed by Jongiliziwe Sand Mine (Pty) Ltd as the independent consultant to conduct the Public Participation process as part of the EIA as stipulated in Sections 56 - 59 of the NEMA (Act no. 107 of 1998) as well as in Section 22 of the MPRDA (Act no. 28 of 2002).

As stipulated in the MPRDA (Act no. 28 of 2002) and in Regulation 49(1) (f) (MPRDA Regulation GN R527), I&APs need to be notified and consulted with, as part of an application for mining right.

### **Identification of Interested and Affected Parties**

The following categories of stakeholders will be identified:

- The landowner/s of the remaining extent of the Farm Zandfontein 259 (the area included in the Mining Right Application i.e. the site).

In addition other potential stakeholders will be identified and invited to register themselves as I&APs. This invitation will also be extended to the public by means of site notices and newspaper notices.

### ***Landowners & lawful occupiers of the site***

The title deed owners of the application area will be listed in the table below. According to the title deed ownership records, the landowners of the application area are private landowners.

<b>FARM NAME</b>	<b>PORTION</b>	<b>EXTENT (Ha)</b>	<b>OWNER</b>	<b>TITLE DEED NUMBER</b>
Zandfontein 259	Remainder	1863.84	Seriti Resources	-

The landowner of the application area has been informed of the proposed mining activities and the process to follow. According to information provided by the landowner of the application area, there are no communities living on the site, but it could not be established whether there are communities living on adjacent properties.

### **iii) Summary of issues raised by I&APs**

**(Complete the table summarising comments and issues raised, and reaction to those responses)**

\*The public participation report is attached as appendix 5.

**iv) The Environmental attributes associated with the sites**

**(1) Baseline Environment**

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

(Its current geographical, physical, biological, socio- economic and cultural character).

**Physical environment**

**The environment on site relative to the environment in the surrounding area**

**Climate**

Sasolburg normally receives about 550mm of rain per year, with most rainfall occurring during summer. The chart below (lower left) shows the average rainfall values for Sasolburg per month. It receives the lowest rainfall (0 mm) in July and the highest (103 mm) in January. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Sasolburg range from 17 °C in June to 27.9 °C in January. The region is the coldest during June when the mercury drops to 0 °C on average during the night.

**Topography and Elevation:**

The Free State province is located on the Highveld, a plateau rising to elevations of 1,800 m in the east and sloping to about (1,200 m) in the west. Two streams drain the province: the upper Orange River, which forms the province's southern boundary, and the Vaal River, part of its northern boundary.

**Geology and Soils:**

The area is largely dominated by the dolerite dykes and sills that formed as the result of magma intruding through sedimentary rocks of the Beaufort group of the Karoo Supergroup. Although the dolerites are more resistant to physical weathering than the surrounding sedimentary rock, they weather easily under chemical weathering resulting in stone aggregates, clay and sand formation that occurs in place around this area.



## **Biological Environment**

### **Vegetation**

The natural vegetation of the eastern part of the Free State is grassland, with savanna in the north-west and Nama-karoo in the south-west. The savanna biome is often described as an area of grassland with dispersed trees or clusters of trees. The lack of water makes the savanna a difficult place for tall plants such as trees to grow. Grasses and trees that grow in the savanna have adapted to life with little water and hot temperatures. Grasses, for example, grow quickly in the wet season when water is abundant and turn brown in the dry season to conserve water. Some trees store water in their roots and only produce leaves during the wet season. Due to frequent fires, grasses stay close to the ground and some plants are fire resistant. Examples of vegetation in the savanna include wild grasses, shrubs, baobab trees, and acacia trees.

# Vegetation Map of a Portion of the Remainder of the Farm Zandfontein 259



Figure 1 Vegetation Map of the area under application

## **Fauna**

### Mammals

The Savanna is home to many large land mammals, including elephants, giraffes, zebras, rhinoceroses, buffalo, lions, leopards, and cheetahs.

### Birds

Can expect good birds such as Goliath Heron, Black-crowned Night-Heron, Giant Kingfisher, Tawny-flanked Prinia, African Jacana, Black Crake, Thick-billed Weaver, Squacco Heron and Great Crested Grebe. African Black Duck is resident on the river and the full suite of highveld ducks and geese, including Hottentot Teal, can be ticked during a summer visit. African Rail is regularly recorded and the Vaal Park wetland, between the suburb of Vaal Park and the river, has turned up surprises like African Crake, Lesser Moorhen, Dwarf Bittern and Little Bittern. There are at least two breeding pairs of African Fish-Eagle and even a record of Osprey on this stretch of river.

### **Conservation areas**

There are currently no formally protected areas in Upper Vaal.

### **Surface water**

Upper Vaal Water Management Area includes the following major rivers: the Wilge River, Liebenbergsvlei River, Mooi River and Vaal River, and covers the following Dams: Boskop Dam; Grootdraai Dam; Klerkskraal Dam; Klipdrift Dam; Potchefstroom Dam; Saulspoot Dam; Sterkfontein Dam; Vaal Dam.

The land use in the Upper Vaal Water Management Area (WMA) is characterised by the sprawling urban and industrial areas in the northern and western parts of the WMA. There is also extensive coal and gold mining activities located in the Upper Vaal water management area. These activities are generating substantial return flow volumes in the form of treated effluent from the urban areas and mine dewatering that are discharged into the river system. These discharges are having significant impacts on the water quality in the mainstream of the Vaal River, throughout all three of the Vaal water management areas.

## Socio-economic setting

### Population

Total: 163 564

Density: 1 900/km<sup>2</sup>

### Population by age groups

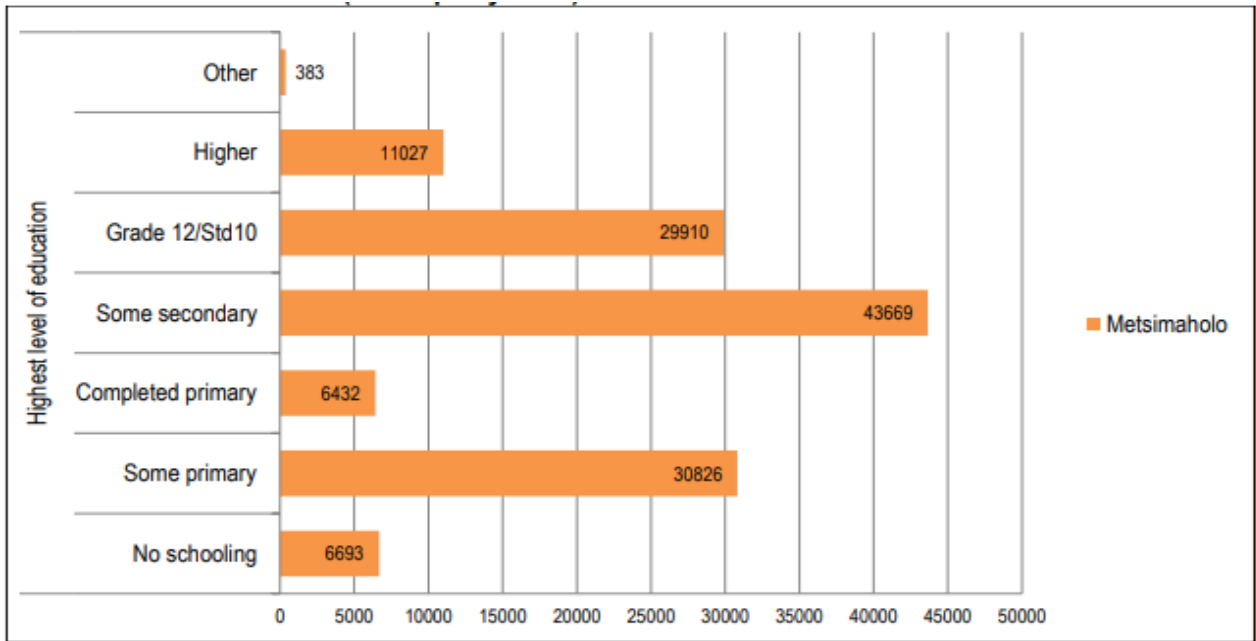
The population by age groups is as follows:

POPULATION AGE GROUPS	FEMALE	MALE
65+(Elderly)	6976	5676
35-64(Adults)	21662	25984
15-34(Youth)	30015	34425
0-14(Children)	19380	19445
Total	78033	85531

### Employment status

	2017/18	2016/17	2015/16	2014/15	2013/14
<b>EMPLOYMENT</b>					
Employment Costs (R'000)	93 362	90 657	88 361	80 294	70 606
Remuneration of councillors (R'000)	7 198	6 547	6 895	6 577	5 983
Total Employee Positions	186	188	196	214	162
Total Vacant Employee Positions	33	13	22	27	16
Total Vacancy Percentage	17.74%	6.91%	11.22%	12.62%	9.88 %

### Education Profile



Source: Stats SA: CS 2016

As depicted on the data charts above, the education profile of the municipality's education profile indicates that 29 910 people have Grade 12 or equivalent education. On the other hand, a total of 11 027 people have obtained higher education qualifications. In total, over 87 621 people have not completed grade 12 / standard 10, with 6 693 with no formal education at all. The total number of people who have not completed matric (including those with no schooling), constitutes 53.5% of the total municipal population and those with matric and higher education constitutes 25% of the total municipal population.

**(b) Description of the current land uses.**

The land in the application area is predominantly utilised for agriculture in the form of crop production and livestock farming. Infrastructure such as secondary tar roads, gravel roads and homesteads occur within proximity of the application area. In terms of land cover, the application area is covered by wetlands, cultivated fields, grassland and woodland/open bush (Figure 5).

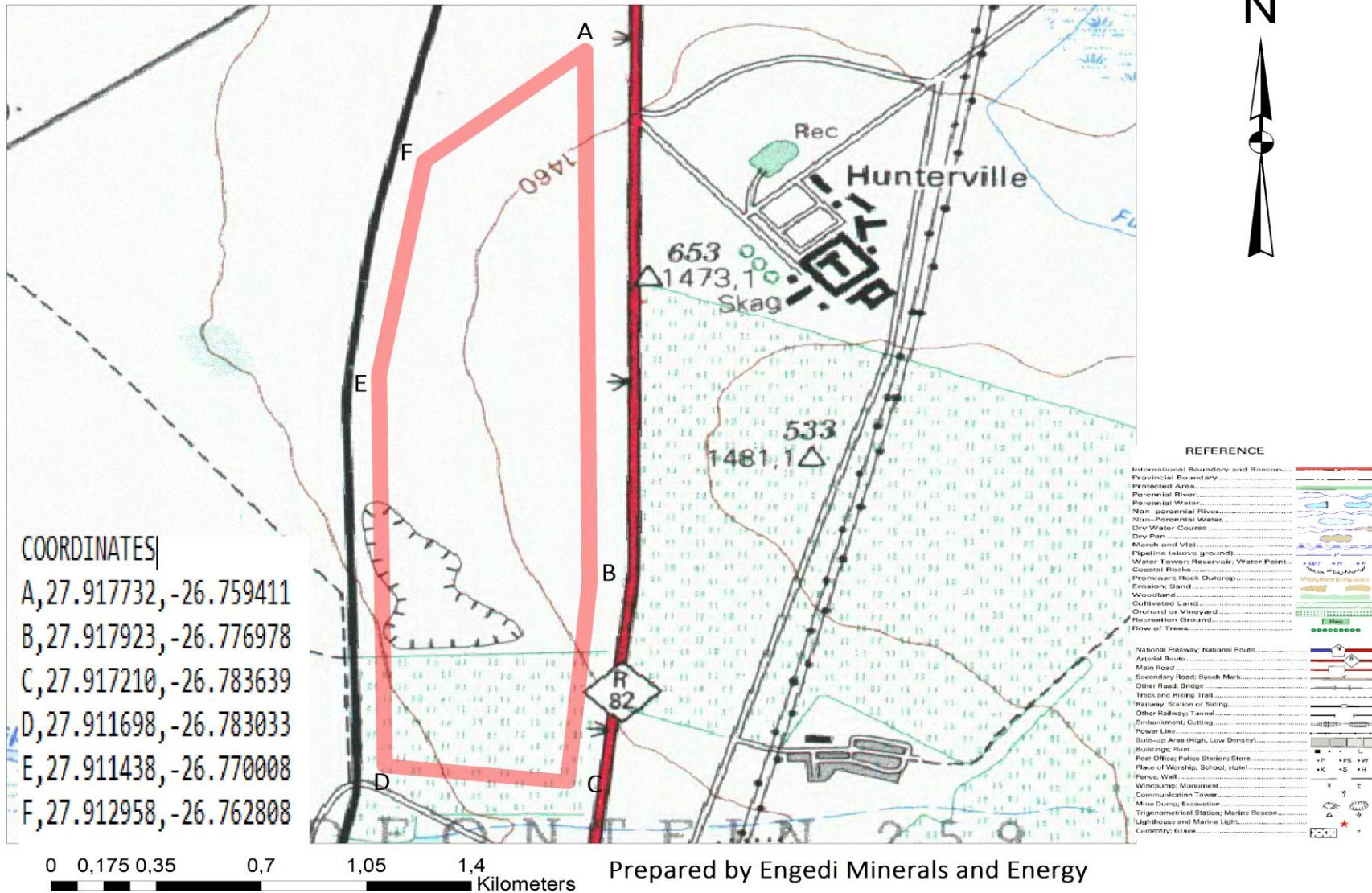
**(c) Description of specific environmental features and infrastructure on the site.**

The following environmental features and infrastructure is present at the site:

- ❖ Access roads are available on site

(d) Environmental and current land use map.

Layout Map of a Portion of the Remainder of the Farm Zandfontein 259



**v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts**

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

ASPECT	POTENTIAL IMPACT
Soil	<ul style="list-style-type: none"> <li>• Compaction - from movement of heavy machinery</li> <li>• Contamination - from diesel, oil, grease, etc. used for the mining and from maintenance of machinery conducted on site</li> <li>• Contamination - from domestic waste.</li> <li>• Loss of topsoil - when the mining site is cleared of vegetation, topsoil may be lost</li> <li>• Erosion - from the clearing of mining sites and movement along access tracks</li> </ul>
Land use	<ul style="list-style-type: none"> <li>• The land use will temporarily change to mining</li> <li>• Mining may interfere with any land uses currently taking place on the site</li> </ul>
Biodiversity (fauna and flora)	<ul style="list-style-type: none"> <li>• The fauna and flora could be negatively affected by the establishment of the mining sites and access tracks</li> <li>• Alien and invasive species could be introduced through the disturbance</li> </ul>
Surface- and groundwater	<ul style="list-style-type: none"> <li>• Contamination - from diesel, oil, grease, etc. used for the drilling machinery and from maintenance of machinery conducted on site</li> <li>• Contamination - from domestic waste, sewerage, drilling core and contaminated soil</li> <li>• Mining requires a large amount of water which may be sourced on site,</li> </ul>



	which may result in the reduction of water available to other users
Heritage sites	<ul style="list-style-type: none"> <li>Heritage sites may be present on the site, which may be disturbed and/or damaged during mining</li> </ul>
Dust	<ul style="list-style-type: none"> <li>Dust from mining activities may coat vegetation making it unsafe for livestock grazing</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Noise from the mining activities could disturb residents within the site</li> </ul>

**vi) Methodology used in determining the significance of Environmental impacts**

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The significance of the impacts will be determined through the consideration of the following criteria:

Probability:	Provides a description of the likelihood/probability of the impact occurring
Extent:	Describes the spatial scale over which the impact will be experienced
Duration:	The period over which the impact will be experienced
Intensity:	The degree/order of magnitude/severity to which the impact affects the health and welfare of humans and the environment
Significance :	Overall significance of the impact on components of the affected environment and whether it is a negative or positive impact

The impacts will be individually described and assessed using the criteria drawn from the EIA Regulations, published by the DEA in terms of the NEMA (Act 107 of 1998).

The significance of each impact is assessed using the following formula (before and after mitigation):

**Significance Point (SP) = (Probability + Extent + Duration) x Intensity**

The maximum value is 150 SP. The impact significance will then be rated as follows:



SP > 75	Indicates <b>high</b> environmental significance	An impact that could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 - 75	Indicates <b>moderate</b> environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP < 30	Indicates <b>low</b> environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

Probability (P)		
None (N)	1	The possibility of the impact occurring in none, due either to the circumstances, design or experience (0%).
Possible (P)	2	The possibility of the impact occurring is very low, due either to the circumstances, design or experience (25%).
Likely (L)	3	There is a possibility that the impact will occur to the extent that provisions must therefore be made (50%).
Highly likely (H)	4	It is most likely that the impacts will occur at some stage of the development and plans must be drawn up before carrying out the activity (75%).
Definite (D)	5	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on (100%).
Extent (E)		
Footprint (F)	1	The impact area extends only as far as the activity which occurs within the

		total site area.
Site (S)	2	The impact could affect the whole site or a significant portion of the site.
Regional (R)	3	The impact could affect the area including the neighbouring farms, the transport route and/or the adjoining towns.
National (N)	4	The impact could have an effect that expands throughout the country.
International (I)	5	Where the impact has international ramifications that extend beyond the boundaries of the country.
<b>Duration (D)</b>		
<i>The period over which the impact will be experienced</i>		
Temporary (T)	1	0 - 18 months (or confined to the construction period).
Short term (S)	2	18 - 36 months (or confined to the construction and part of the operational period).
Medium term (M)	3	36 - 48 months (or confined to the construction and whole operational period).
Long term (L)	5	For the whole life of mine (including closure and rehabilitation period).
Permanent (P)	5+	Beyond the anticipated lifetime of the project.
<b>Intensity (I)</b>		
Insignificant (I)	2	Will have a no or very little impact on the health and welfare of humans and environment
Low (L)	4	Will have a slight impact on the health and welfare of humans and environment
Moderate (M)	6	Will have a moderate impact on the health and welfare of humans and environment
High (H)	8	Will have a significant impact on the health and welfare of humans and the

		environment
Very high/ don't know (V)	10	Will have a severe impact on the health and welfare of humans and the environment

**vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.**

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Description	Occurring phase
<b>Creation of new employment opportunities</b>	
Employment creation during the life of mining activities may be greatly beneficial to a number of households within the surrounding area. It is however anticipated that a contractor operation is the preference and therefore job opportunities might be very limited.	Construction and Operational phases
<b>Transfer of skills to local people</b>	
In order to promote preferential recruitment for local people, it would be necessary to assess the skills available locally and to ensure that these skills match the local positions at the operation. From the data collected to date, it is apparent that there is significant potential for skills transfer given education levels in the area.	Construction and Operational phases
<b>Support of local suppliers and contractors</b>	
During both the construction and operational phases of the operations, it is expected that a wide variety and generally substantial quantities of goods and services will be required by the mine and their contractors. It is recommended that whenever possible, local contractors should be utilized to provide goods and services to the mine.	Construction and Operational phases

**viii) The possible mitigation measures that could be applied and the level of risk.**

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

Aspect	Potential impact	MITIGATION MEASURES
Soil	Compaction - from movement of heavy machinery	<ul style="list-style-type: none"> <li>• Existing roads and tracks will be used as far as possible.</li> <li>• New access tracks will be kept to a minimum.</li> <li>• Rehabilitation of disturbed areas will take place.</li> </ul>
	Loss of topsoil - when the mining site is cleared of vegetation, topsoil may be lost	<ul style="list-style-type: none"> <li>• Any removed topsoil will be kept to one side and protected from being blown away or being eroded.</li> <li>• Rehabilitation of mining and disturbed areas will take place.</li> </ul>
	Erosion – from the clearing of drill sites and movement along access tracks	<ul style="list-style-type: none"> <li>• Sediment and erosion controls will be designed to prevent runoff from the mining sites into the rivers and any wetland areas.</li> <li>• Appropriate water management, sediment and erosion control measures will be designed for roads and tracks that may be constructed.</li> <li>• Rehabilitation of mining and disturbed areas will take place.</li> </ul>

	<ul style="list-style-type: none"> <li>• Contamination – from diesel, oil, grease, etc. used for the mining machinery and from maintenance of machinery conducted on site</li> <li>• Contamination - from domestic waste, sewerage and mining core</li> </ul>	<ul style="list-style-type: none"> <li>• Topsoil must not be contaminated with oil, grease, diesel, etc. which may inhibit the later growth of vegetation.</li> <li>• Mining sumps and containment measures will be designed to contain all mining fluid.</li> <li>• Mining sumps will be constructed sufficiently large to retain all slurry produced during mining.</li> <li>• All chemicals, fuels and oils to be stored on site will be appropriately stored in sealed containers and placed on a lined area.</li> <li>• Inspect equipment daily for leaks. Machinery and equipment will only be maintained over a drip tray, a thin concrete slab or a PVC lining to prevent soil and water contamination. No vehicle will be extensively repaired on site.</li> <li>• All equipment and vehicles must be adequately maintained so that during operations it does not spill oil, diesel, fuel, etc.</li> <li>• Any contaminated soil will be collected into non-permeable bags and disposed of at an approved landfill site.</li> <li>• A chemical toilet will be used on site and will be used in such a way as to prevent water pollution. Full or leaking toilets must be reported to the supervisor for corrective action or replacement.</li> <li>• All mining core will be removed from the mining sites or place in a specified area as per request or permission from the land owner..</li> <li>• Rehabilitation of mining and disturbed areas will take place.</li> </ul>

Land use	Mining may interfere with any land uses currently taking place on the site	<ul style="list-style-type: none"> <li>• Only one quarry site will be operational at any time.</li> <li>• The area to be disturbed will be kept to a minimum (not exceeding 20mx20m).</li> <li>• No mining site will be established within 50m of any agricultural land unless consent is received from the land owner.</li> <li>• Rehabilitation of mining and disturbed areas will take place.</li> </ul>
Biodiversity (fauna and flora)	The fauna and flora could be negatively affected by the establishment of the mining sites and access tracks	<ul style="list-style-type: none"> <li>• Mining and access tracks will be located in areas that will result in minimal ground disturbance.</li> <li>• A field survey will be undertaken before mining commences at each mining site to confirm that no threatened species or ecologically sensitive areas are present in sections to be cleared.</li> <li>• Permission will be obtained from the landowner before trees are felled, should it be necessary.</li> <li>• All trees protected in terms of the National Forests Act, 1998, will be protected – will not be cut, disturbed, damaged, removed, etc.</li> </ul>
	Alien and invasive species could be introduced through the disturbance	<ul style="list-style-type: none"> <li>• Rehabilitation of mining and disturbed areas will take place.</li> <li>• Machinery will be cleared of mud and seeds prior to relocation to the next site to prevent the spread of alien invasive species.</li> <li>• An inspection on whether there is evidence of alien and invasive species as a result of mining activities will be undertaken and removed if required.</li> </ul>

<p>Surface-groundwater and</p>	<ul style="list-style-type: none"> <li>• Contamination – from diesel, oil, grease, etc. used for the mining machinery and from maintenance of machinery conducted on site</li> <li>• Contamination - from domestic waste, sewerage, mining and contaminated soil</li> <li>• Water discharge during mining</li> </ul>	<ul style="list-style-type: none"> <li>• No mining will be established within 100m of any watercourse or wetland.</li> <li>• Mining sumps and containment measures will be designed to contain all mining fluid.</li> <li>• Mining sumps will be constructed sufficiently large to retain all slurry produced during mining.</li> <li>• All chemicals, fuels and oils to be stored on site will be appropriately stored in sealed containers and placed on a lined area.</li> <li>• All waste will be collected, separated and stored properly in containers with lids and removed to an approved landfill.</li> <li>• Inspect equipment daily for leaks. Machinery and equipment will only be maintained over a drip tray, a thin concrete slab or a PVC lining to prevent soil and water contamination. No vehicle will be extensively repaired on site.</li> <li>• All equipment and vehicles must be adequately maintained so that during operations it does not spill oil, diesel, fuel, etc.</li> <li>• Any contaminated soil will be collected into non-permeable bags and disposed of at an approved landfill site.</li> <li>• A chemical toilet will be used on site and will be used in such a way as to prevent water pollution. Full or leaking toilets must be reported to the supervisor for corrective action or replacement.</li> <li>• All mining will be drilled and constructed in such a way as to prevent ingress of water into the hole.</li> <li>• Any completed mining that is not required for groundwater monitoring will be rehabilitated to prevent groundwater contamination.</li> <li>• Rehabilitation of disturbed areas will take place.</li> </ul>
	<p>Drinking water</p>	<ul style="list-style-type: none"> <li>• Drinking water will be supplied in plastic containers to be stored on site.</li> </ul>

Heritage sites	Heritage sites may be present on the site, which may be disturbed and/or damaged during mining	<ul style="list-style-type: none"> <li>• Potential heritage sites will be identified during the planning of borehole locations and demarcated.</li> <li>• Access to these sites will then be limited and all workers will be notified to keep at least 100m away from these sites.</li> </ul>
Air quality (dust)	The air quality will not be disturbed, however, a minimal dust problem may be experienced, especially in the mining area during mining	<ul style="list-style-type: none"> <li>• All mining rigs will be fitted with appropriate dust suppression equipment like water sprays, where possible.</li> <li>• Speed limits on gravel roads will be limited to 40km/hr to minimise dust generation.</li> <li>• Dust will be effectively controlled in all disturbed areas through water spraying.</li> <li>• Excavation, handling and transportation of erodible materials should be avoided during periods of excessive wind.</li> <li>• If necessary, other appropriate dust suppression techniques will be administered. For example chemicals, wind fencing, covering of surfaces and vegetation of open areas.</li> </ul>
Noise	Noise from the mining activities could disturb residents within the site	<ul style="list-style-type: none"> <li>• Modern, low noise emission vehicles and equipment will be favoured.</li> <li>• All equipment on site will be maintained in good working order.</li> <li>• Mining will be restricted to day light hours.</li> <li>• Speed limits on gravel roads will be limited to 40km/h to minimise noise generation.</li> </ul>
Socio-economic	Expectations could be created that numerous job and business opportunities will become available during mining	<ul style="list-style-type: none"> <li>• Due to the nature of mining, employment opportunities will be minimal. The mining crew is small (4-6 people) with specialised skills. Where possible, local people will however be employed during the project.</li> </ul>



#### **ix) Motivation where no alternative sites were considered**

No location alternatives are applicable to this project since the waste rock dumps are contained in the proposed mining area. Locating the development to another area will result in the ore possibly not being found and the economy and society not benefitting from future proposed mining and possible mining activities. The proposed site for the proposed mining is located within an area which is already severely disturbed as a result of agricultural activities.

#### **x) Statement motivating the alternative development location**

Within the overall site (Provide a statement motivating the final site layout that is proposed)

The proposed site for the mining activities is located within an area which is already severely disturbed as a result of mining activities. However, whenever mining activities are located within sensitive areas (i.e. wetlands, rivers, streams as well as their buffers), utmost caution will be taken to have as little impact as possible to the environment.

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

(In respect of the final site layout plan) through the life of the activity (Including

- (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and
- (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

#### **An assessment of each identified potentially significant impact and risk, including-**

The following sections present the outcome of the significance rating exercise. The results suggest that almost none of the key issues identified as part of the EIR process had a high negative environmental significance. Instead the overall score indicate a low environmental significance score.

#### **INITIAL CLEARANCE AND SITE PREPARATION PHASE**

*Direct impacts:* During this phase minor negative impacts are foreseen over the short term. The latter refers to a period of weeks. The site preparation may result in the loss or

fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, soil erosion, hydrology, and temporary noise disturbance, generation of waste, visual intrusions, increase in heavy vehicle traffic, and risk to safety of livestock and farm infrastructure, and increased risk of veld fires. The above mentioned impacts are discussed in more detail below:

Loss or fragmentation of indigenous natural fauna and flora - Grassland

The Southern parts of the province are mainly grassland. Sometimes farmers burn the grass in winter so that it will grow better in summer. Some trees also grow in the grassland, especially near rivers. The grassland are good for cattle farming. Large areas of grassland have been ploughed up and used for planting such as mealies and sunflowers. Trees and grass shall not be removed or damaged without prior approval and permits.

<b>Loss or fragmentation of indigenous natural fauna and flora</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative impacts (1),	
Significance	Negative low (26)	Negative low (12)
Can impacts be mitigated?	If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures - refer to section (f)	

	<p>of the EMPr.</p> <p>The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include:</p> <p>The site should be fenced off prior to commencement of construction activities;</p> <ul style="list-style-type: none"> <li>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible;</li> </ul> <ul style="list-style-type: none"> <li><input type="checkbox"/> An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;</li> <li><input type="checkbox"/> All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;</li> <li><input type="checkbox"/> The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr - section (f) of the EMPr.</li> <li><input type="checkbox"/> The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> <li><input type="checkbox"/> Thorn trees shall not be removed or damaged without prior approval and permits.</li> </ul>
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- Loss or fragmentation of habitats - Given the low probability of resident threatened species occurring at the footprint site, the low probability of any significant conservation corridor or buffer zone at the footprint site. A small non-perennial pan is found on site, a Water Use License will be applied for where applicable to prospect in or near this area.

<b>Loss or fragmentation of habitats</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative impacts (1)	
Significance	Negative low (12)	Negative low (12)
Can impacts be mitigated?	Exotic and invasive plant species should not be allowed to establish, if the development is approved. Where exotic and invasive plant species are found at the site continuous eradication should take place. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for development – section (f) of the EMPr also provides numerous mitigation measures related to fauna and flora.	

- Loss of topsoil – Topsoil may be lost due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.) The effect will be the loss of soil fertility on disturbed areas after rehabilitation.

<b>Loss of topsoil</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
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Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Negligible cumulative impact (1).	
Significance	Negative low (20)	Negative low (18)
Can impacts be mitigated?	<p>The following mitigation or management measures are provided:</p> <ul style="list-style-type: none"> <li>• If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation.</li> <li>• Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.</li> <li>• Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land.</li> <li>• During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</li> <li>• Erosion must be controlled where necessary on top soiled areas.</li> </ul> <p>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below.</p>	

	<ul style="list-style-type: none"> <li>• Record the GPS coordinates of each area.</li> <li>• Record the date of topsoil stripping.</li> <li>• Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>• Record the date of cessation of constructional (or operational) activities at the particular site.</li> <li>• Photograph the area on cessation of constructional activities.</li> <li>• Record date and depth of re-spreading of topsoil.</li> </ul>
	<p><input type="checkbox"/> Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</p> <p>Section (f) of the EMPr also provide mitigation measures related to topsoil management.</p>

- Soil erosion – Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal and the establishment of roads. Erosion will cause loss and deterioration of soil resources. The erosion risk is low due to the low slope gradients and low to moderate erosion levels of the soils.

<b>Soil erosion</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)

Cumulative impact	Negligible cumulative impact (1).	
Significance	Negative low (20)	Negative low (18)
Can impacts be mitigated?	<p>The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</p> <p>Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream – refer to section (f) of the EMPr..</p>	

- Temporary noise disturbance - Preparation activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as back actors and people working on the site. The noise impact is unlikely to be significant; but activities should be limited to normal working days and hours (6:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	

Significance	Negative low (20)	Negative low (9)
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

- Generation of waste - general waste, construction waste, sewage and greywater -  
The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc., (if any). The applicant will need to ensure that general and construction waste is appropriately disposed of i.e. taken to the nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community.	
Significance	Negative medium (13)	Negative low (13)
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in section (f) of the EMPr. are implemented.	

- Impacts on heritage objects – No sites, features or objects of cultural significance were found in the study area, and that there would be no impact as a result of the proposed development. It is however noted that, in terms of the National Heritage



Resource Act no 25 of 1999. Heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected. They will not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA will be contacted immediately and work will stop.

Impacts on heritage objects	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Possible (2)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2). Should these impacts occur, there may be a cumulative impact on the preservation of heritage objects in the area.	
Significance	Negative low (24)	Negative low (12)
Can impacts be mitigated?	If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Also refer to section (f) of the EMPr.	

**Indirect impacts:** The nuisance aspects generally associated with the installation of infrastructure or ground preparation will also be applicable to this development, which relates primarily to the increase in vehicle traffic associated with mining practices, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Increase in vehicle traffic – The movement of heavy vehicles during the clearance of vegetation and topsoil has the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access will be obtained from an existing secondary gravel road. While the volume of traffic along this road is low, the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users. The contractor should be required to ensure that damage to the road is repaired periodically. The movement of additional heavy vehicle traffic is unlikely to increase significantly to the current traffic load on the road. The impact on the road is therefore likely to be low.

<b>Increase in vehicle traffic</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3). If damage to roads is	
	not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	
Significance	Negative low (22)	Negative low (11)

<p>Can impacts be mitigated?</p>	<p>The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• The contractor must ensure that damage caused by construction related traffic to the gravel access road is repaired and maintained. The costs associated with the repair must be borne by the contractor;</li> <li>• Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;</li> <li>• All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits of 40 km/h.</li> </ul> <p>Also refer section (f) of the EMPr. For mitigation measures related to traffic.</p>
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- Risk to safety, livestock and farm infrastructure - The presence on and movement of workers on and off the site poses a potential safety threat to local farmer's and farm workers in the vicinity of the site threat. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

<b>Risk to safety, livestock and farm infrastructure</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	Negative low (22)	Negative low (11)
Can impacts be mitigated?	<p>Key mitigation measures include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Jongiliziwe Sand Mine should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;</li> <li><input type="checkbox"/> The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;</li> <li><input type="checkbox"/> Contractors appointed by Jongiliziwe Sand Mine should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;</li> </ul>	

- Jongiliziwe Sand Mine should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below);
- The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;
- Contractors appointed by Fiona mining enterprise must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by Fiona mining enterprise must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;
- The housing of construction workers on the site should be strictly limited to security personnel (if any).

- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of veld fires was heightened by the windy conditions in the area, especially during the dry, windy winter months from May to October. In terms of potential mitigation measures, a fire-break should be constructed around the

perimeter of the site prior to the commencement of the construction phase. In addition, fire-fighting equipment should be provided on site during the construction phase.

<b>Increased risk of veld fires</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Medium term (2)	Short term (1)
Magnitude	High (3)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	Negative medium (33)	Negative low (9)
Can impacts be mitigated?	<p>The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase;</li> <li>• Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;</li> <li>• Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter</li> </ul>	

	<p>months;  </p> <ul style="list-style-type: none"> <li>• Contractor to provide adequate fire fighting equipment on-site, including a fire fighting vehicle;</li> <li>• Contractor to provide fire-fighting training to selected construction staff;</li> <li>• No construction staff, with the exception of security staff, to be accommodated on site over night;</li> <li>• As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire fighting costs borne by farmers and local authorities.</li> </ul>
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## OPERATIONAL PHASE

**Direct impacts:** During the operational phase the study area will serve as an mining area and the impacts are generally associated with soil erosion, change in land use, impacts associated with the, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities and facilitating a positive economic growth. The abovementioned impacts are discussed in more detail below:

- Soil erosion – The largest risk factor for soil erosion will be during the operational phase when the mining activity ensues and soil is left bare until rehabilitation is initiated. Erosion will be localised within the site. This will ultimately lead to the irretrievable commitment of this resource. The measurable effect of reducing erosion by utilizing mitigation measures may reduce possible erosion significantly.

<b>Soil erosion</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Definite (4)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3). Should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	
Can impacts be mitigated?	Yes, to avoid soil erosion it will be a good practice to not remove all the vegetation at once but to only clear the area as it becomes necessary and to implement concurrent rehabilitation.  Also refer to section (f) of the EMPr.	

- Change in land-use – The use of the area for the operation of the mining activity will result in the area not being used for cultivation anymore. The impact on farm income due to the loss of agriculture will be more than offset by the income from Jongiliziwe Sand Mine (Pty) Ltd

<b>Change in land use</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	medium term (2)	medium term (2)
Magnitude	Low (1)	Low (1)



Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative impacts (1). Only 0.20Ha per year will be excavated. The rest of the farm will stay intact and undergo concurrent rehabilitation.	
Significance	Negative low (10)	Negative low (10)
Can impacts be mitigated?	<p>The proponent should establish a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience in the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.</p> <p>Also refer to section (f) of the EMPr.</p>	

- Generation of alternative land use income – Income generated through the Sand mine will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of farming onsite.

<b>Generation of alternative land use income</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Positive	Positive
Geographical extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)

Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact (2).	
Significance	Positive Low (24)	Positive Low (24)
Can impacts be mitigated?	No mitigation required.	

- Increase in storm water runoff – The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion, especially where vegetation will be cleared. Not all the vegetation should be removed at once. Only the specific trench being excavated at the specific time should be cleared.

<b>Increase in storm water runoff</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3) - Should these impacts occur, there will be a cumulative impacts on the wider area.	
Significance	Negative medium (30)	Negative low (13)
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in section (f) of the EMPr. are implemented to ensure that these impacts do not occur	

- Increased consumption of water - Approximately 10 000 – 16 000 of water per hour will be required for the washing of the gravel. The water will be sourced from groundwater sources.

<b>Increased consumption of water</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Region (3)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	High cumulative impacts (4) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
Significance	Negative medium (40)	Negative medium (40)
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in section (f) of the EMPr.	

- Generation of waste – Approximately 15 Workers will be present on site from 6:00 – 18:00, Monday to Saturday. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis by a contractor.

<b>Generation of waste</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)

Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of landfill space.	
Significance	Negative low (15)	Negative low (15)
Can impacts be mitigated?	Yes, management actions related to waste management are included in section (f) of the EMPr.	

- Leakage of hazardous materials - The proposed mining activity will make use of machinery that use fuel and oil. Leakage of these oils and fuel can contaminate water supplies and must be prevented by constructing oil and diesel permeable bunds to ensure that any spills are suitably attenuated and not released into the environment.

<b>Leakage of hazardous materials</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative medium (36)	Negative low (22)

Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the section (f) of EMPr are implemented to ensure that these impacts do not occur.
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- Noise disturbance - Mining activities will result in the generation of noise over a period of 10 years. Sources of noise are likely to include vehicles, the use of machinery such as back actors, and people working on the site, as well as occasional blasting. The noise impact is unlikely to be significant as the closest homestead is more than 1km from the site; but mining activities should be limited to normal working days and hours (6:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	
Significance	Negative low (22)	Negative low (10)
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

**Indirect impacts:** The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

Potential impact on tourism – The tourism sector is regarded as an important economic sector in the Free State Province. The tourism potential of the area is linked to the area's

natural resources, including the relatively undisturbed scenery and landscape. The impact of the proposed mining of sand on the areas sense of place with mitigation is likely to be low. The impact of the proposed mine on the tourism potential of the area is therefore likely to be low.

Potential impacts on tourism	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/a	N/a
Cumulative impact	N/a	
Significance	Negative low (6)	Negative low (6)
Can impacts be mitigated?	No mitigation required	

#### DECOMMISSIONING PHASE (MINE CLOSURE AND REHABILITATION)

**Direct impacts:** Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live. If infrastructures are removed after a 3/5 year period, the site will be returned to its natural state.

- Rehabilitation of the physical environment - The physical environment will benefit from the closure of the mining since the site will be restored to its natural state as far as possible

<b>Rehabilitation of the physical environment</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Possible (2)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Medium (2)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative low (7)	Negative low (16)
Can impacts be mitigated?	No mitigation measures required.	

- Loss of employment - Given the relatively large number of people employed during the operational phase, the decommissioning of the facility has the potential to have a negative social impact on the local community.

<b>Loss of employment</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative medium (30)	Negative low (18)

Can impacts be mitigated?	<p>The following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>• All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;</li> <li>• Jongiliziwe Sand Mine should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas.</li> </ul>
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**Indirect impacts:** No indirect impacts are anticipated from the decommissioning phase of the proposed development.

### Process for the identification of key issues

The methodology for the identification of key issues aims, as far as possible, to provide a user-friendly analysis of information to allow for easy interpretation.

- Checklist: The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix: The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

### Checklist analysis



The site visit was conducted to ensure a proper analysis of the site specific characteristics of the study area. The table below provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format.

**Table:** Environmental checklist

QUESTION	YES	NO	Un- sure	Description
<b>1. Are any of the following located on the site earmarked for the development?</b>				
I. A river, stream, dam or wetland	<input type="checkbox"/>			Small non-perennial pan in the north east corner of the site
II. A conservation or open space area		<input type="checkbox"/>		None.
III. An area that is of cultural importance		<input type="checkbox"/>		The initial site investigation concluded that there are no obvious heritage resources located on the site earmarked for development.
IV. Site of geological significance		<input type="checkbox"/>		None.
V. Areas of outstanding natural beauty		<input type="checkbox"/>		None.
VI. Highly productive agricultural land		<input type="checkbox"/>		None.
VII. Floodplain		<input type="checkbox"/>		None.
VIII. Indigenous forest		<input type="checkbox"/>		None.
IX. Grass land		<input type="checkbox"/>		None.
X. Bird nesting sites		<input type="checkbox"/>		None.
XI. Red data species		<input type="checkbox"/>		None.

XII. Tourist resort		<input type="checkbox"/>		None.
2. Will the project potentially result in potential?				
I. Removal of people		<input type="checkbox"/>		None.
II. Visual Impacts	<input type="checkbox"/>			The visual impact will be managed
III. Noise pollution		<input type="checkbox"/>		The noise impact is unlikely to be significant.
IV. Construction of an access road		<input type="checkbox"/>		None. Access will be obtained from a secondary gravel road off the R82
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		<input type="checkbox"/>		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.		<input type="checkbox"/>		Approximately 15 employment opportunities will be created during the construction and operational phase of the project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	<input type="checkbox"/>			10 - 18ft washing pans which utilise approximately 10 000 - 16 000 L per pan/per hour each from which 40% is re-used.
VIII. Job creation		<input type="checkbox"/>		Approximately 15 employment opportunities will be created during the construction and operational phase of the project.
IX. Traffic generation		<input type="checkbox"/>		None.

X. Soil erosion		<input type="checkbox"/>		Only areas earmarked for mining will be cleared. The mining will be phased and the topsoil stockpiled separately. Concurrent rehabilitation will take place. The soil also has a low erosion potential.
XI. Installation of additional bulk telecommunication transmission lines or facilities		<input type="checkbox"/>		None.
<b>3. Is the proposed project located near the following</b>				
I. A river, stream, dam or wetland	<input type="checkbox"/>			The area is bounded by the Vaal river
II. A conservation or open space area		<input type="checkbox"/>		None.
III. An area that is of cultural importance		<input type="checkbox"/>		None.
IV. A site of geological significance		<input type="checkbox"/>		None.
V. An area of outstanding natural beauty		<input type="checkbox"/>		None.
VI. Highly productive agricultural land		<input type="checkbox"/>		None.
VII. A tourist resort		<input type="checkbox"/>		None.
VIII. A formal or informal settlement		<input type="checkbox"/>		None.

### Matrix Analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, and the significance and magnitude of the potential impacts. The matrix also highlights areas of particular concern for more in depth assessment during the EIR process. Each cell is evaluated individually in terms of the nature of the impact, duration

and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

In order to conceptualise the different impacts the matrix specify the following:

**Stressor:** Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.

**Receptor:** Highlights the recipient and most important components of the environment affected by the stressor.

**Impacts:** Indicates the net result of the cause-effect between the stressor and receptor.

**Mitigation:** Impacts need to be mitigated to minimise the effect on the environment

Matrix Analysis

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS			MITIGATION OF POTENTIAL IMPACTS	SPECIALIST STUDIES / INFORMATION
		Receptors	Impact description	Minor	Major	Duration	Possible Mitigation		
CONSTRUCTION PHASE									
<p><u>Listing Notice GNR 984, Activity15:</u>"The clearance of an area of 20 hectares or more, of indigenous vegetation."</p>	<p><u>Site clearing and preparation</u> Areas earmarked for mining will need to be cleared, topsoil will be stockpiled separately.</p>	<p>BI O P H Y S I C A L E N V I R O N M E N T</p>	Fauna & Flora	<ul style="list-style-type: none"> <li>Loss or fragmentation of indigenous natural vegetation.</li> <li>Loss of sensitive species.</li> <li>Loss or fragmentation of habitats.</li> </ul>		-	S	Yes	-
			Air	<input type="checkbox"/> Air pollution due to the increase of traffic of construction vehicles.	-		S	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Loss of topsoil.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> </ul>		-	S	Yes	-
			Geology	<input type="checkbox"/> It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.		-	S	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the local sewage plant.</li> </ul>		-	S	Yes	-
			Ground water	<input type="checkbox"/> Pollution due to construction vehicles.	-		S	Yes	-

ENVIRONMENT		S O C I A L / E C O N O M I C E	Surface water	<ul style="list-style-type: none"> <li>Increase in storm water run-off.</li> <li>Pollution of water sources due to soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>	-	-	S	Yes	-
			Local unemployment rate	<ul style="list-style-type: none"> <li>Job creation.</li> <li>Business opportunities.</li> <li>Skills development.</li> </ul>		+	S	Yes	-
			Visual landscape	Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility.	-		S	Yes	-
			Traffic volumes	Increase in construction vehicles.	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> <li>Increased risk of veld fires.</li> </ul>		-	S	Yes	-
			Noise levels	The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site.	-		S	Yes	-
			Tourism industry	Since there are no tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	-
			Heritage resources	Removal or destruction of archaeological and/or paleontological sites. Removal or destruction of buildings, structures, places and equipment of cultural significance. Removal or destruction of graves, cemeteries and burial grounds.		-	S	Yes	-
<u>Listing Notice GNR 984, Activity 15: "The clearance of an area of 20 hectares or more, of indigenous vegetation."</u>	Site clearing and preparation Areas earmarked for mining will need to be cleared, topsoil will be stockpiled separately. This will inevitably result in the removal of indigenous vegetation located on the site.	N M E N T	(Avi) Fauna & Flora	<ul style="list-style-type: none"> <li>Loss or fragmentation of indigenous natural vegetation.</li> <li>Loss of sensitive species.</li> <li>Loss or fragmentation of habitats.</li> </ul>		-	S	Yes	-
			Air quality	Air pollution due to the increase of traffic.	-		S	Yes	-

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Soil	<ul style="list-style-type: none"> <li>• Soil degradation, including erosion.</li> <li>• Disturbance of soils and existing land use (soil compaction).</li> <li>• Loss of agricultural potential (low significance relative to agricultural potential of the site).</li> </ul>	-		S	Yes	-
Geology	It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.	N/A	N/A	N/A	N/A	-
Existing services infrastructure	<ul style="list-style-type: none"> <li>• Generation of waste that need to be accommodated at a licensed landfill site.</li> <li><input type="checkbox"/> • Generation of sewage that need to be</li> </ul>	-		S	Yes	-

			<input type="checkbox"/> accommodated by the local sewage plant.					
		Ground water	<input type="checkbox"/> Pollution due to construction vehicles.	-		S	Yes	-
		Surface water	<ul style="list-style-type: none"> <li>• Increase in storm water run-off.</li> <li>• Pollution of water sources due to soil erosion.</li> <li>• Destruction of watercourses (pans/dams/streams).</li> </ul>	-		S	Yes	-
	ENVIRONMENTAL SOCIAL AND ECONOMIC	Local unemployment rate	<ul style="list-style-type: none"> <li>• Job creation.</li> <li>• Skills development.</li> </ul>			S	N/A	-
		Visual landscape	<input type="checkbox"/> Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility due to dust.	-		S	Yes	-
		Traffic volumes	Increase in construction vehicles.	-		S	Yes	-

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				structures, places and equipment of cultural significance. • Removal or destruction of graves, cemeteries and burial grounds.	N/A	N/A	N/A	N/A	-
OPERATIONAL PHASE									
<p><u>Listing Notice GNR 984, Activity19:</u> The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resource4s Development Act (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to mining of a mineral resource,</p>	<p>The key components of the proposed project are described below:</p> <ul style="list-style-type: none"> <li>• <u>Supporting Infrastructure</u> - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 50m<sup>2</sup> or less. Other supporting infrastructure includes a site office and workshop area.</li> </ul>	B I O P H Y S I C A L E N V I R O N M E N T	(Avi) Fauna & Flora	<ul style="list-style-type: none"> <li>• Fragmentation of habitats.</li> <li>• Establishment and spread of declared weeds and alien invader plants (operations).</li> </ul>	-		L	Yes	-
			Air quality	<input type="checkbox"/> Air pollution due to the mining activity, crusher plant and transport of the gravel to the designated areas.	N/A	N/A	N/A	N/A	-
			Soil	<ul style="list-style-type: none"> <li>• Soil degradation, including erosion.</li> <li>• Disturbance of soils and existing land use (soil compaction).</li> <li>• Loss of agricultural potential (low significance relative to agricultural potential of the site).</li> </ul>		-	L	Yes	-

including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)

- Roads - Access will be obtained from a local gravel road off the N1. All site roads will require a width of approximately 10m.
- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.

Geology	<ul style="list-style-type: none"> <li>• Collapsible soil.</li> <li>• Seepage (shallow water table).</li> <li>• Active soil (high soil heave).</li> <li>• Erodible soil.</li> <li>• The presence of undermined ground.</li> <li>• Instability due to soluble rock.</li> <li>• Steep slopes or areas of unstable natural slopes.</li> <li>• Areas subject to seismic activity.</li> <li>• Areas subject to flooding.</li> </ul>	-	S	Yes	-
Existing services infrastructure	<ul style="list-style-type: none"> <li>• Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>• Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li> <li>• Increased consumption of water. Approximately 10 000 - 22 500 per pan per hour</li> </ul>	-	L	Yes	-
Ground water	<input type="checkbox"/> Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.	-	L	Yes	-
Surface water	<ul style="list-style-type: none"> <li>• Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion.</li> <li>• Destruction of watercourses (pans/dams/streams).</li> </ul>	-	L	Yes	-
	<input type="checkbox"/> Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can				

			contaminate water supplies.					
S O C I A L/ E C O N O M I C E N V I R O N M E N T	Local unemployment rate	<input type="checkbox"/> Job creation. Security guards will be required for 24 hours every day of the week and general Labourers will also be required <input type="checkbox"/> Skills development.		+	L	Yes	-	
	Visual landscape	<input type="checkbox"/> Change in land-use/sense of place. The site is characterized by open veldt with a rural agricultural sense of place. The use of the area for the mining activity will result in the area not being used for livestock grazing anymore until rehabilitated.		-	L	Yes	-	
	Traffic volumes	<input type="checkbox"/> Increase in vehicles collecting gravel for distribution.	-		S	Yes	-	
	Health & Safety	<input type="checkbox"/> Air/dust pollution. <input type="checkbox"/> Road safety.	N/A	N/A	N/A	N/A	-	
	Noise levels	<input type="checkbox"/> The proposed development will result in noise pollution during the operational phase.	-	-	S	Yes	-	
	Tourism industry	<input type="checkbox"/> Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	-	

			Heritage resources	<input type="checkbox"/> It is not foreseen that the proposed activity will impact on heritage resources or vice versa.	N/A	N/A	N/A	N/A	-
DECOMMISSIONING PHASE									
-	<p><u>Mine closure</u> During the mine closure the Mine and its associated infrastructure will be dismantled.</p> <p><u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.</p>	BI O P H Y S I C A L E N V I R O N M E N T	(Avi) Fauna & Flora	<input type="checkbox"/> Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.	+		L	Yes	-
			Air quality	<input type="checkbox"/> Air pollution due to the increase of traffic of construction vehicles.	-		S	Yes	-
			Soil	<ul style="list-style-type: none"> <li>• Backfilling of all voids</li> <li>• Placing of topsoil on backfill</li> </ul>	+		L	Yes	-
			Geology	<input type="checkbox"/> It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>• Generation of waste that need to be accommodated at the local landfill site.</li> <li>• Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li> <li>• Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Ground water	<input type="checkbox"/> Pollution due to construction vehicles.	-		S	Yes	-

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	Surface water	<ul style="list-style-type: none"> <li>• Increase in storm water run-off.</li> <li>• Pollution of water sources due to soil erosion.</li> <li>• Destruction of watercourses (pans/dams/streams).</li> </ul>	-		S	Yes	-
E N V I R O N M E N T A L	Local unemployment rate	<input type="checkbox"/> Loss of employment.		-	L	Yes	-
	Visual landscape	<input type="checkbox"/> Potential visual impact on visual receptors in close proximity to proposed facility.					
			-		S	Yes	-
	Traffic volumes	<input type="checkbox"/> Increase in construction vehicles.	-		S	Yes	-
	Health & Safety	<ul style="list-style-type: none"> <li>• Air/dust pollution.</li> <li>• Road safety.</li> <li>• Increased crime levels. The presence of mine workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.</li> </ul>	-			Yes	-

		Noise levels	<input type="checkbox"/> The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.	-		S	Yes	-
		Tourism industry	<input type="checkbox"/> Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	-
		Heritage resources	<input type="checkbox"/> It is not foreseen that the decommissioning phase will impact on any heritage resources.	N/A	N/A	N/A	N/A	-

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

**a) Summary of specialist reports**

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process)

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Impact Assessment	<p>From a heritage point of view it is recommended that the proposed development be allowed to continue, on condition of acceptance of the mitigation measures that should archaeological sites or graves be exposed during mining activities, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.</p> <p>As no heritage sites occur in the study area, there would be no impact resulting from the proposed development.</p> <ul style="list-style-type: none"> <li>• No sites, features or objects dating to the Stone Age were identified in the study area.</li> </ul>	X	

	<ul style="list-style-type: none"><li>• No sites, features or objects dating to the Iron Age were identified in the study area.</li> <li>• No sites, features or objects dating to the historic period were identified in the study area.</li></ul>		
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## **ix) Environmental impact statement**

### **(iii) Summary of the key findings of the environmental impact assessment;**

This section provides a summary of the assessment and conclusion drawn from the proposed mining area. In doing so, it draws on the information gathered as part of the environmental impact assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion on the environmental impacts associated with the proposed project. The following conclusions can be drawn for the proposed mining activity:

**Potential impacts on biodiversity:** There are biodiversity features (aquatic ecosystems) in the form of small non-perennial pans found on site, which can be adequately mitigated by means of a Water Use License Application if they plan to prospect in or near the pans, otherwise no impacts to the pans are expected.

**Potential impacts on land use:** The farm is currently utilised as low potential cattle grazing and crop production. The activity which will be subject to concurrent rehabilitation will not have any significant impact on the land use nor will it change the sense of place of the area.

**Potential social impacts:** The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.

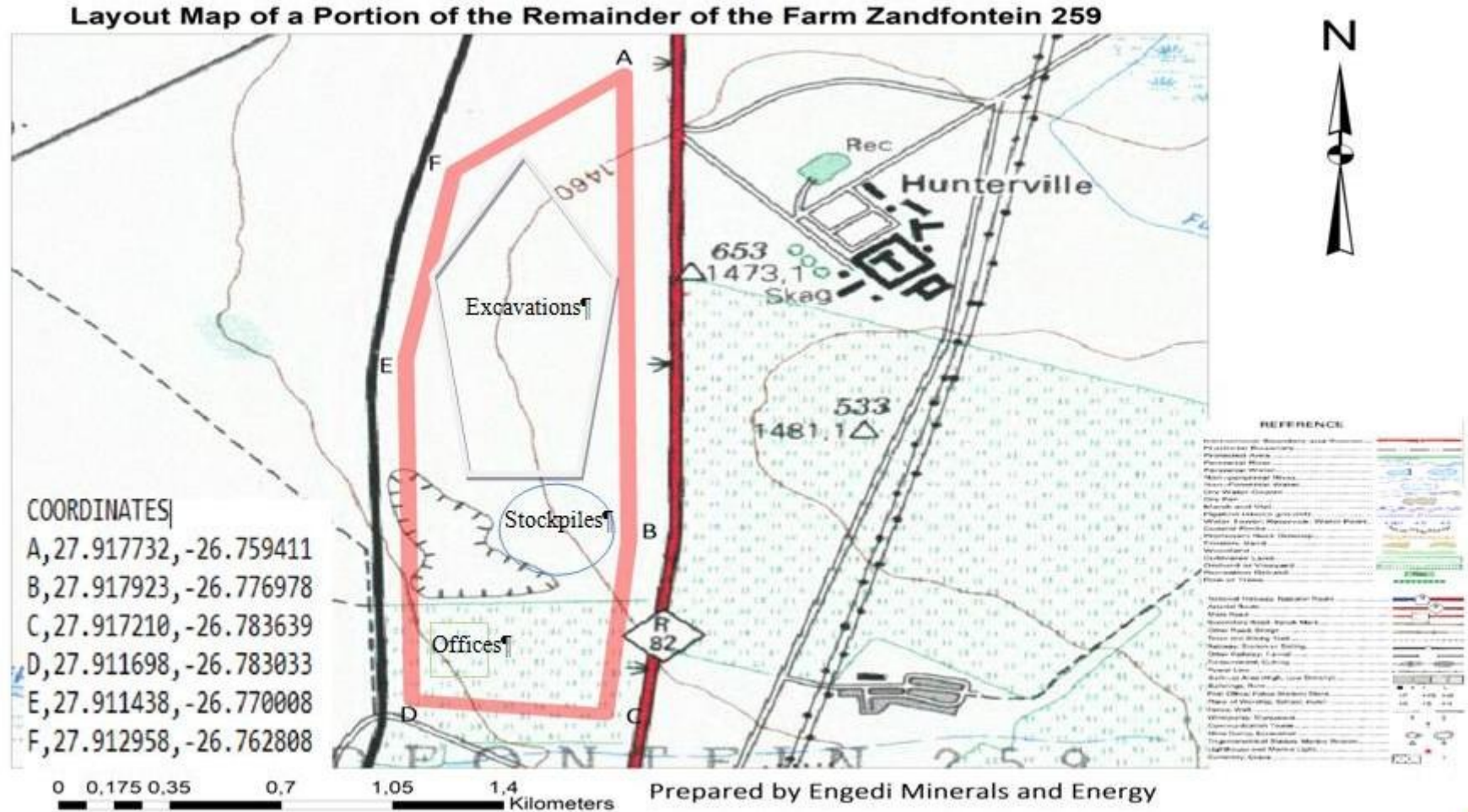
**Potential negative impacts:** (noise, dust, soil degradation, storm water, traffic, health and safety) associated with the operation of the facility are expected to be low-medium impact, of medium terms and site specific. These can be mitigated or negated through the implementation of practical and appropriate mitigation measures.

**Positive impacts:** The mining of sand will have socio-economic benefit to the area.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the migratory measures as set out in the Environmental Management Programme (EMPr) attached in Part B. It is therefore recommended that the environmental authorisation for the mining right be granted

**(iv) Final Site Map**

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.



**(v) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;**

There are regional socio economic benefits due to the sand being prospected in the Free State Province and greater knowledge is gained on the mineralogy of South Africa. All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the mitigation measures as set in the Environmental Management Programme (EMPr.) attached in Part B. No significantly social or environmental impacts are anticipated.

**b) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr.**

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr. as well as for inclusion as conditions of authorisation.

Management objectives include:

- ✚ Ensure that mining activity does not cause pollution to the environment or harm to persons.
- ✚ Minimise production of waste.
- ✚ All mining activities must be conducted in a manner that minimises noise impact, litter, environmental degradation and health hazards i.e. injuries.
- ✚ The mine must be kept neat and tidy during waste handling to prevent unsightliness and accidents.

Expected outcomes include:

- ✚ Minimum impacts on the environment as a result of sand mining.
- ✚ Compliance with legislative requirements
- ✚ Mine is neat and tidy and well managed

**c) Final proposed alternatives**

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

None were proposed since mining/mining of particular minerals occur at specific areas.

**d) Aspects for inclusion as conditions of Authorisation**

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.

A copy of the EMP should be made available onsite at all times. Implementation of the proposed mitigation measures set out in the EMPr.

**e) Description of any assumptions, uncertainties and gaps in knowledge**

(Which relate to the assessment and mitigation measures proposed)

The uncertainties in results are mostly related to the availability of information, time available to gather the relevant information as well as the sometimes subjective nature of the assessment methodology. In terms of addressing the key issues the EAP is satisfied that there are no major gaps in knowledge and that the specialist reports provide sufficient information to conduct the significant rating and provide the environmental authority with sufficient information to make an informed decision.

**f) Reasoned opinion as to whether the proposed activity should or should not be authorised**

**ii) Reasons why the activity should be authorized or not.**

It is the opinion of the EAP that the activity may be authorised.

Based on the outcomes of other Sand mines in the area, the possibility to encounter further Sand Reserves were identified.

The proposed mining area is targeted as, historically, several Sand occurrences are known in the area, and a number of these have been exploited in the past. There are also various Sand operations within the vicinity of exploration area.

No other properties have been secured by the applicant and the site is therefore regarded as the preferred site, and alternatives are not considered.

The option of not approving the activities will result in significant loss to valuable Sand being exploited. And all economic benefits will be lost.

### **iii) Conditions that must be included in the authorisation**

#### **(1) Specific conditions to be included into the compilation and approval of EMPr**

#### **(2)**

The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.

A copy of EMP should be made available onsite at all times. Implementation of the proposed mitigation measures set out in the EMPr.

The EMPr should binding on all managers and contractors operating/utilizing the site.

### **(3) Rehabilitation requirements**

All the excavated areas and where the mining equipment must rehabilitated to finality and to the satisfaction of the DMR. No area should be left rehabilitated unless it's agreed with the land owner such agreement is submitted to the DMR.

### **g) Period for which the Environmental Authorisation is required**

The environmental authorization is required for 30 years.

## h) Undertaking

Confirm 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 and the Environmental Management Programme report.

Jongiliziwe Sand Mine is committed to make available financial provision as will be determined and required by an EAP and DMR.

## i) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

- The financial provision will amount to the total of R 62 754.61 to manage the disturbed environment in respect to rehabilitation.

Applicant: Evaluator(s)		Jongiliziwe Sand Mine (Pty) Ltd - FS 10069 MR Engedi Minerals and Energy (Pty) Ltd			Location: Date:		Sasolburg Feb-22
No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	19	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0
3	Rehabilitation of access roads	m2	5,00	49	1	1	245
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	3	257	1	1	771
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0,01	284292	1	1	2842,92
7	Sealing of shafts adits and inclines	m3	0	146	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	189528	1	1	18952,8
8 (B)	Rehabilitation of processing waste deposits and evaporative ponds (non-polluting potential)	ha	0	236054	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporative ponds (polluting potential)	ha	0	685612	1	1	0
9	Rehabilitation of subsided areas	ha	0,01	158701	1	1	1587,01
10	General surface rehabilitation	ha	0,1	150138	1	1	15013,8
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	0	171	1	1	0
13	Water management	ha	0,1	57087	1	1	5708,7
14	2 to 3 years of maintenance and aftercare	ha	0	19980	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
<b>Sub Total 1</b>							<b>45121,23</b>
1	Preliminary and General		5414,5476		<b>weighting factor 2</b> 1		5414,5476
2	Contingencies			4512,123			4512,123
<b>Subtotal 2</b>							<b>55047,90</b>
<b>VAT (15%)</b>							<b>7706,71</b>
<b>Grand Total</b>							<b>R 62 754,61</b>

**iv) Explain how the aforesaid amount was derived.**

The closure cost estimate provided above is aligned with the Guideline Document for the Evaluation of Quantum of Closure related Financial Provision Provided by a Mine , by the DMR (January, 2005). The amount was calculated by Engedi (Pty) Ltd.

**v) Confirm that this amount can be provided for from operating expenditure.**

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Mining Work Programme as the case may be).

The financial provision will be provided for in the form of a bank guarantee.

**j) Deviations from the approved scoping report and plan of study**

**vi) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.**

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

No deviation from scoping in this report.

**vii) Motivation for the deviation.**

N/A

**k) Other Information required by the competent Authority**

**viii) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-**

**(1) Impact on the socio-economic conditions of any directly affected person.**

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining activities on any directly affected person including the landowner, lawful



occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The sand mine will not impact directly on any socio- economic aspects. Indirect socio-economic benefits are expected to be associated with the creation of employment.

- (2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.**(Provide the results of Investigation, assessment, and evaluation of the impact of the mining activities on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The sand mine will not impact on any heritage estate referred to in section 3(2) of the National Heritage Resources Act. It is noted that, in terms of the National Heritage Resource Act no 25 of 199. Heritage resources including archaeological and palaeontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected. They will not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA will be contacted immediately and work will stop.

- l) Other matters required in terms of sections 24(4)(a) and (b) of the Act.**  
(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4**).

No any other area can be chosen than this one since it is situated where there is sand.



**PART B**

**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.**

a) **Details of the EAP**, (Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Confirmed

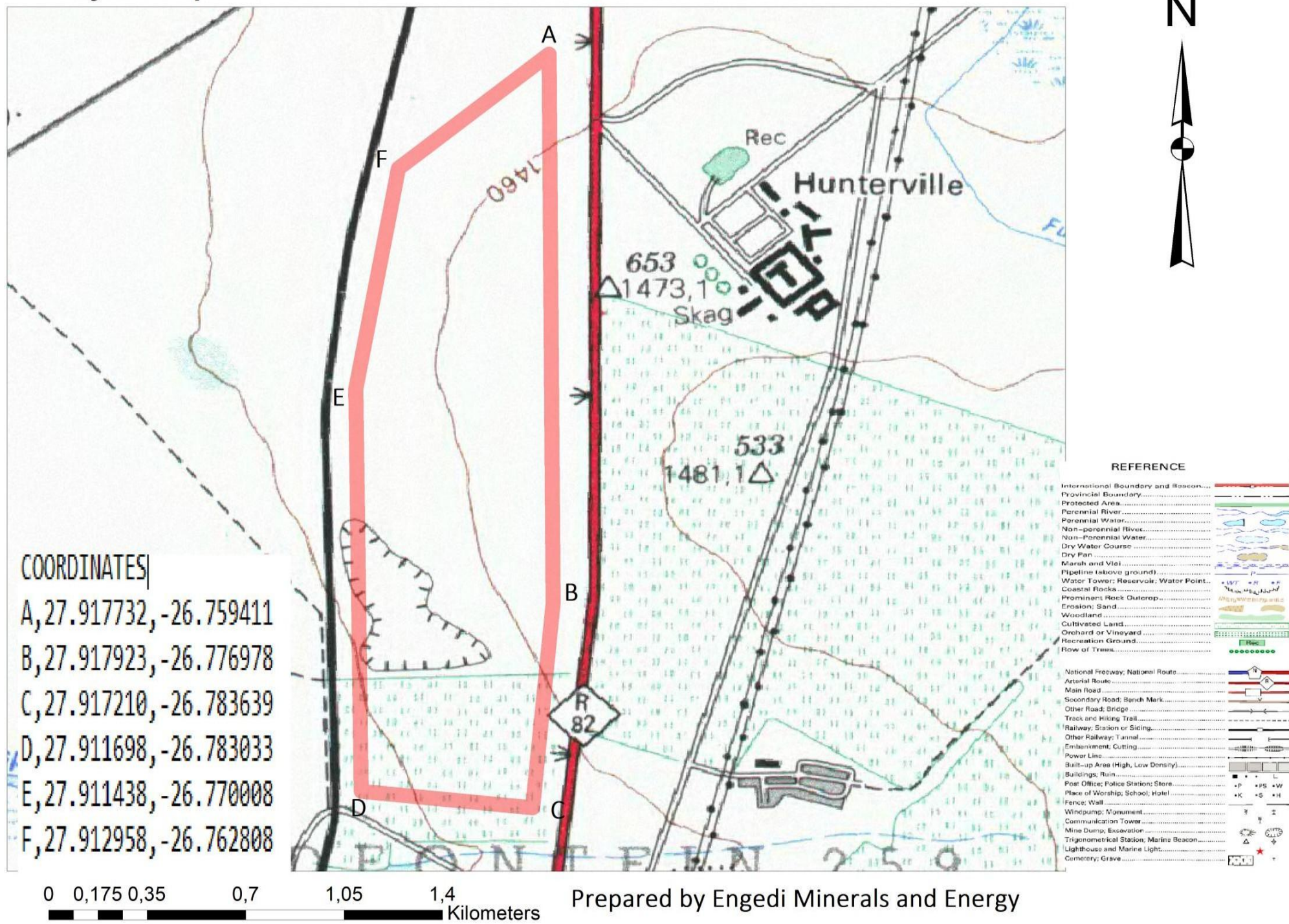
b) **Description of the Aspects of the Activity** (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

Confirmed

c) **Composite Map**

V

**Layout Map of a Portion of the Remainder of the Farm Zandfontein 259**



(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

**d) Description of Impact management objectives including management statements**

- i) **Determination of closure objectives.**(ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The closure objectives for sand mining will aim at ensuring that the residual post-closure negating environmental impacts be minimized and kept at an acceptable level to relevant parties. In order to achieve such closure objectives the following measures must be implemented;

All mining related infrastructure, foundations and concrete areas will be decommissioned, removed from the site and appropriately disposed off to a relevant registered facility. Reclaimable structures such as metal, electrical installations or equipment will be sold for re-use or as scrap.

all disturbed areas within the site not already vegetated will be re-vegetated with appropriate indigenous vegetation type, ecologically adopted species appropriate to the area and the final land-use as soon as possible after operation ceases. Progress of vegetation re-establishment, stability and erosion will be monitored and in the event of adverse trends of erosion been identified, corrective measures will be implemented. In the case where the vegetation natural grows after rehabilitation no indigenous re-vegetation will be necessary.

Vegetation monitoring will consider, interlia, the establishment of perennial ground cover and infestation by alien invasive species. The encroachment of indigenous vegetation into the area will be used as an indication of a stable, self-sustaining vegetation cover with little risk of retrogressing to a situation where land and water pollution may occur.

- ii) **The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.**

iii)

Any water that will be used in the process of mining activities and get polluted will be re-used in the process or cleaned before its pumped back to the source. No polluted water will be disposed of to the water stream prior to cleaning or recycling.

All the polluted soil by hydrocarbon spills will be rehabilitated by a chemical in the soil rehabilitation farm or be disposed of through a registered facility by a contractor (i.e Oilkol or inter-waste).

- iv) **Potential risk of Acid Mine Drainage.** (Indicate whether or not the mining can result in acid mine drainage).

The mining activity at hand is highly unlikely to result in Acid Mine Drainage since the commodity being mine is sand.

- v) **Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.**

The mining activity at hand is highly unlikely to result in Acid Mine Drainage since sand mining uses minimal or no chemicals during the processing of gravels and other related activities

- vi) **Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.**

Not applicable

- vii) **Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.**

Not applicable

- viii) **Volumes and rate of water use required for the mining**

500 to 1000 L per days to stabilise rocks during crushing and also for dust suppression.

- ix) **Has a water use licence has been applied for?**

Not yet.

x) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

<b>ACTIVITIES</b> <b>(E.g. For</b> <b>mining – drill</b> site, site camp, ablution facility, accommodation , equipment storage, sample storage, site office, access route <b>etc...etc...etc</b>  <b>E.g. For</b> <b>mining –</b> excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and mining, accommodation , offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, <b>etc...etc...etc)</b>	<b>PHASE</b>  of operation in which activity will take place.  State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	<b>SIZE AND SCALE</b> <b>of disturbance</b> (volumes, tonnages and hectares or m <sup>2</sup> )	<b>MITIGATION MEASURES</b>  (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	<b>COMPLIANCE</b> <b>WITH</b> <b>STANDARDS</b>  (A description of how each of the recommendation s herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	<b>TIME PERIOD FOR</b> <b>IMPLEMENTATION</b>  Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining activities as the case may be.
Clearance of vegetation	Mining phase(constructio n and operation phase)	368.5 Hectares – 3m x 2m x 3m pit every 2.5 hectares (150 pits), 20m x 20m x 2m trench every 9 hectares (40 trenches). Only the areas where mining takes place, will be cleared. Concurrent backfilling will take place in order to rehabilitate.	1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be prospected on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5.The necessary silt fences and	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.



			erosion control measures must be implemented in areas where these risks are more prevalent 6. Thorn trees shall not be removed or damaged without prior approval and permits.		
Construction of roads	Mining phase(construction and operation phase)	+ - 500m	<p>Planning of access routes to the site for construction/mining purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for mining vehicles" sign. Construction routes and required access roads must be clearly defined.</p> <p>Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</p> <p>Soils compacted by construction/mining activities shall be deep ripped to loosen compacted layers and re-graded to even running levels.</p> <p>The contractor must ensure that damage caused by related traffic to the gravel access road off the R82 is repaired continuously. The costs associated with the repair must be borne by the contractor;</p> <p>Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport the gravel are fitted with tarpaulins or covers;</p> <p>All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</p>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.
Mining of Sand- Soils and geology	Mining phase(construction and operation phase)	368.5 Hectares – 3m x 2m x 3m pit every 2.5 hectares (150 pits), 20m x 20m x 2m trench every 9 hectares (40 trenches). Only	The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil (If topsoil exists), and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mine

		<p>the areas where mining takes place, will be cleared.</p> <p>Concurrent backfilling will take place in order to rehabilitate.</p>	<p>construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. Care must be taken not to mix topsoil and subsoil during stripping.</p> <p>The topsoil must be conserved on site in and around the pit/trench area.</p> <p>Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</p> <p>If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p> <p>Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p> <p>The impact on the geology will be permanent. There is no mitigation measure.</p>		
Mining Sand-excavations and	Mining phase(construction and operation phase)	<p>150 Hectares – 3m x 2m x 3m pit every 2.5 hectares (150 pits), 20m x 20m x 2m trench every 9 hectares (40 trenches). Only the areas where mining takes place, will be cleared.</p> <p>Concurrent backfilling will take</p>	<p>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</p> <p>2. Mine, pans, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made</p>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining area

		<p>place in order to rehabilitate.</p>	<p>available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</p> <p>3. Truck traffic should be routed away from noise sensitive areas, where possible.</p> <p>4. Noise levels must be kept within acceptable limits.</p> <p>5. Noisy operations should be combined so that they occur where possible at the same time.</p> <p>6. Mine workers to wear necessary ear protection gear.</p> <p>7. Noisy activities to take place during allocated hours.</p> <p>8. Noise from labourers must be controlled.</p> <p>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.</p> <p>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</p> <p>11. Implementation of enclosure and cladding of processing plants.</p> <p>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</p>		
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**e) Impact Management Outcomes**

(A description of impact management outcomes, identifying the standard of impact management required)

<p><b>ACTIVITY</b></p> <p>whether listed or not listed.</p> <p>(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).</p>	<p><b>POTENTIAL IMPACT</b></p> <p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</p>	<p><b>ASPECTS AFFECTED</b></p>	<p><b>PHASE</b></p> <p>In which impact is anticipated</p> <p>(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)</p>	<p><b>MITIGATION TYPE</b></p> <p>(modify, remedy, control, or stop) through</p> <p>(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)</p> <p>E.g.</p> <ul style="list-style-type: none"> <li>• Modify through alternative method.</li> <li>• Control through noise control</li> <li>• Control through management and monitoring</li> <li>• Remedy through rehabilitation..</li> </ul>	<p><b>STANDARD TO BE ACHIEVED</b></p> <p>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.</p>
<p>Clearance of vegetation</p>	<p>Loss or fragmentation of habitats</p>	<p>(Avi) Fauna &amp; flora</p>	<p>Mining phase(construction and operation phase)</p>	<p>Existing vegetation</p> <ol style="list-style-type: none"> <li>1. Vegetation removal must be limited to the mining area.</li> <li>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</li> <li>3. No vegetation to be used for firewood.</li> <li>4. Exotic and invasive plant species should not be allowed to establish, if the development is approved.</li> </ol>	<p>Minimisation of impacts to acceptable limits</p>



				<p>5. Thorn trees shall not be removed or damaged without prior approval and permits.</p> <p>Rehabilitation</p> <p>6. All damaged areas shall be rehabilitated upon completion of the contract.</p> <p>7. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</p> <p>8. All natural areas impacted during construction/mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.</p> <p>9. Rehabilitation must take place in a phased approach as soon as possible.</p> <p>10. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.</p> <p>11. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</p> <p>12. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.</p> <p>Demarcation of mining area</p> <p>13. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan.</p>	
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				<p>14. The mining area must be well demarcated and no construction/mining activities must be allowed outside of this demarcated footprint.</p> <p>15. Vegetation removal must be phased in order to reduce impact of construction/mining.</p> <p>16. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>17. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas.</p> <p>18. Soils must be kept free of petrochemical solutions that may be kept on site during construction/mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. Utilisation of resources</p> <p>19. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p>Exotic vegetation</p> <p>20. Alien vegetation on the site will need to be controlled.</p> <p>21. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p>	
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				<p>22. The spread of exotic species occurring throughout the site should be controlled.</p> <p>Herbicides</p> <p>23. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>24. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p>(Avi) Fauna</p> <p>25. Rehabilitation to be undertaken as soon as possible after the mining activities have been completed.</p> <p>26. No trapping or snaring to fauna on the construction/mining site should be allowed.</p> <p>27. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p> <p>28. No impacts on bats are expected since mining will be taking place during the day and not at night, also no cave like structures are found on site.</p>	
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Mining of sand	Loss of topsoil	Soil	Mining phase(construction and operation phase)	<p>The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of top soil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <p>2. Care must be taken not to mix topsoil and subsoil during stripping.</p> <p>3. The topsoil must be conserved on site in and around the pit/trench area.</p> <p>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</p> <p>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p> <p>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an</p>	Minimisation of impacts to acceptable limits
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				<p>approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p> <p>Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>•Record the GPS coordinates of each area.</li> <li>•Record the date of topsoil stripping.</li> <li>•Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>•Record the date of cessation mining activities at the particular site.</li> <li>•Photograph the area on cessation of mining activities.</li> <li>•Record date and depth of re-spreading of topsoil.</li> <li>•Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul>	
	Erosion	Air Soil Water	Mining phase(construction and operation phase)	1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.	Minimisation of impacts to acceptable limits

				<p>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.</p> <p>3. Wind screening and storm water control should be undertaken to prevent soil loss from the site.</p> <p>4. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.</p> <p>5. Other erosion control measures that can be implemented are as follows:</p> <p style="padding-left: 40px;">Brush packing with cleared vegetation or Mulchor chip packing or Planting of vegetation or Hydro-seeding/hand sowing</p> <p>6. Sensitive areas need to be identified prior to construction/mining so that the necessary precautions can be implemented.</p> <p>7. All erosion control mechanisms need to be regularly maintained.</p> <p>8. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</p> <p>9. Retention of vegetation where possible to avoid soil erosion.</p> <p>10. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</p> <p>11. Re-vegetation of</p>	
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				<p>disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses.</p> <p>12. No impediment to the natural water flow other than approved erosion control works is permitted.</p> <p>13. To prevent storm water damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly.</p> <p>14. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion.</p>	
	Air Pollution	Air	Mining phase(construction and operation phase)	<p>Dust control</p> <p>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.</p> <p>2. Retention of vegetation where possible will reduce dust travel.</p> <p>3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.</p> <p>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</p> <p>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</p> <p>6. A speed limit of 30km/h must not be exceeded on</p>	Minimisation of impacts to acceptable limits

				<p>site.</p> <p>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</p> <p>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</p> <p>Odour control</p> <p>9. Regular servicing of vehicles in order to limit gaseous emissions.</p> <p>10. Regular servicing of onsite toilets to avoid potential odours.</p> <p>Rehabilitation</p> <p>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</p> <p>Fire prevention</p> <p>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</p> <p>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</p>	
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**g) Impact Management Actions**

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes)

<b>ACTIVITY</b> (whether listed or not listed)  (E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and mining, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc)	<b>POTENTIAL IMPACT</b>  (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc...etc...)	<b>MITIGATION TYPE</b>  (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc...etc...)	<b>TIME PERIOD FOR IMPLEMENTATION</b>  Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required.  With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard Rehabilitation, therefore state either –  • Upon cessation of the individual activity  Or  Upon cessation of mining activities as the case may be.	<b>COMPLIANCE WITH STANDARDS</b>  (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities).
Site Establishment activities (fencing, signage, access formation, etc.)	Loss of vegetation	Remedy through rehabilitation	Start-up	Issues of compliance with standards will be incorporated into the dayday business activities at the proposed mining. The work methods used the monitoring and measures done and the review processes will be aimed at ensuring that the legal thresholds as, set out in environmental standards are complied with.  This will include compliance standards as per COLTO 1998, standards as per Mining Petroleum Resources Development Act regulations, Mine Health and Safety Act regulations, National Water Act
	Habitat Destruction	Limit footprint	Start-up	
	Visual scarring	Remedy through rehabilitation	Start up and operational	
	Soil erosion	Limit footprint	Start up and operational	
Drilling	Drainage disruption	Control with Storm water controls	Operational Phase	Management of legal compliance will be incorporated into normal business activities.
	Slope instability	Control with slope	Operational Phase	This means that particular

		management controls		responsibilities need to be clearly defined for the identification of relevant issues and delivery of compliance.
	Noise	Control with Noise control measures	Operational Phase	This will help to ensure that adequate resources are available to support these activities. Environmental standards as set out in COLTO 1998, Mining and Petroleum Resources Development Act regulations, Mine Health and Safety Act
	Visual Scarring	Rehabilitation	Operational Phase	
	Soil erosion	Rehabilitation, use slope management control	Operational Phase	
	Destruction of heritage resource	Avoidance	Operational Phase	
	Noise and vibrations	Control with blast control measures	Operational Phase	
Waste Disposal and Material storage	Dust	Control with dust control measures Control with blast control measures	Operational Phase	This will be achieved by clearly outlining the environmental standards to be achieved and the thresholds which are not to be exceeded in the management system used at the site. This will include compliance with standards as per COLTO 1998, Explosive Act regulations, Mine Health and Safety Act Regulations and the Hazardous Substances Act
	Fly rock	Control with blast control measures	Operational Phase	
	Soil contamination	Avoidance, Operational control measures	Operational Phase	
Material handling, hauling and transportation	Water pollution	Avoidance, Operational control measures	Operational Phase	The waste management hierarchy and the proximity principle will be used in ensuring that the environmental standards as set out in COLTO 1998 and the National Environmental Management Waste Act regulation and National Water Act regulation, are complied with.
	Increased risk of fire	Avoidance, Operational control measures	Operational Phase	
	Dust	Control with dust Control measures	Operational Phase	
Removal of infrastructure & equipment and re-shaping of proposed mining	Increased risk of accidents	Site management protocols	Operational Phase	Issues of compliance with standards will be incorporated into the day to day business activities at the proposed mining to ensure that legal thresholds as set out in the environmental standards are complied with.  This will include compliance with standards as per COLTO 1998, the standards as per Mining and Petroleum Resources Development Act regulations, Mine Health and Safety Act
	Noise	Control with noise control measures	Operational Phase	
	Soil contamination from oil/fuel leaks	Control with operational control measures	Operational Phase	
	Noise	Control with noise control measures	Decommissioning and closure	

				regulations, National Water Act regulations, Mine Health and Safety Act regulations
Community and labour relations management	Dust	Control with dust control measures	Decommissioning and closure	The recommendations will incorporate factors that include the elimination or the minimization of negative impacts in the work methodologies used during decommissioning so as to comply with the standards as per COLTO 1998, Mining and Petroleum Resources Development Act regulations, Mine Health and Safety Act regulations and the National Environmental Management Act.
	Soil contamination from oil/fuel	Control with operational control measures	Decommissioning and closure	
	Disruption of surface drainage	Control with storm water controls	Decommissioning and closure	
	Community conflicts and tensions	Control using site management protocols	Operational	
Site Establishment activities (fencing, signage, access formation, etc.)	Increased risk of fire	Control using site management protocols	Operational	The future impacts from the proposed mining and the long term stability of the area, any concerns in relation to the long term liability for the facility and its aesthetics will be taken into account to ensure compliance with the environmental standards as set out in COLTO 1998, the National Environmental Management Act, Conservation of Agricultural resources Act and National Environmental Management Biodiversity Act regulations
	Reduced security on area	Control site management protocols	Operational	
	Improved employment	Control site management protocols	Operational	
	Improved skills	Controls site management protocols	Operational	
	Loss of vegetation	Remedy through rehabilitation	Start-up	

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

- a) **Monitoring of Impact Management Actions**
- b) **Monitoring and reporting frequency**
- c) **Responsible persons**
- d) **Time period for implementing impact management actions**
- e) **Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Clearance of vegetation	Loss or fragmentation of habitats	<ul style="list-style-type: none"> <li>•Conduct regular internal audits</li> <li>•Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>•Environmental Manager</li> <li>•Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken

				by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required
Mining of Alluvial and - excavations	Loss of topsoil Erosion Air Pollution Noise Impact on potential cultural and heritage artifacts	<ul style="list-style-type: none"> <li>•Conduct regular internal audits</li> <li>•Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>•Environmental Manager</li> <li>•Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required
Waste management	Pollution	<ul style="list-style-type: none"> <li>•Conduct regular internal audits</li> <li>•Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>•Environmental Manager</li> <li>•Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required
Water use and quality	Water pollution	<ul style="list-style-type: none"> <li>•Conduct regular internal audits</li> <li>•Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>•Environmental Manager</li> <li>•Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required

- f) **Indicate the frequency of the submission of the performance assessment report.**

The performance assessment report will be compiled by a relevant specialist and be submitted bi-annually to the DMR.

g) **Environmental Awareness Plan**

- (1) **Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.**

The following environmental plan will be implemented during mining on site; Employees (full-time and contractors) will be given induction courses which include environmental aspects such hydrocarbon spills handling, veld fires, water pollution, handling of fauna and flora species especially the protected ones and procedures to be followed during an environmental accident occurrence.

All the trainings will be held on the daily basis during the toolbox talks of employees at the beginning of each shift.

- (2) **Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.**

Jongiliziwe Sand Mine will implement the necessary incident report and reporting procedure in order to identify risks timorously and implement actions to avoid or minimize environmental risks on site.

- h) **Specific information required by the Competent Authority  
(Among others, confirm that the financial provision will be reviewed annually).**

No specific information has been detailed and required by the competent authority

## **CLOSURE OBJECTIVES**

- i) **Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.**

- Final landforms must be resilient to perturbation and also be self-sustaining to obviate/limit further/ongoing interventions and maintenance by Jongiliziwe Sand Mine (Pty) Ltd
- The remaining impacts be of an acceptable nature with minimal deterioration over time.
- The final outcome of the mine site rehabilitation would be productive systems, where required sustaining either cattle or wildlife.
- Environmental and human quality of life, including health and safety requirements in general, would not be compromised; and
- Closure is achieved in an efficient and cost-effective manner as possible and with minimum socioeconomic changes.

The above goal is underpinned by more specific objectives listed below.

#### 1. Upfront planning/development

To provide overall guidance and direction to closure planning and/or the implementation of progressive closure measures over the remaining over the mining life.

#### 2. Physical stability

To ensure that surface infrastructure and mining residue and/or disturbances that are present at processing plant decommissioning will be removed and/or stabilised in a manner that these will not compromise post-closure land use and be sustainable long-term landforms.

- Closure, removal and disposal of all surface infrastructure that has no beneficial post-closure use
- Shaping and vegetating the remaining earth embankments, trenches, etc. to stabilise slopes and integrate with surrounding topography

#### 3. Environmental quality

To ensure that local environmental quality is not adversely affected by possible physical effects arising from mining operations and the mining site after closure. This will be achieved by:

- Avoiding and/or limiting the following during mining operations which could result in adverse effects that could not be readily addressed and/or mitigated at mine closure - Dust fall-out areas surrounding the mining site.

- Wash-off and/or mobilisation of chemically contaminated soils and sediments from the mining site that could have long term adverse effects on local aquatic health and/or other water uses.

- Possible shallow groundwater contamination adversely affecting the quality of the local water resource and its beneficial use.

Limiting the potential for dust generation on the rehabilitated mining site that could cause nuisance and/or health effects to surrounding landowners;

Limiting the possible adverse water quality and quantity effects arising from the rehabilitated mining site to ensure that long term beneficial use of local resources is not compromised;

Conducting soil clean-up/remediation to ensure that the planned land use could be implemented and maintained;

#### 4. Health and safety

To limit the possible health and safety treats due to terrain hazards to humans and animals utilizing the rehabilitated mining site after closure by:

Demonstrating through upfront soil testing that any resultant inorganic and organic pollution present on the site is acceptable;

Removal of potential contaminants such as hydrocarbons and chemicals off site;

shaping of embankments and trenches to safe slopes and reintegrating of these into surrounding topography

Ensuring that the environmental quality as reflected above is achieved

#### 5. Land capability / land use

To ensure that the required land capability to achieve and support the planned land use can be achieved over the mining site by:

Clean-up and reclamation of contaminated soil areas in order not to compromise the above land use planning earmarked for implementation;

To ensure that the overall rehabilitated mining site is free draining

Transferring mining related surface infrastructure to third parties for beneficial use after closure.

#### 6. Aesthetic quality

To ensure that the rehabilitated mining site will display, at a minimum, an acceptable aesthetic appearance that would not compromise the planned land use by leaving behind:

- A mining area that is properly cleared-up with no fugitive/scattered waste piles
- Rehabilitated mining area that is free draining and disturbed areas that are suitably vegetated.
- Rehabilitated mining residues that are suitably landscaped, blending with the surrounding environment as far as possible.
- Shaped and rehabilitated terrace and hard stand areas, roughly emulating the local natural surface topography.

#### 7. Landscape viability

To create a landscape that is self-sustaining and over time will evolve/converge to the desired ecosystem structure, function and composition by:

- Conducting surface profiling, with associated material movement optimisation, to obtain a landscape resembling the natural landscapes to support the succession trajectory towards a climax ecological system
- Establishing woody patches and create rough and loose areas for pioneer species establishment around the respective patches.
- Establishing pioneer species as follows:
  - Collected and prepared seeds for broad casting;
  - Seedlings grown on on-site nursery;
  - Cuttings collected from surrounding veld areas;
- Conducting rehabilitation monitoring and corrective action as required.

#### 8. Biodiversity

To encourage, where appropriate, the re-establishment of native vegetation on the rehabilitated mine site such the terrestrial biodiversity is largely re-instated over time, by:

- Stabilising disturbed areas to prevent erosion in the short- to medium term until a suitable vegetation cover has established; and
- Establishing viable self-sustaining vegetation communities of local fauna, as far as possible

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



The closure objectives within the EMPr have been presented to the public as part of the public participation process and on-going closure planning for mining activities.

- k) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

Map drawn.

- l) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.**

The rehabilitation plan is compatible with the closure plan in that it focuses on rehabilitating all the disturbed environment to archive a closure that will be satisfactory to the DMR, stakeholders, interested and affected parties. And at the end the area will be able to support grazing for cattle as it is currently prior to mining.

- m) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.**

Applicant:  
Evaluator(s)

**Jongiliziwe Sand Mine (Pty) Ltd - FS 10069 MR**  
**Engedi Minerals and Energy (Pty) Ltd**

**Location:**  
**Date:**

**Sasolburg**  
**Feb-22**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	19	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0
3	Rehabilitation of access roads	m2	5,00	49	1	1	245
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	3	257	1	1	771
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0,01	284292	1	1	2842,92
7	Sealing of shafts adits and inclines	m3	0	146	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	189528	1	1	18952,8
8 (B)	Rehabilitation of processing waste deposits and evaporative ponds (non-polluting potential)	ha	0	236054	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporative ponds (polluting potential)	ha	0	685612	1	1	0
9	Rehabilitation of subsided areas	ha	0,01	158701	1	1	1587,01
10	General surface rehabilitation	ha	0,1	150138	1	1	15013,8
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	0	171	1	1	0
13	Water management	ha	0,1	57087	1	1	5708,7
14	2 to 3 years of maintenance and aftercare	ha	0	19980	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
<b>Sub Total 1</b>							<b>45121,23</b>
1	Preliminary and General		5414,5476		<b>weighting factor 2</b>		5414,5476
2	Contingencies			4512,123	1		4512,123
<b>Subtotal 2</b>							<b>55047,90</b>
<b>VAT (15%)</b>							<b>7706,71</b>
<b>Grand Total</b>							<b>R 62 754,61</b>

a) Confirm that the financial provision will be provided as determined.

Jongiliziwe Sand Mine is determined to make available financial provision as determined by the DMR and agreed upon with the EAP. Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.



Manufacturing team. Currently I am working as a Consultant Geologist at Breeze Court Investments 47 (Pty) Ltd and i have gained experience in Map Production (Using ArcGis), Identification of Minerals, and Applications for (Mining Right, Mining Right, and Mining Permit on DMR Samradonline portal), Petroleum applications ( Compilation of EMP, EIA, Progress report, Environmental Performance Assessment, Closure application, and Mineral Laws Administration (knowledge of MPRDA, 2002, NWA, 1998, NEMA, 1998, NHRA, 1999, MHSA, 1996, Mining Charter, 2010 and Freedom Charter, 1955.).

I have also worked with the small scale miners in the region of Northern Cape, Free State and North West helping them with the application for Mining permit, mining right and also attend the site inspection with the officials from Department Mineral Resources to help the small scale miners to comply with the legislation of the department.

I served at the Makhado Municipality for two (2) years under Local Economic Development as an Intern (**In Mining, Environmental and Geology Sectors**) and was attending seminars on Local Economic Development issues, interacting with the stake holders and helping the Small Micro Medium Enterprises (SMME's) to get funds from the sponsors.

## EMPLOYMENT HISTORY

Job title	:	Trainee Mine Geologist
Name of organization	:	Agnes gold mine
Period	:	June 2010 - June 2011 (1 year)
Experiences and skills	:	Face mapping, stope observing, continuous sampling, Geological data capturing, Report writing and Geological mapping.
Job title	:	Chief production, quality, and safety officer
Name of Organization:	:	Tshedza concrete art
Period	:	January 2012 - January 2013 (1 year, 1 month)

Experiences and skills : Managing high quality production and enforcing safe working

Environment for workers

Job title : LED Intern (in Mining, Environmental and Geology)

Name of Organization: Makhado Local Municipality (Limpopo)

Period : February 2013 - December 2014 (11 Months)

Experiences and skills : To formulate and implement measures and procedures to

Facilitate for the development of SMME's. Implement

Measures, processes, and procedures to attract the Investors,

Facilitate and implement job creation projects and initiatives.

Formulate, review and update LED plans in alignment with

the Province and District Municipality. Facilitate and create

Partnership with regard to service provider, trade exhibitions,

Corporate and SMME's.

Job title : Consultant Environmental Geologist and GIS specialist

Name of organization : Breeze court investment (Pty) Ltd Geol & Min Consultants

Period : January 2014 - January 2015

Experiences and skills : Map Production (Using ArcGis), Identification of Minerals, and Applications for (Mining Right, Mining Right, and Mining Permit on DMR Samrad online portal), Technical Cooperation Permit, Reconnaissance Permit, Exploration Right, Production right (Petroleum applications) Compilation of EMP, EIA, Environmental Authorisation, Progress report, Environmental Performance Assessment, Closure application, and Mineral Laws Administration

(Broad knowledge of MPRDA, 2002), Assisting small scale miners in the region of Northern Cape, North West, and Free State with application for Mining permit and Mining right, help them with compliance in terms of the MPRDA, 2002. Also do the site inspection with the officials from Department of Mineral Resources, and help the miners and management to comply with the statutory while operating and always work in a safe working conditions and enforce also that the act of one employee must be safer towards another employee to achieve zero harm.

Job title : Consultant Environmental Geologist and GIS specialist

Name of organization : Engedi Minerals and Energy (Pty) Ltd

Period : February 2015 - Present

Experiences and skills : Map Production (Using ArcGis), Identification of Minerals, and Applications for (Mining Right, Mining Right, and Mining Permit on DMR Samrad online portal), Technical Cooperation Permit, Reconnaissance Permit, Exploration Right, Production right (Petroleum applications) Compilation of EMP, EIA, Environmental Authorisation, Progress report, Environmental Performance Assessment, Closure application, and Mineral Laws Administration (Broad knowledge of MPRDA, 2002), Assisting small scale miners in the region of Northern Cape, North West, and Free State with application for Mining permit and Mining right, help them with compliance in terms of the MPRDA, 2002. Also do the site inspection with the officials from Department of Mineral Resources, and help the miners and management to comply with the statutory while operating

### **Knowledge of Legislations and Acts**

and always work in a safe working conditions and enforce also that

the act of one employee must be safer towards another employee to achieve zero harm.

Constitution of the Republic of South Africa No.108 of 1996

Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)

Mineral and Petroleum Resources Development Act Amendments bill 15 of 2013

Mineral and Petroleum Resources Development Act Regulations

National Water Act, 1998 (Act 36 of 1998)

Mine Health and Safety Act, 1996 (Act 29 of 1996)

National Heritage Resources Act, 1999 (Act 25 of 1999)

National and Environmental Management Act, 1998 (Act 107 of 1998)

Public Finance Management Act, 1999 (Act 1 of 1999) and Act 29 of 1999 as Amended

2014 Environmental Impact Assessment Regulations

Mining Charter, 2010

Freedom Charter, 1955

Municipal System Act, 2000 (Act 32 of 2000)

Municipal Structure Act, 1998 (Act 117 of 1998) and as amended in Act 20 of 2002.

## **COMPETENCIES**

Ability to relate with people,

Ability to work independently and as a team,

Determination to succeed,

Strong leadership skills,

Proactive, resourceful, well organized and able to meet deadlines, and

Ability to communicate effectively

## **EXTRAMURAL ACTIVITIES AND INTERESTS**

I love reading newspapers, business literatures, watching discovery channels, News, writing and Public speaking, these help me share my ideas and opinion and to get my message across, and I love learning new things everyday and I am eager to learn.

## REFERENCES

Name : Mr P. Makoela  
Name of organization : Agnes gold mine (Pty) Ltd  
Position : Head of department of geology section  
Contacts : 087 351 8304 (W), 076 311 7791 (C)

Name : Mr R.P. Mamphaga  
Name of organization : Tshedza concrete art (Pty) Ltd  
Position : Managing director  
Contacts : 011 024 1167 (W), 082 857 3204 (C)

Name : Mr P. Netshivhuyu  
Name of organization : Makhado Local Municipality  
Position : Supervisor  
Contacts : 072 718 3220(C)

Name : Mr A.J. Davids  
Name of organization : Breeze Court Investments (Pty) Ltd  
Position : Consultant Environmental Geologist  
Contacts : 082 707 3239 (C)



# SACNASP

South African Council for Natural Scientific Professions

**herewith certifies that**  
**Tshimangadzo Mulaudzi**  
Registration Number: 114576  
**is a registered scientist**

in terms of section 20(3) of the Natural Scientific Professions Act, 2003  
(Act 27 of 2003)  
in the following field(s) of practice (Schedule 1 of the Act)  
Geological Science (Professional Natural Scientist)

Effective 20 March 2018

Expires 31 March 2021



*Baiba*


Chairperson

*R. J. J. J.*

Chief Executive Officer



To verify this certificate scan this code

<p>15 Barnes Street, Westdene, Langebaan Building Bloemfontein, South Africa 9301</p> <p>P.O.Box 29567 Danhof 9310</p>	 <p><b>ENGEDI</b> Minerals &amp; Energy <i>pride, determination, and resilience</i> Reg. No. 2015/153624/07</p>	<p>Cell: 079 362 6046 (+27) 076 763 8486 (+27) Fax: 086 556 2568 (+27)</p> <p>email: info@engedime.com mulaudzi@engedime.com www.engedime.com</p>
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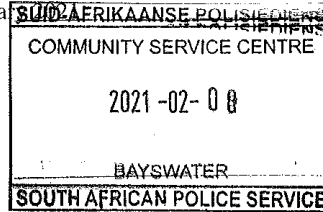
8<sup>th</sup> of February 2021

**UNDERTAKING AND DECLARATION UNDER OATH AS ENVIRONMENTAL  
ASSESSMENT PRACTITIONER (EAP)**

As refer to the subject of the matter above;

I am hereby confirming that all the information contained in this report is true and correct  
And hereby declared that I, **Mr Tshimangadzo Mulaudzi**, of Identity number: **8803265731082**, I am an Environmental Geologist Consultants at Engedi Minerals and Energy (Pty) Ltd (Reg. No, 2015/153624/07), I am an Environmental Assessment Practitioner (EAP) and I am capable to compile Environmental reports in support of permits and rights application with Department of Mineral Resource (DMR) and Environmental authorisation with the Department of Environmental Affairs (DEA) and any relevant department including Department of Water and Sanitation amongst others.

This was done and signed at Bloemfontein on the 8<sup>th</sup> of February



Yours sincerely

  
T. Mulaudzi

Engedi Minerals and Energy (Pty) Ltd (consultant)

Ek seertifiseer dat bovrstaende verklaring deur my  
sigeneem is en dat die verklaarder erken dat  
hy/sy verewend is met die inhoud van hierdie ver-  
klaring en dit begryp. Hierdie verklaaring is voor  
my bedryf/besigheid (handtekening) verklaarder se  
aangewese uitdruk is in my teen-  
woordigheid daerop aangebring.

I certify that the above statement was taken by  
me and that the deponent has acknowl-  
edged that he/she knows and understands the  
contents of this statement. This statement was  
signed/affirmed by the deponent's  
signature/mark/thumbprint was placed thereon  
in my presence.

Op ..... 2021-02-08 om 14:00  
at .....

(HANDTEKENING) (SIGNATURE) KOMMISSARIS VAN EDE  
KOMMISSARIS VAN EDE  
COMMISSIONER OF OATHS

WILCOCKS  
99 WILCOCKS STR  
BLOEMFONTEIN  
9301

BESIGHEFTINGSADRES (STRAATADRES)  
BUSINESS ADDRESS (STREET ADDRESS)

SA POLISIEDIENS  
SA POLICE SERVICE

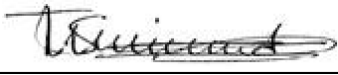
*pride, determination, and resilience.*

Page 1

**APPENDIX 2**

**UNDERTAKING REGARDING CORRECTNESS OF INFORMATION**

I Tshimangadzo Mulaudzi herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.



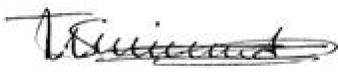
Signature of the EAP

DATE: 21 February 2022

**APPENDIX 3**

**UNDERTAKING REGARDING LEVEL OF AGREEMENT**

I Tshimangadzo Mulaudzi herewith undertakes that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.



Signature of the EAP

DATE: 21 February 2022

