

# **Application & Draft Assessment Report**

**25 November 2022**

**Malherbe, Izak Abraham:  
Borrow Pit 01, Remainder of  
the Farm Dundee 16,  
Letsemeng Local  
Municipality, Free State  
Province**



**GREEN-BOX**  
CONSULTING

# ASSESSMENT REPORT

SUBMITTED FOR APPROVAL IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED), **SECTION 106.**

## NAME OF APPLICANT:

Project applicant:	Malherbe, Izak Abraham		
Business reg. no. /ID. no.:	8610225185089		
Contact person:	Malherbe, Izak Abraham		
Physical & Postal address:	PO Box 78, Luckhoff, 9982		
Telephone:	0824129776	Cell:	0824129776
E-mail:	danie@green-box.co.za	Fax:	-

# DOLERITE GRAVEL MINING ASSESSMENT REPORT

## 1. Contact Person and correspondence address

### a) Details of

Project applicant:	Malherbe, Izak Abraham		
Business reg. no. /ID. no.:	8610225185089		
Contact person:	Malherbe, Izak Abraham		
Postal address:	PO Box 78, Luckhoff, 9982		
Telephone:	0824129776	Cell:	0824129776
E-mail:	danie@green-box.co.za	Fax:	-

### i) Details of the EAP

Registered Company	Green-Box Consulting		
Business reg. no. /ID. no.:	2011/087408/23		
Name of the EAP:	Danie Krynauw		
Postal address:	P.O. Box 37738, Langenhovenpark, BFN		
Telephone:	-	Cell:	0824352108
E-mail:	info@green-box.co.za	Fax:	-

### ii) Expertise of the EAP.

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

#### CURRICULUM VITAE – DANIE KRYNAUW

1. Family name: Krynauw
2. First name: Daniël
3. Date of birth: 14/12/1971
4. Nationality: South African
5. Contacts: Cell: 082 435 2108  
Email: [danie@green-box.co.za](mailto:danie@green-box.co.za)

#### 6. Education:

Institution	Degree(s) or Diploma(s) obtained
University of the Free State 2001 – 2002	Master in Environmental Management – Dissertation pending
University of the Free State 1996 – 1998	Masters in Urban and Regional Planning
University of the Free State 1993 – 1995	BA Geography and Sociology

#### 7. Membership of professional bodies:

- Environmental Assessment Practitioners Association of South Africa (EAPASA) – 2019/1348
- International Association of Impact Assessment South Africa (IAIASa)

#### 8. Present position:

- Environmental Scientist / Director – Green-Box Consulting

#### 9. Current Responsibilities:

- Liaising with clients in both the private and public sectors.
- Conduct Environmental Impact Assessments and other Environmental Technical Investigations.
- Apply and obtain waste licenses, water licenses, mining permits and environmental authorisations for clients.

- Use different GIS datasets in order to create new information or investigate patterns for projects.
- Conduct environmental compliance and other environmental audits.
- Provide technical-level support for environmental remediation and mitigation projects, including remediation system design and determination of regulatory applicability for incoming projects.
- Collaborate with other environmental scientists, planners, engineers, and other specialists, and experts in law and business etc. to address environmental problems for clients.
- Conduct Environmental training.

10. Years within the organization:

- 10 years

11. Other skills (e.g. computer literacy, etc.):

- All suits of Microsoft Office, Arc View, ReGIS, and Project Professional.

12. Professional experience:

Date	2011 – Current
Organisation	Green-Box Consulting (Environmental Consultants)
Position	Environmental Scientist (Owner and Director)

Date	2009 – 2016
Organisation	Terra Works Environmental Consultants
Position	Senior Environmental Scientist and COO

Date	2001 – 2009
Organisation	Department of Economic Development, Tourism and Environmental Affairs, Free State
Position	Principal Environmental Officer
Description of duties	<ul style="list-style-type: none"> <li>• Review Environmental Impact Assessments</li> <li>• Review Environmental Management Programmes</li> <li>• Issuing Environmental Authorisations</li> </ul>

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

Professional experience:

Date	2011 – Current
Organisation	Green-Box Consulting (Environmental Consultants)
Position	Environmental Scientist (Owner and Director)

Date	2009 – 2016
Organisation	Terra Works Environmental Consultants
Position	Senior Environmental Scientist and COO

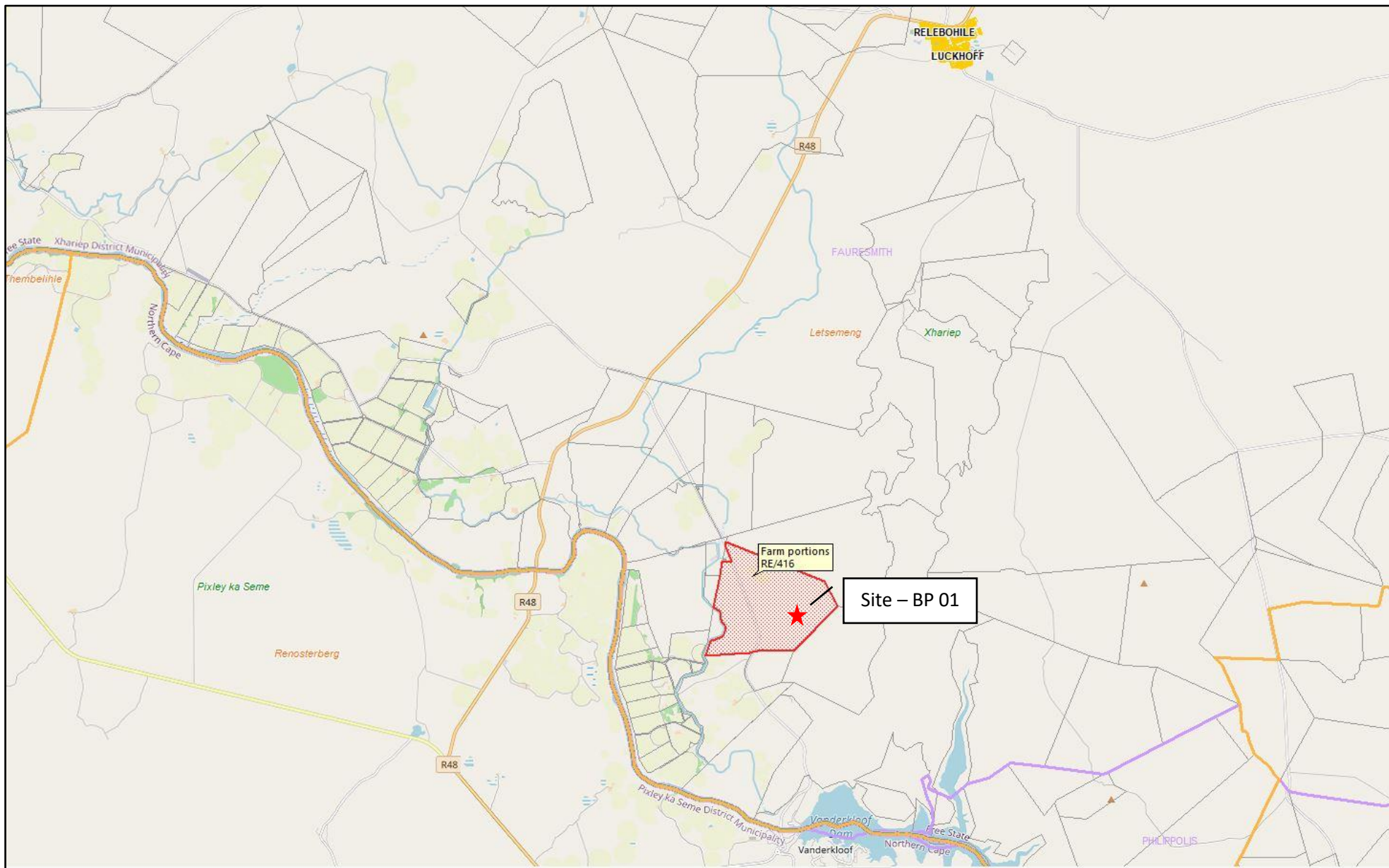
Date	2001 – 2009
Organisation	Department of Economic Development, Tourism and Environmental Affairs, Free State
Position	Principal Environmental Officer
Description of duties	<ul style="list-style-type: none"> <li>• Review Environmental Impact Assessments</li> <li>• Review Environmental Management Programmes</li> <li>• Issuing Environmental Authorisations</li> </ul>

**b) Location of the overall Activity.**

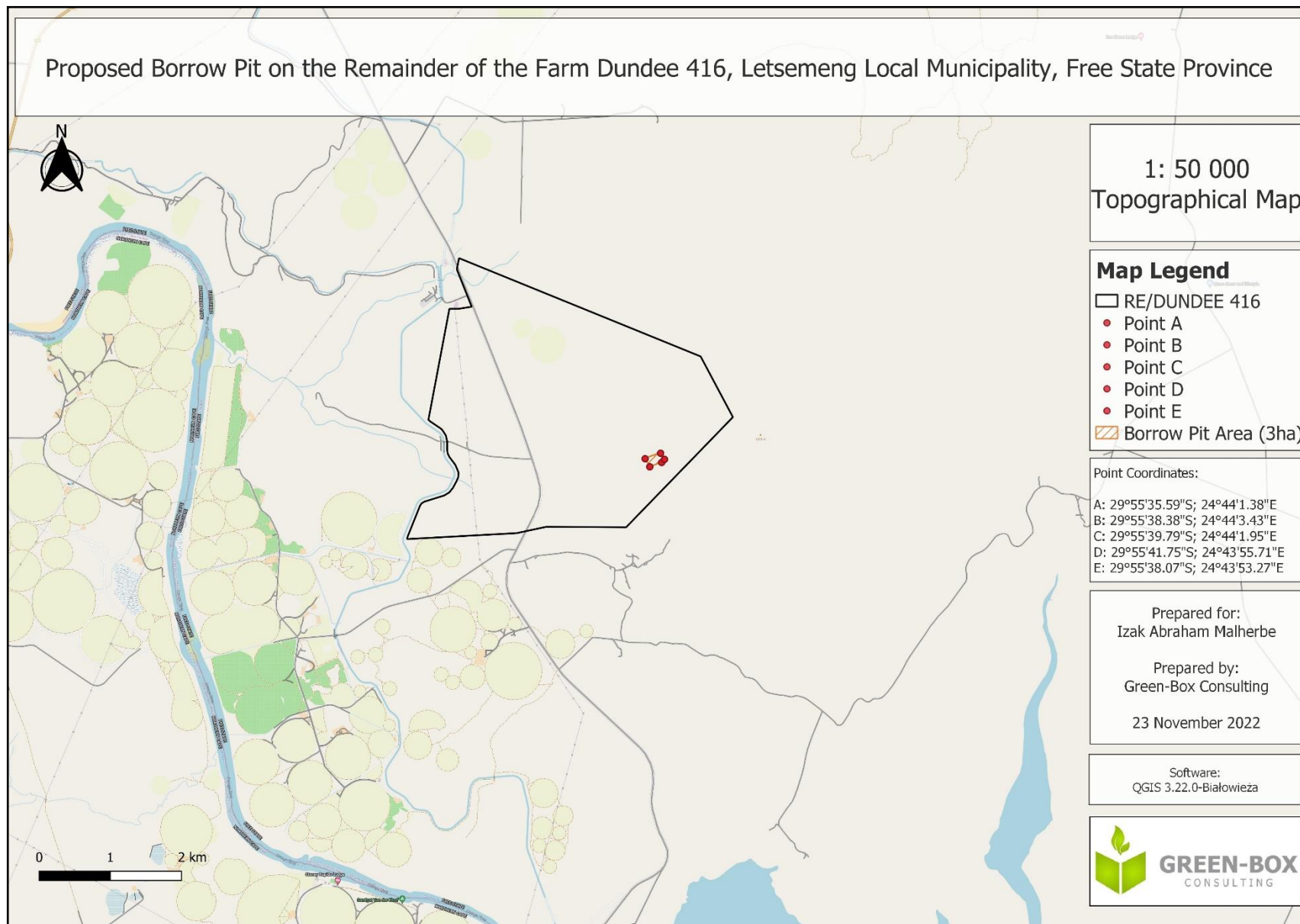
<b>Farm Name:</b>	Remainder of Dundee 416
<b>Application area (Ha)</b>	Farm Extent - 1121.672243 Ha, BP - 3 hectares
<b>Magisterial district:</b>	Xhariep District Municipality
<b>Distance and direction from nearest town</b>	Approximately 18 kilometres south-east from Luckhof
<b>21 digit Surveyor General Code for each farm portion</b>	F01100000000041600000

**c) Locality map**

(show nearest town, scale not smaller than 1:250000). X



Map 01: 1:125 000 Locality Map



Map 02: 1:50 000 Topo Map



Proposed Borrow Pit on the Remainder of the Farm Dundee 416, Letsemeng Local Municipality, Free State Province



Map 03: Borrow Pit Diagram



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

##### **(i) Description of the activities to be undertaken**

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity)

The proposed activity will require surface dolerite material excavation from an existing quarry for own use on the Remainder of the farm Dundee 416. **The Farm Owner intend to upgrade his own existing gravel roads by using dolerite material located on his farm, none of the material will be taken off the farm or will be sold. The intended use is for own purposes and in line with Section 106 of the Minerals Act. The Borrow Pit Area is characterised as an existing old quarry, consisting of hard rock.**

- The primary activities associated with the pre-construction (pre-mining) of the borrow pit area include the following:
- Landowner to confirm the mining process and to develop a method statement for the excavation and operation of the borrow pit.
- Contractor to develop a Mining Plan, which includes the layout of mining activities and features such as fencing arrangements, access, aggregate stockpiles, topsoil stockpiles, overburden placement, etc.
- Determine pre-existing drainage patterns and concentration of flow on the borrow pit site.
- Site preparation, including clearing, grubbing, and fencing of the borrow pit area.
- Remove and safe storage (temporary stockpiles) of topsoil and remaining overburden material for rehabilitation.

The primary activities related to the construction and operation of suitable construction material from the borrow pit (mining process) include the following:

- Site drainage and stormwater to be managed.
- Manage borrow pit, including side slopes and floor of the excavated areas.
- Manage impacts related to pollution sources (noise, air and water).
- Excavation of required material:
  - The material will be excavated from the borrow pit by the use of an excavator in order to remove required volumes of construction material.
- Blasting activities (where necessary):
  - Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.
  - Survey potentially affected structures prior to and after blasting.
  - Should blasting be required, adjacent landowners must be notified well in advance and appropriate precautionary measures must be taken.
- Processing of material (screener):
  - Excavated material will be placed in a screener (if necessary), where the processed material will be stockpiled.
- All required material for road upgrading, will be loaded onto a haul vehicle (i.e. tipper truck) by a front-end loader, where the material will then be transported to the necessary roads.

The following activities will occur during the Closure Phase of the borrow pit:

- All fences, infrastructure (site office/store), mining equipment (screener, haul vehicles), and waste/rubble on site will be removed;
- Overburden stockpiles from the construction and operation phase will be used for the filling of borrow pit excavated; and
- Site stabilisation:
  - The borrow pit will be graded.
- Closure of borrow area:
  - A Closure Plan will also be required for the proposed borrow pit. The closure plan will ensure that the borrow area is rehabilitated, and that after closure of the area,

vegetation establishes effectively. Measures for rehabilitation of the borrow areas during closure will be provided in the EMPr.

The equipment to be used includes the following:

- Excavator;
- Bull-dozers, front-end loader, back actor;
- Tipper truck;
- Grader;
- Crusher;
- Water truck; and
- Lowbed truck (transporting machines on and off site).

Sustainable development applied to mining works necessarily includes rehabilitation with the aim of either restoring the land to its original use or eliminating or reducing adverse environmental impacts to a long-term acceptable condition.

**e) Policy and Legislative Context**

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Minerals and Petroleum Resources Act 28 of 2002 as amended.	Section 106	<p>Exemptions from certain provisions of Act 106.</p> <p>(3) Any landowner or lawful occupier of land who lawfully, takes sand, stone, rock, gravel or clay for farming or for effecting improvements in connection with such land or community development purposes, is exempted from the provisions of in subsection (1) as long as the sand, stone, rock, gravel or clay is not sold or disposed of.</p> <p>Mr. Malherbe intends to utilize the material from the BP on his farm for road maintenance and gravel road upgrades.</p>
MPRDA Pollution Control and Waste Management Regulations	Regulations	<p>Provide that water management and pollution control comply with the provisions of the National Water Act. It further provides that control of erosion and soil pollution control comply with applicable legislative requirements.</p> <p>BP operations must comply with waste management standards, and proper disposal of all types of waste generated during mining operations.</p>
NEMA:	Section 28(1)	<p>Environmental management principles set out in NEMA, and other Specific Environmental Management Acts (SEMA) should guide decision making throughout the mining life cycle to reflect the objective of sustainable development<sup>25</sup>. Mining is prohibited in protected areas defined in the National Environmental Management Protected Areas Act (No. 57 of 2003; hereafter referred to as Protected Areas Act).</p> <p>One of the most important and relevant principles is that disturbance of ecosystems, loss of biodiversity, pollution and degradation of environment and sites that constitute the nation's cultural heritage should be avoided, minimised or as a last option remedied. This is supported by the</p>

		<p>Biodiversity Act as it relates to loss of biodiversity.</p> <p>Duty of Care to not harm or pollute the natural environment significantly is a responsibility of all South Africans. The BP area is however already transformed, notwithstanding this all-greenfield areas on the perimeter of the BP must be utilised with or treated with the duty of care principle in mind.</p>
Water Use Authorisations: The National Water Act (No. 36 of 1998)	Section 21	<p>The Act requires that provision is made both in terms of water quantity and quality for 'the reserve', namely to meet the ecological requirements of freshwater systems and basic human needs of downstream communities. It is essential in preparing an EMP that any impacts on water resources, be they surface water or groundwater resources, and/ or impacts on water quality or flow, are carefully assessed and evaluated against both the reserve requirement and information on biodiversity priorities. This information will be required in applications for water use licenses or permits and/or in relation to waste disposal authorisations.</p> <p>Should any new water sources be utilised for the operation of the mining gravel, the required General Authorisations of Water Use licenses will apply.</p>
National Heritage Resources Act (No. 25 of 1999)	SAHRA Regulations	<p>Describes the importance of heritage in the South African context, and designates the South African Heritage Resource Agency (SAHRA) as guardian of the national estate which may include heritage resources of cultural significance that link to biodiversity, such as places to which oral traditions are attached or which are associated with living heritage, historical settlements, landscapes and natural features of cultural significance, archaeological and paleontological sites, graves and burial grounds, or movable objects associated with living heritage. Further, formal protections under the National Heritage Resources Act include: national heritage sites and provincial heritage sites (some recognized globally under the World Heritage</p>



		Convention), and protected areas amongst others.  Should any evidence or findings of historical value be unearth will the National Heritage Resources Agency have to be notified.
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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).

Material from the planned BP has been tested and found to be suitable, as it is an existing quarry, with a profile suitable for uses located on the farm portion applicable. The existing roads on the farm are deemed necessary to be upgraded, to improve operating conditions.

Both the borrow pit and the structures occur on the same property and the same site, RE of Dundee 416. Therefore, all activities will be within the boundaries of RE of Dundee 416.

**g) Motivation for the overall preferred site, activities and technology alternative.**

The application for the borrow pit has been proposed in order to source material that can be used for the upgrading of existing gravel roads on the farm. The applicant has chosen the BP site due to their proximity on the farm and the fact that it is an existing quarry, making it more cost effective and efficient in contrast to importing the material from elsewhere.

The borrow pit also forms part of a completely transformed area.

**h) Full description of the process followed to reach the proposed preferred alternatives within the 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.

**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.

## **The Property**

The proposed borrow pit is situated on the Remainder of the Farm Dundee 416, Free State Province. Site coordinates are 29°55'39.35"S, 24°43'57.02"E.

No activity alternatives were investigated, as the earmarked portion is an existing quarry.

The borrow pit is designed to optimally mine the desired amount of material needed while keeping in mind the possible environmental impacts associated with the proposed activities.

There are no technology alternatives as the technology proposed for the borrow pit will comply with national standards and best practices.

There are no operational alternatives as the activities will comply with national standards and best practices.

The option of not implementing the activity is referred to as the No-go Alternative. Should mining at the borrow pit not be implemented, the applicant will have to import the material which result in increased costs and loss of job opportunities. Additionally, this will result in environmental impacts which could be avoided if the existing quarry is utilized.

See below proposed Borrow Pit diagram.



## 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.

The following measures were taken regarding the public participation process:

- Interested and affected parties (I&APs) were identified, and all relevant information sent to these parties for comment.
- Notice boards were placed at the location on the 11 November 2022, where the borrow pit excavation will take place.

Site notice 1: 29°51'15.31"S; 24°40'27.64"E.

Site notice 2: 29°55'39.50"S; 24°42'54.80"E.

- The Interested and Affected Parties was identified as the following:

- Letsemeng Local Municipality
- Xhariep District Municipality
- Free State Department of Water and Sanitation
- South African Heritage Resources Authority
- Free State Department Agriculture and Rural Development

## Summary of issues raised by I&APs

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

Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant
<b>Municipality</b>		
Letsemeng Local Municipality	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Xhariep District Municipality	<i>To be included in the Final</i>	<i>To be included in the Final</i>
<b>Organs of state</b>		
South African Heritage Resources Authority	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Free State Department of Water and Sanitation	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Free State Department of Agriculture and Rural Development.	<i>To be included in the Final</i>	<i>To be included in the Final</i>

**The Environmental attributes associated with the alternatives.** (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

## **Baseline Environment**

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

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

#### **Climate**

The general area (including Luckhof) receives approximately 236mm of rainfall per year, with most rainfall occurring mainly during autumn months. The lowest rainfall occurs in the winter months, specifically in July. The highest rainfall (51mm) occurs in March.

Average midday temperatures can range from 16.4°C in June to 31°C in January. The region is at its coldest in July when the temperature drops to 0.3°C on average during the night.

#### **Biodiversity**

##### **Geology, Soils and Terrain**

The area is characterized by alternating layers of mudstone and sandstone mostly of the Permian Adelaide Subgroup (Beaufort Group, Karoo Supergroup). Part of the area is covered with soils with diagnostic pedocutanic and prismaeutanic (dark clayey) Bh horizons and belongs to soil forms such as Estcourt, Rensburg and Oakleaf. In some areas, especially towards the more arid west, patches of calcrete on the soil surface are notable- here the soil forms such as Kimberly and Plooyburg prevail (dwarf karroid shrubs usually concentrate on these areas of limestone rich patches). The existing quarry assessed however has been cleared of the topsoil layer and consist of bare rock surfaces.

##### **Vegetation**

Luckhoff area falls within the Grassland Biome. According to (Mucina & Rutherford 2006), the area is characterized by Shrubland dominated by dwarf Karoo shrubs. The preferred site falls within the Xhariep Karroid Grassland vegetation type (Gh3), whilst only the most northerly portion forms part of the Northern Upper karoo vegetation type (NKu 3) (Mucina & Rutherford, 2006).

#### **Conservation**

The entire assessment area is categorised as an Ecological Support Area Two (ESA2), bordered by Degraded categories, in accordance with the Free State Biodiversity Plan 2015, which sets out biodiversity priority areas in the province.

The assessment area itself is an existing quarry, thus it is entirely transformed.



SOCIO-ECONOMIC CHARACTER

Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

In 2017, Xhariep employed 36 800 people which is 4.59% of the total employment in Free State Province (802 000), 0.23% of total employment in South Africa (15.9 million). Employment within Xhariep increased annually at an average rate of 0.05% from 2007 to 2017.

In 2017, there were a total number of 11 700 people unemployed in Xhariep, which is an increase of 1 610 from 10 000 in 2007. The total number of unemployed people within Xhariep constitutes 3.04% of the total number of unemployed people in Free State Province. The Xhariep District Municipality experienced an average annual increase of 1.50% in the number of unemployed people, which is better than that of the Free State Province which had an average annual increase in unemployment of 3.33%.

In 2017, the unemployment rate in Xhariep District Municipality (based on the official definition of unemployment) was 24.06%, which is an increase of 2.49 percentage points. The unemployment rate in Xhariep District Municipality is lower than that of Free State. The unemployment rate for South Africa was 27.21% in 2017, which is an increase of -2.44 percentage points from 24.77% in 2007.

Economic profile of local municipality:

The Xhariep District Municipality had a total GDP of R 7.86 billion and in terms of total contribution towards Free State Province the Xhariep District Municipality ranked lowest relative to all the regional economies to total Free State Province GDP (fig 1). This ranking in terms of size compared to other regions of Xhariep remained the same since 2007.

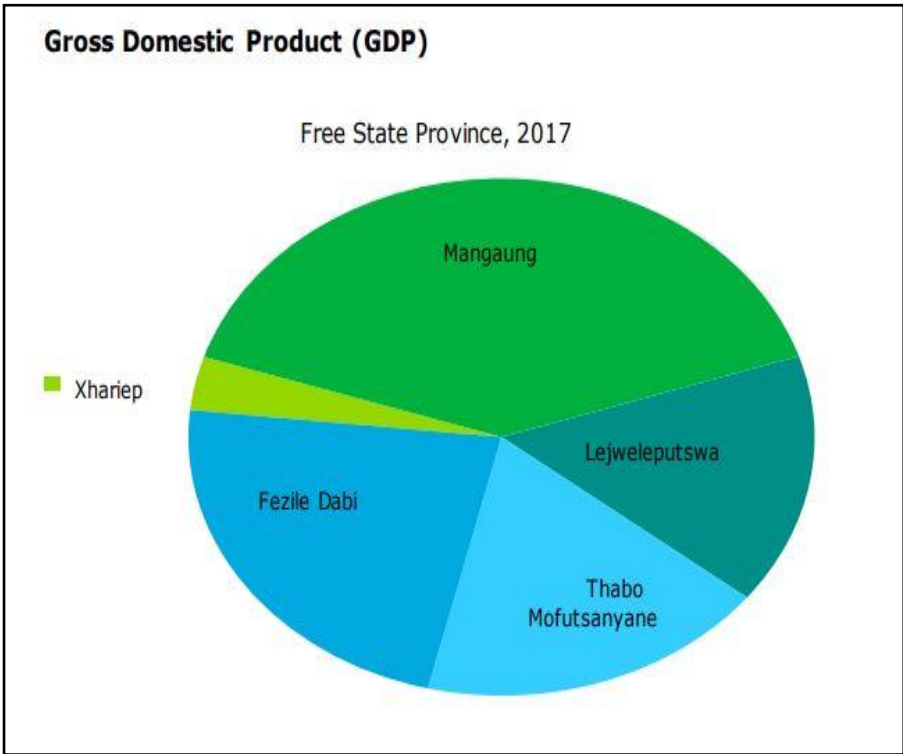


Fig 1: Xhariep District Municipality economy contribution (Xhariep Municipal IDP, 2020)

In 2017, the community services sector is the largest within Xhariep District Municipality accounting for R 2.2 billion or 30.6% of the total GVA in the district municipality's economy. The sector that contributes the second most to the GVA of the Xhariep District Municipality is the agriculture sector at 16.0%, followed by the mining sector with 13.2%. The sector that contributes the least to the economy of Xhariep District Municipality is the electricity sector with a contribution of R 219 million or 3.06% of the total GVA (fig 2).

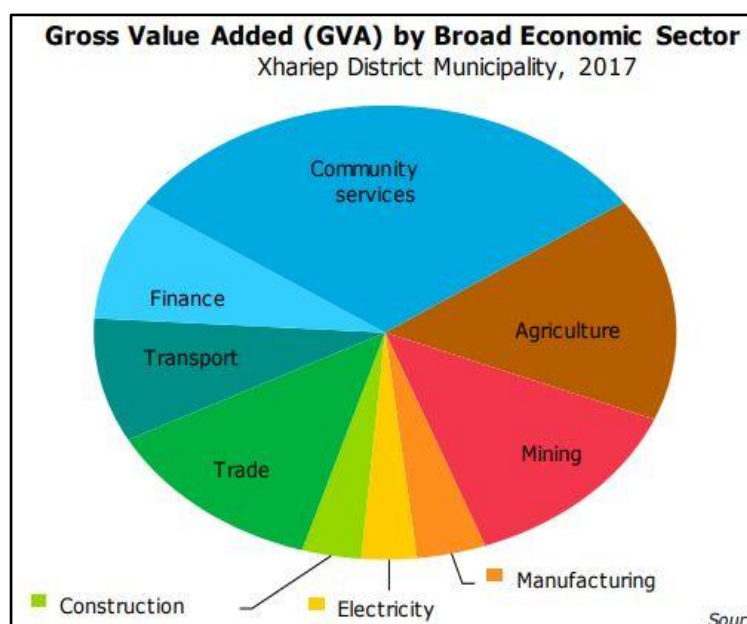


Fig. 2: Xhariep District Municipality sector contribution (Xhariep Municipal IDP, 2020)

#### Level of education:

Within Xhariep District Municipality, the number of people without any schooling decreased from 2007 to 2017 with an average annual rate of -5.29%, while the number of people within the 'matric only' category, increased from 13,200 to 16,000. The number of people with 'matric and a certificate/diploma' decreased with an average annual rate of -0.77%, with the number of people with a 'matric and a Bachelor's' degree increasing with an average annual rate of 1.69% (fig 3).

The number of people without any schooling in Xhariep District Municipality accounts for 8.10% of the number of people without schooling in the province and a total share of 0.35% of the national. In 2017, the number of people in Xhariep District Municipality with a matric only was 16,000 which is a share of 3.20% of the province's total number of people that has obtained a matric. The number of people with a matric and a Postgrad degree constitutes 2.83% of the province and 0.12% of the national.

HIGHEST LEVEL OF EDUCATION: AGE 15+ - XHARIEP DISTRICT MUNICIPALITY,  
2007-2017 [PERCENTAGE]

Highest level of education: age 15+

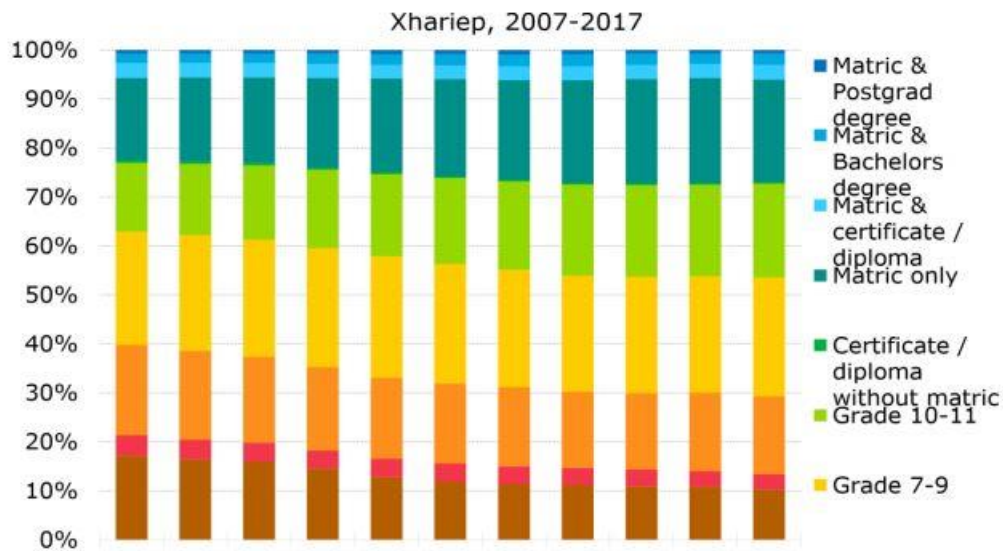


Fig. 3: Education percentage in Xhariep District Municipality (Xhariep Municipal IDP, 2020)

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

The area is completely transformed and is an existing quarry. The greater site is an operational farm for grazing purposes and is zoned agriculture.

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

No environmental sensitive features reside within the 3ha BP portion.

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

	Activity	Impact	Duration	Intensity	Probability	Significance Rating	
1	Site Preparation	Loss of vegetation	3	2	10	50	Medium
		Habitat Destruction	2	2	10	40	Low
		Visual scarring	3	3	8	48	Low
		Soil erosion	3	4	6	42	Low
2	Excavations	Dust emissions	2	5	8	56	Medium
		Surface disturbances	3	3	10	60	Medium
		Drainage interruption	1	1	10	20	Low
		Slope instability	4	3	6	42	Low

	Activity	Impact	Duration	Intensity	Probability	Significance Rating	
		Noise	2	2	10	40	Low
		Visual Scarring	3	4	8	56	Medium
		Soil erosion	3	4	6	42	Low
3	Blasting	Fly rock	2.5	5	10	75	High
		Noise and vibrations	2.5	5	10	75	High
		Dust	2.5	5	10	75	High
4	Stockpiles	Dust	2	5	8	56	Medium
		Surface disturbances	3	5	10	80	High
		Drainage disruption	1	1	10	20	Low
5	Loading, Hauling and transportation	Dust	2	5	10	70	Medium
		Increased risk of accidents	2	4	4	16	Low
		Noise	2	2	10	55	Medium
		Soil contamination from oil/fuel leaks	3	3	6	36	Low

e) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks:

**Assessment of the significance of the potential impacts**

**Criteria of assigning significance to potential impacts**

The significance of potential impacts is derived through a synthesis of ratings of all criteria in the following calculation:

$$(\text{Duration} + \text{Intensity}) \times \text{Probability} = \text{Significance}$$

The significance of a potential impact on decision-making is indicated through significance points in the right-hand column of the table below. The significance points indicate the following:

- **Low** (Significance points (SP) < 50): The impact will not have an influence on the project design;
- **Moderate** (SP between 50 and 75): It could have an influence on the environment and will require modification of the project design or operational mitigation methods;
- **High** (SP > 75): It could be a major implication on the project regardless of any mitigation.



**Table 2: Assessing Impacts for significance**

<b>Impact</b>	<b>Duration</b>	<b>Intensity</b>	<b>Probability</b>	<b>Significance points (SP) and rating</b>
<b>Example. Soil contamination from hazardous substances before mitigation</b>	<b>Permanent - 5</b>	<b>Very high / don't know - 5</b>	<b>Definite / don't know - 10</b>	<b>High SP &gt; 75</b>
	<b>Long term - 4</b>	<b>High - 4</b>	<b>High probable - 8</b>	<b>Moderate SP 50 to 75</b>
	<b>Medium term - 3</b>	<b>Moderate - 3</b>	<b>Medium probability - 6</b>	<b>Low SP &lt; 50</b>
	<b>Short term - 2</b>	<b>Low - 2</b>	<b>Low probability - 4</b>	
	<b>Immediate - 1</b>	<b>Minor - 1</b>	<b>Improbable - 2</b>	

**f) 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.**

The following standards will be upheld once the borrow pit mining has ended:

- i. The borrow pit be rehabilitated properly after material has been sourced and they should give their input in the finishing off and rehabilitation of the borrow pit.
- ii. The borrow pit must be managed in accordance with the Environmental Management Plan included in this report.
- iii. The finishing off, of the borrow pit must be safe for humans and animals.
- iv. The landowner should be informed of who will be working on the borrow pit.
- v. The landowner be informed of who will work on the borrow pit before this commences.
- vi. There should be no dumping of any kind at the borrow pit.
- vii. The borrow pit will only be used for the construction of the roads by the project applicant.

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

#### **MANAGING SOIL IMPACTS**

These measures are targeted at managing soil erosion, soil contamination, compaction of soil and removal of topsoil in the vicinity of the quarry.

- Area to be stripped of vegetation should be kept to an absolute minimum.
- Contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage and unnecessary movements should be prohibited.
- Where topsoil is applicable, the topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. The soil is to be stored and the soil stockpiles shall not be higher than 2 metres or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- Topsoil shall be stored separately from subsoil and other overburden material.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.

- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
- The contractor shall apply soil conservation measures to the stockpiles to prevent erosion.
- Ensure regular maintenance of equipment to prevent diesel and hydraulic spillages
- Where possible ensure low work surface gradients so that run-off flows at a controlled rate so as to minimize channelling and soil erosion during high rainfall.

#### **LOSS OF VEGETATION**

- No protected species must be removed without a permit. A final walkthrough must be done by an ecologist to ensure that the areas where vegetation is to be cleared do not have protected species.
- Clearance of vegetation should be restricted to the absolute minimum required to facilitate access and undertake borrow pit activities. Disturbance of topsoil and vegetation rootstock must be minimized as far as possible.
- Any declared category 1 invasive species identified should be cleared.
- Rehabilitation strategies following operational activities must ensure that appropriate indigenous plant species are used and should be done as per rehabilitation plan.

#### **DUST AND VEHICLE FUMES**

- Avoid unnecessary excessive vehicle movement.
- Limit vehicle speeds on unsurfaced roads.
- Rehabilitate disturbed areas with vegetation as soon as operation is completed.
- Maintain equipment and vehicles in good working order to avoid excessive emissions
- Borrow pit working floors should be sprayed with water from time to time to reduce dust emission during operations.
- Use rubber curtains/other material to limit dust during screening should be considered.
- Spray roads, material stockpiles and screening areas with water if dust becomes problematic.
- No fires should be allowed on the borrow pit site.

#### **WASTE DISPOSAL**

- All personnel must be instructed to dispose of waste in a proper manner in the correct designated areas.
- Suitable receptacles shall be available at all times and conveniently placed for the disposal of waste.
- No waste shall under any circumstance be disposed of in the veld. No burning of waste is permitted on site and the borrow pit area should be protected from illegal dumping of waste.
- All used oils, grease or hydraulic fluids shall be placed in appropriate impervious containers and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility or sent for recycling/reuse with a registered facility.
- Spills should be cleaned up immediately by removing the spillage together with the polluted soil and by disposing of them at a recognised facility. In areas where the spills are some, an absorbent agent can be used, and the area treated

- Contaminated materials and residues from machinery maintenance and other sources contaminated with hazardous waste should be stored in proper containers that avoid seepage to ground.
- The reduce, reuse, recycle waste management philosophy will be used where possible.
- Only authorized registered waste disposal contractors should be hired for collection of waste for all waste streams.

#### **SOCIAL IMPACTS**

- Effective two-way public disclosure and public consultation should be implemented to allay community perceptions. There should be an opportunity provided for the resolution of grievances or complaints received and recorded from individuals in the community.
- Community should be adequately informed of activities being done at the borrow pit that are likely to affect them.
- Labour recruitment should occur in a manner that is objective, transparent, and wherever possible, provide opportunities for people from the local area.
- The activities of contractors, consultants, and company employees should be routinely reviewed to ensure good community relations are being maintained. The project proponent should use its influence as employer to encourage responsible behaviour among employees.

#### **STABILITY OF EXCAVATIONS**

- Excavations shall take place only within the approved demarcated borrow pit area and appropriate barriers should be put as necessary.
- The borrow pit operator shall ensure that a place of work, whether temporary or permanent in or near the excavation has a structure and solidity appropriate to its use is operated, supervised and maintained, so as to withstand the environmental forces anticipated and be safe.
- The borrow pit operator shall ensure that material is not placed, stacked or used at the borrow pit near the edge of any excavation, where it is likely to endanger people at work and equipment or where it is likely to cause collapse of the side of the excavation.
- Excavations should be routinely inspected. If cracks occur in any structure they need to be investigated to ascertain if there is a risk to safety
- Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the mineral or gravel has been excavated.
- An appropriate drainage provisions must be constructed as necessary to accommodate the surface water movement. If the water table is reached during excavations appropriate pumping facilities should be provided.
- Excavated areas should be kept in a safe and stable manner. No unstable block should be present. Reshaping of the borrow pit may need to be done to ensure that this objective is reached. The profiling should be done to match the surrounding landscape
- The borrow pit should be finished in such a manner that it is self-draining
- Topsoil should be put back on the surfaces and the areas revegetated.

## **VISUAL IMPACTS**

- The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be dumped into the excavation.
- Once excavation parts that can be filled have been refilled with overburden, rocks and coarse natural materials, the borrow pit shall be profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area.
- The area shall be fertilised if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, there may be need for the soil to be analysed and any deleterious effects on the soil arising from the borrow pit, be corrected and the area be seeded with an indigenous vegetation seed mix that matches the surrounding flora.

## **EQUIPMENT USED ON SITE**

- Only well-maintained vehicles and equipment should be operated onsite and all machinery should be serviced regularly during the borrow pit operation.
- The maintenance of vehicles and some equipment used for any purpose during the borrow pit operation will take place only in the maintenance workshops which are not located on the borrow pit. No vehicle may be extensively repaired in any place other than in the maintenance yard.
- A maintenance schedule should be prepared in order to ensure that equipment is in its best form so as to not cause unnecessary pollution such as noise, emissions and makes effective use of energy.
- Equipment used in the borrow pit process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.
- Machinery or equipment used on the borrow pit area must not constitute a pollution hazard. No equipment leaking oil should be used. Drip tray should be used to prevent pollution.

## **NOISE**

- Construction activities required outside normal working hours must be approved by the Project Manager, and where necessary, advance warning provided to adjacent residents.
- Noise levels exceeding 85dB shall only be permitted where approved and with appropriate advanced warning to adjacent residents (minimum of 2 days) being provided.
- Noise that could cause a major disturbance should only be carried out during daylight hours and with advance warning provided as above.
- Adequate ear protection should be provided to employees in noisy areas
- No amplified music shall be allowed at the site.
- Construction vehicles and plant to be in good working order.



**g) Motivation where no alternative sites were considered.**

The selected area is already in a transformed state and constitutes an existing quarry, the correct materials were tested and found suitable for the road surfacing, and the proposed borrow pit site occurs on the same property on which it is intended to be used.

- i) 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 were 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.)**

## h) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

NAME OF ACTIVITY  (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route <b>etc...etc...etc</b>  E.g. For mining, - 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.)	POTENTIAL IMPACT  (Including the potential impacts for cumulative impacts)  (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)	ASPECTS AFFECTED	PHASE  In which impact is anticipated  (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	SIGNIFICANCE if not mitigated	MITIGATION TYPE  (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)  E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	SIGNIFICANCE if mitigated
Site Establishment activities (fencing, signage, access formation, etc)	Loss of vegetation	Visual character, Land use	Pre-mining	Medium	Remedy through rehabilitation, Limit footprint	Low
	Habitat Destruction	Visual character	Pre-mining	Low	Remedy through rehabilitation, Limit footprint	Low
	Visual scarring	Visual character	Pre-mining	Low	Remedy through rehabilitation	Low
	Soil erosion	Visual character, Land use	Pre-mining	Medium	Remedy through rehabilitation, Limit footprint, Control through storm water control	Low
Clearance of area for mining	Visual scarring	Visual Character	Operational Phase	Low	Remedy through rehabilitation	Low
	Destruction of flora and habitat	Visual Character, Land use	Operational Phase	Low	Remedy through rehabilitation, Limit	Low

					footprint and removal of vegetation	
	Loss of agricultural potential	Land use management	Operational Phase	Low	Control through soil conservation techniques Limit footprint of the borrow pit as far possible to limit loss of agricultural land	Low
	Soil erosion	Land use	Operational	Medium	Control through soil conservation techniques, Stop through appropriate storage of topsoil	Low
Excavation	Dust emissions	Air quality	Operational Phase	Medium	Control through dust control measures	Low
	Drainage disruption	Drainage	Operational Phase	Low	Control through storm water controls	Low
	Slope instability	Topography	Operational Phase	Low	Control through slope management controls	Low
	Noise	Noise	Operational Phase	Low	Control through noise control measures	Low
	Visual Scarring	Visual Character	Operational Phase	Medium	Remedy through rehabilitation of already worked areas	Low
	Soil erosion	Land use	Operational Phase	Low	Remedy through the rehabilitation of already worked areas, Control through slope control, Stop through appropriate storage of topsoil	Low

	Destruction of heritage resource	Heritage issues	Operational Phase	Low	Avoidance	Low
Drilling & blasting	Noise and vibrations	Noise	Operational Phase	Medium	Control through blast control measures	Low
	Dust	Air quality	Operational Phase	Low	Control through dust control measures	Low
	Fly rock	Safety	Operational Phase	Low	Control through blast control measures	Low
Waste Disposal and Material storage	Soil contamination	Land degradation	Operational Phase	Low	Avoidance	Low
	Water pollution	Water	Operational Phase	Low	Avoidance	Low
	Increased risk of fire	Safety	Operational Phase	Low	Avoidance	Low
Material handling, hauling and transportation	Dust	Air quality	Operational Phase	Medium	Control through dust control measures	Low
	Increased risk of accidents	Safety	Operational Phase	Low	Stop through site management protocols	Low
	Noise	Noise	Operational Phase	Low	Control through noise control measures	Low
	Soil contamination from oil/fuel leaks	Land degradation	Operational Phase	Low	Stop through operational control measures e.g. drip trays and use of well serviced machinery	Low
Removal of infrastructure & equipment and re-shaping of borrow pit	Noise	Noise	Decommissioning and closure	Low	Control through noise control measures	Low
	Dust	Air quality	Decommissioning and closure	Medium	Control through dust Control measures	Low
	Soil contamination from oil/fuel	Land degradation	Decommissioning and closure	Low	Stop through operational Control measures, e.g. drip	Low

					trays and use of well serviced machinery	
	Disruption of surface drainage	Water movement	Decommissioning and closure	Low	Control through storm water controls, remedy through rehabilitation	Low
Community and labour relations management	Community conflicts and tensions	Community relations	Operational	Medium	Control through Site Management protocols	Low
	Increase risk of fire	Fire risk	Operational	Low	Control through Site Management protocols	Low
	Reduced security on area	Safety Issues	Operational	Low	Control through Site Management protocols	Low
	Improved employment	Community relations	Operational	Medium +	No mitigation required	Medium +
	Improved skills	Community relations	Operational	Medium +	No mitigation required	Medium +

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix 5**

## **i) Environmental impact statement**

### **Summary of the key findings of the environmental impact assessment.**

The findings of the studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated from the proposed project conclude that:

- There are no environmental fatal flaws that should prevent the proposed borrow pit development provided that the recommended mitigation and management measures are implemented and given due consideration during the life of mine of the borrow pit.
- The development will have both positive and negative social impacts. It will create employment and business opportunities for locals during both the construction and but will also create health and safety risk especially during operation. The negative impacts are however low.
- The management of the impact's hinges on the effective and efficient operation of the borrow pit. There is need to ensure that competent personnel are employed, and adequate training and skills development provided for where it is lacking.
- The cumulative significance of all the negative potential impacts on the environment is considered low due to the limited scale of the development and the scarcity of development in the immediate surrounding area.

### **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.

Attach as **Appendix 2**

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

No alternatives were considered. The summary of identified positive and negative risks is as follows.

Negative Impacts:

- Visual Impacts
- Noise Impacts
- Air Quality Deterioration
- Disruption of surface drainage- only in times of heavy downpour
- Destruction of flora and loss of habitat
- Loss of soil and agricultural potential- minimal however
- Water pollution
- Erosion
- Safety and Security Impacts
- Land Degradation

Positive impacts:

- Creation of employment opportunities.
- Training and skills development opportunities.
- Contributes towards infrastructure upkeep.

#### **a. Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;**

The management objectives and impact management outcomes are:



- To fulfil the requirements of Minerals and Petroleum Resources Development Act and the requirements of the National Environmental Management Act and other legislative requirements.
- To promote the rational development of borrow pit in order to reduce or eliminate the associated negative environmental impacts.
- To identify proposed mitigation and management measures to manage adverse impacts and to increase benefits.
- To ensure that the applicant use resources efficiently and effectively during the life of mine in order to reduce wastage thereby reducing associated negative environmental impacts.
- To improve the environmental awareness of all personnel who will work at the borrow pit.

**j) Aspects for inclusion as conditions of Authorisation.**

Any aspects which must be made conditions of the Environmental Authorisation

The applicant should appoint an independent environmental control officer to inspect and audit and make recommendations for the improvement of environmental performance during the life of mine of the borrow pit.

**a. Description of any assumptions, uncertainties and gaps in knowledge.**

(Which relate to the assessment and mitigation measures proposed)

In undertaking this investigation and compiling the report, it has been assumed that:

- The information provided by the client, and the applicant is accurate and unbiased.
- The scope of this investigation is limited to assessing the environmental impacts associated with the borrow pit and does not include assessment of lifecycle analysis of equipment and other materials to be used.

**b. Reasoned opinion as to whether the proposed activity should or should not be authorised**

**i. Reasons why the activity should be authorized or not.**

There are no environmental fatal flaws that should prevent the proposed development of the borrow pit on the current location provided that the recommended mitigation and management measures are implemented

The cumulative significance of all the negative potential impacts on the environment is considered low due to the limited scale of the development and the scarcity of development in the immediate surrounding area.

**ii. Conditions that must be included in the authorisation**

- The borrow pit be rehabilitated properly after material has been sourced and they should give their input in the finishing off and rehabilitation of the borrow pit.
- The finishing off of the borrow pit must be safe for humans and animals.
- People residing close to the area should be informed of who will be working on the borrow pit, as well as the farm owner on which the borrow pit is situated.
- There should be no dumping of any kind of waste at or in the borrow pit.
- The borrow pit will only be used for the upgrade of the farm internal gravel roads.
- An Environmental Control Officer should be appointed to monitor the construction phase of the project.

## 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).

Please refer to Section 1(a) for details.

- 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).

Please refer to Section d(i)

#### c) **Composite Map**

(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)

See Appendix 2

#### 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)

Closure management objectives in this regard will include:

- Adequate reinstatement and rehabilitation of construction and borrow pit area; and
- Conduct concurrent or progressive rehabilitation of areas affected by construction and operation activities associated with the borrow pit.
- Minimise the area to be disturbed and to ensure that the areas disturbed during the activities are rehabilitated, as per the measures provided in the EMPr.

Specific objectives and targets to be set in the EMPr for the following:

- Removal of structures and infrastructure;
- Inert waste and rubble;
- Hazardous waste and pollution control;
- Final shaping;
- Topsoil replacement and soil amelioration;
- Ripping and scarifying;
- Maintenance and monitoring.

Rehabilitation measures to meet closure objective are as follows:

- The Contractor shall take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.
- Upon completion of all construction activities, all structures, equipment, materials, waste, rubble, notice boards at the borrow pit area must be removed from site.
- All waste generated by the decommissioning of the site must be disposed of at an appropriate waste disposal site.

- All rehabilitation and reinstatement efforts shall be implemented immediately after completion of use of the BP.
- All topsoil removed and stockpiled must be spread evenly all scared areas and;
- Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.

ii) **Volumes and rate of water use required for the operation.**

Water use for the operational phase of the borrow pit will be sources from exiting water supply on the farm.

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

No Section 21 water use activities triggered, and therefore no water use license required.

## E) Impacts to be mitigated in their respective phases

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

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
<p>Mining – sourcing road upgrade material by creating a borrow pit:</p> <ul style="list-style-type: none"> <li>• Excavations.</li> </ul> <p>The excavation of a borrow pit for dolerite material to be used for the improvement of internal gravel roads on the farm.</p>	Pre-Construction, Construction and Operation	Up to 3ha	<ul style="list-style-type: none"> <li>• The farmer to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>• During site preparation, special care must be taken during the clearing of the works area where topsoil will be stored separately. This topsoil must be reused during the rehabilitation phase.</li> <li>• The Farmer shall take measures to ensure that there is no undue stormwater damage and soil erosion resulting from the construction and operation activities outside the borrow pit area.</li> <li>• Erosion Control: <ul style="list-style-type: none"> <li>o Suitable erosion protective measures to be implemented.</li> <li>o Stabilisation of cleared areas to prevent and control erosion.</li> <li>o Monitoring to be conducted to detect erosion.</li> <li>o Rehabilitate all areas disturbed during construction.</li> <li>o Manage stormwater from construction site to avoid environmental contamination and erosion.</li> </ul> </li> </ul>	Compliance with mitigation measures will ensure that environmental management standards and practices are met.

			<ul style="list-style-type: none"> <li>• Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and microorganisms in the soil.</li> <li>• Topsoil stockpiles must be kept free of weeds and alien invasive vegetation at all times.</li> <li>• Soil must not be stockpiled on drainage lines or near Watercourses, a drainage line is located east of the BP area.</li> <li>• All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.</li> <li>• Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations.</li> <li>• No washing of plant may occur on the construction site. Plant to be washed in dedicated areas.</li> <li>• Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.</li> </ul>	
	Construction and Operation	Up to 3ha	Compliance with Occupational Health and Safety Act (Act No. 85 of 1993).	Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and

			<ul style="list-style-type: none"> <li>• The farmer and his workers must wear the necessary Personal Protective Equipment (PPE).</li> <li>• Employees to remain within the site boundary.</li> <li>• Access into and out of the borrow pit area must only be via existing access roads.</li> <li>• When working in the area of encroachment is prevalent, all open excavated trenches and foundations should be clearly marked and secured to keep people and fauna from falling in.</li> <li>• Closure of the borrow pit after construction is completed.</li> </ul>	other relevant regulations.
	Construction and Operation	Up to 3ha	If any archaeological material, such as, objects or features, are uncovered during construction activities on site, work will cease immediately and an archaeologist should be contacted as a matter of urgency in order to assess such occurrences.	Compliance with mitigation measures will ensure that environmental management standards and practices are met.
	Construction and Operation	Up to 3ha	<p>Suitable litter receptacles to be positioned strategically across the site at all working areas.</p> <ul style="list-style-type: none"> <li>• Waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).</li> </ul>	Compliance with mitigation measures will ensure that environmental management standards and practices are met.



		<ul style="list-style-type: none"> <li>• Waste material that may harm man or animals should be removed immediately.</li> <li>• No hazardous materials e.g. oil, diesel and fuel should be disposed of in the surrounding environment. Any diesel, oil or petrol spillages are to be collected and stored in specially marked containers and disposed of at a permitted waste disposal site and must be treated as hazardous waste.</li> <li>• No refuse or litter is allowed to be burnt on site.</li> <li>• The recycling of all waste is to be encouraged of both the contractor and staff.</li> <li>• Where possible, spoil should be used to fill, shape and rehabilitate the borrow pit.</li> </ul>	
	Rehabilitation of the borrow pit	<p>All rehabilitation and reinstatement efforts shall be implemented immediately after completion of improving the internal farm roads.</p> <ul style="list-style-type: none"> <li>• The Farmer shall take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>• Upon completion of all construction activities, all structures, equipment, materials, waste, rubble, notice boards along the</li> </ul>	Compliance with mitigation measures will ensure that environmental management standards and practices are met.

		<p>entire length of the road and at the borrow pit areas must be removed from site.</p> <ul style="list-style-type: none"> <li>• All waste generated by the decommissioning of the site must be disposed of at an appropriate waste disposal site.</li> <li>• All rehabilitation and reinstatement efforts shall be implemented immediately after completion of construction activities.</li> <li>• Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.</li> </ul>	
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## F) Impact Management Outcomes

### MANAGING SOIL IMPACTS

These measures are targeted at managing soil erosion, soil contamination, compaction of soil and removal of topsoil.

- The area that is stripped of vegetation should be kept to an absolute minimum.
- The contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage and unnecessary movements should be prohibited.
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. The soil is to be stored and the soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- Topsoil shall be stored separately from subsoil and other overburden material.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
- The contractor shall apply soil conservation measures to the stockpiles to prevent erosion.
- Ensure regular maintenance of equipment to prevent diesel and hydraulic spillages.
- Where possible ensure low work surface gradients so that run-off flows at a controlled rate so as to minimize channelling and soil erosion during high rainfall.
- At the end of operations, all disturbed areas shall be re-vegetated.

TIMING: At Start up and throughout the operational phase of the borrow pit

### LOSS OF VEGETATION AND HABITAT DESTRUCTION

- Clearance of vegetation should be restricted to the absolute minimum required to facilitate access and undertake borrow pit activities. Disturbance of topsoil and vegetation rootstock must be minimized as far as possible.
- Trees larger than 2m should not be removed unless it is absolutely necessary and cannot be avoided.
- No protected species must be removed without a permit. A final walk-through must be done by an ecologist to ensure that the areas where vegetation is to be cleared do not have protected species.
- Any alien species identified should be cleared.
- Burning of any waste material is not permitted under any circumstances.

- Rehabilitation strategies following operational activities must ensure that appropriate indigenous plant species are used and should be done as per rehabilitation plan.

TIMING: At Start up and throughout the operational phase of the borrow pit.

#### DUST AND VEHICLE FUMES

- Avoid unnecessary excessive vehicle movement.
- Limit vehicle speeds on unsurfaced roads.
- Rehabilitate disturbed areas with vegetation as soon as operation is completed.
- Maintain equipment and vehicles in good working order to avoid excessive emissions.
- Borrow pit working floors should be sprayed with water from time to time to reduce dust emission during operations.
- The use of rubber curtains/other material to limit dust during screening should be considered.
- Spray roads, material stockpiles and screening areas with water if dust becomes problematic.
- No fires should be allowed on the borrow pit site.

TIMING: Throughout life of mine.

#### WASTE DISPOSAL

- All personnel must be instructed to dispose of waste in a proper manner.
- Suitable receptacles shall be available at all times and conveniently placed for the disposal of waste.
- No waste shall under any circumstance be disposed of in the veldt. No burning of waste is permitted on site and the borrow pit area should be protected from illegal dumping of waste.
- All used oils, grease or hydraulic fluids shall be placed in appropriate impervious containers and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility or sent for recycling/reuse with a registered facility.
- Spills should be cleaned up immediately by removing the spillage together with the polluted soil and by disposing thereof at a recognised facility. In areas where the spills are small, a tested absorbent agent can be used, and the area treated accordingly.
- Contaminated materials and residues from machinery maintenance and other sources contaminated with hazardous waste should be stored in proper containers that avoid seepage to the ground.
- The 'reduce, reuse, recycle' waste management philosophy will be used where possible.
- Only authorized registered waste disposal contractors should be hired for collection of waste for all waste streams

TIMING: At Start – up and throughout the operational phase of the borrow pit.

#### STABILITY OF EXCAVATIONS

- Excavations shall take place only within the approved demarcated borrow pit area and appropriate barriers should be put as necessary.
- The appointed contractor/borrow pit operator shall ensure that a place of work, whether temporary or permanent in or near the excavation has a structure and solidity appropriate to its use and is operated, supervised and maintained, so as to withstand the environmental forces anticipated and be safe.
- The appointed contractor/borrow pit operator shall ensure that material is not placed, stacked or used at the borrow pit near the edge of any excavation, where it is likely to endanger people at work and equipment or where it is likely to cause collapse of the side of the excavation.
- Excavations should be routinely inspected. If cracks occur in any structure they need to be investigated to ascertain if there is a risk to safety.
- Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the mineral or gravel has been excavated.
- Appropriate drainage provisions must be constructed as necessary to accommodate the surface water movement. If the water table is reached during excavations, appropriate pumping facilities should be provided.
- Excavated areas should be kept in a safe and stable manner. No unstable block should be present. Reshaping of the borrow pit may need to be done to ensure that this objective is reached. The profiling should be done to match the surrounding landscape.
- The borrow pit should be finished in such a manner that it is self-draining as far as is possible.
- Topsoil should be put back on the surfaces and the areas re-vegetated.

TIMING: During operational phase, closure and post closure of the borrow pit.

#### VISUAL IMPACTS

- The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be backfilled into the excavation.
- Once excavation parts that can be filled have been refilled with overburden, rocks and coarse natural materials, the borrow pit shall be profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area. The profiling shall be done to match the surrounding landscape as far as is reasonable possible.
- The area shall be fertilised if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora.

- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, then there may be need for the soil to be analysed and any deleterious effects on the soil arising from the borrow pit, be corrected and the area be re-seeded with a suitable vegetation seed mix

TIMING: At Start up and throughout the whole life of the borrow pit.

#### EQUIPMENT USED ON SITE

- Only well-maintained vehicles and equipment should be operated on site and all machinery should be serviced regularly during the borrow pit operation to limit environmental impacts as a result of spillage, emissions and noise.
- The maintenance of vehicles and some equipment used for any purpose during the borrow pit operation will take place only in the maintenance workshops which are not located on the borrow pit. No vehicle may be extensively repaired in any place other than in the maintenance yard.
- A maintenance schedule should be prepared in order to ensure that equipment is in its best form
- Machinery or equipment used on the borrow pit area must not constitute a pollution hazard. No equipment leaking oil, fuels etc should be used. Drip tray should be used to prevent pollution

TIMING: At Start up and throughout the operational phase of the borrow pit.

#### NOISE

- Construction activities required outside normal working hours must be approved by the Project Manager, and where necessary, advance warning provided to adjacent residents.
- Noise levels exceeding 85dB shall only be permitted where approved and with appropriate advanced warning to adjacent residents (minimum of 2 days) being provided.
- Noise that could cause a major disturbance should only be carried out during daylight hours and with advance warning provided as above.
- Adequate ear protection should be provided to employees in noisy areas.
- No amplified music shall be allowed at the site.
- Construction vehicles and plant to be in good working order.

TIMING: At Start up and throughout the operational phase of the borrow pit.



## SAFETY AND SECURITY RISKS

- The borrow pit should be fenced off and adequate beacons put in place. Entry to the borrow pit area shall be controlled and unauthorised entry prohibited.
- Adequate precautions shall be taken to protect persons present at, or in the vicinity of, the borrow pit from risks that may arise from borrow pit operations.
- Adequate signage should be put in place regarding safety and to warn the public it is a mine.
- The appointed contractor/borrow pit operator should be held liable for damage to farm/community infrastructure that can be linked to construction workers.
- The appointed contractor/borrow pit operator should have a code of conduct governing activities of workers during the work at the borrow pit and ensure that all workers are informed of the conditions, specifically trespassing on adjacent farms/plots.
- Workers are only to use designated access roads for movement of material from or to site.
- Safety rules, such as the implementation of speed limits in particular, restriction of heavy vehicle movements to specific access roads should be in place.
- There should be procedures for managing and storing waste on site that may pose a threat to livestock if ingested e.g. plastics.
- There should be mechanism to inform police of theft that occur on site.

TIMING: At Start up and throughout the operational phase of the borrow pit.

## ALTERED TOPOGRAPHY IMPACTS

- Mining techniques used should try to avoid the creation of steep slopes.
- On completion of mining, the borrow pit is to be profiled and profiling shall be done to match the surrounding landscape as far as is reasonable possible.
- Slopes on finishing off the borrow pit should not exceed 3:1 to ensure slope stability and the easy re-establishment of vegetation. Gentler slopes are preferred.
- Appropriate drainage provisions must be constructed as necessary to accommodate the free surface water movement.
- On completion all slopes and disturbed areas are to be re-top soiled and re-vegetated in order to prevent erosion, improve aesthetics and regenerate the biodiversity of the site.

TIMING: During the operational and closing phase.

## DEALING WITH EMERGENCIES

- The appointed contractor/borrow pit operator should identify all situations that can lead to emergency situations and provide response strategies. The situations should include fire and major chemical spill.
- Contact details of all departments/service providers to be contacted in case of an emergency shall be made available to employees.
- Equipment for dealing with emergencies such as spill kits, firefighting equipment, first aid boxes etc. shall be made available and personnel properly trained in its use.
- All the emergency equipment should be serviced, repaired and maintained as per supplier's specification or as per engineering specification to ensure that the equipment is in order. Service certificates should be kept on site and be available on inspection.
- All staff on site should be trained on how to handle emergency situations and emergency drills/ rehearsals should be conducted periodically to ensure that staff is prepared. The training shall be recorded.

**TIMING:** During the operational phase and whenever an emergency occurs during the operational and closing phase.

**G) Indicate the frequency of the submission of the performance assessment/  
environmental audit report.**

Environmental Audit Reports will be submitted to DMR on a quarterly basis, unless stipulated otherwise by DMR.

## UNDERTAKING

The EAP herewith confirms the correctness of the information provided in the reports



the inclusion of comments and inputs from stakeholders and I&APs ; ☒

the inclusion of inputs and recommendations from the specialist reports where relevant;



that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein. ☒



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Signature of the environmental assessment practitioner:

Green-Box Consulting

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Name of company:

25 November 2022

---

Date:

**-END-**

**APPENDIX 1**  
**EAP CURRICULUM VITAE**

# CURRICULUM VITAE

## DANIE KRYNAUW

1. Family name: Krynauw
2. First name: Daniël
3. Date of birth: 1971/12/14
4. Nationality: South African
5. Contacts: Cell: 0824352108 / e-mail: danie@green-box.co.za
6. Education:

Institution	Degree(s) or Diploma(s) obtained
University of the Free State 2001 - 2002	Master in Environmental Management – Dissertation pending
University of the Free State 1996-1998	Masters in Urban and Regional Planning (UFS)
University of the Free State 1993-1995	BA Geography and Sociology (UFS)

7. Membership of professional bodies:

- International Association of Impact Assessment South Africa (IAIAsa)

8. Present position: Environmental Scientist / Director – Green-Box Consulting

9. Current Responsibilities:

- Liaising with clients in both the private and public sectors.
- Conduct Environmental Impact Assessments and other Environmental Technical Investigations.
- Apply and obtain waste licenses, water licenses, mining permits and environmental authorisations for clients.
- Use different GIS datasets in order to create new information or investigate patterns for projects.
- Conduct environmental compliance and other environmental audits.
- Provide technical-level support for environmental remediation and mitigation projects, including remediation system design and determination of regulatory applicability for incoming projects.
- Collaborate with other environmental scientists, planners, engineers, and other specialists, and experts in law and business etc to address environmental problems for clients.
- Conduct Environmental training.

10. Years within the organization: 8 years (total years' environmental management experience = 18 years)

11. Other skills (e.g. computer literacy, etc.): All suits of Microsoft Office, Arc View, ReGIS, and Project

Professional.

12. Professional experience:

Date	2011 - Current
Organisation	Green-Box Consulting (Environmental Consultants)
Position	Environmental Scientist (Owner and Director)

Date	2009 - 2016
Organisation	Terra Works Environmental Consultants
Position	Senior Environmental Scientist and COO

Date	2001 - 2009
Organisation	Department of Economic Development, Tourism and Environmental Affairs, Free State
Position	Principal Environmental Officer
Description of duties	Review Environmental Impact Assessments Review Environmental Management Programmes Issuing Environmental Authorisations



**APPENDIX 2**  
**LOCALITY MAP AND**  
**BORROW PIT SITE MAP**

# Proposed Borrow Pit on the Remainder of the Farm Dundee 416, Letsemeng Local Municipality, Free State Province



To Luckhof

BP site

1: 50 000  
Topographical Map

## Map Legend

- RE/DUNDEE 416
- Point A
- Point B
- Point C
- Point D
- Point E
- Borrow Pit Area (3ha)

## Point Coordinates:

A: 29°55'35.59"S; 24°44'1.38"E  
B: 29°55'38.38"S; 24°44'3.43"E  
C: 29°55'39.79"S; 24°44'1.95"E  
D: 29°55'41.75"S; 24°43'55.71"E  
E: 29°55'38.07"S; 24°43'53.27"E

Prepared for:  
Izak Abraham Malherbe

Prepared by:  
Green-Box Consulting

23 November 2022

Software:  
QGIS 3.22.0-Białowieża



0 1 2 km

Vanderkloof Dam



# Proposed Borrow Pit on the Remainder of the Farm Dundee 416, Letsemeng Local Municipality, Free State Province





**APPENDIX 3**  
**PUBLIC CONSULTATION**  
**DOCUMENTS**

The following measures were taken regarding the public participation process:

- 📖 Interested and affected parties (I&APs) were identified, and all relevant information sent to these parties for comment.
- 📖 Notice boards were placed at the location on the 11 November 2022, where the borrow pit excavations will take place.

Site notice 1: 29°51'15.31"S; 24°40'27.64"E.

Site notice 2: 29°55'39.50"S; 24°42'54.80"E.

- 📖 The Interested and Affected Parties was identified as the following:

- Letsemeng Local Municipality
- Xhariep District Municipality
- Free State Department of Water and Sanitation
- Free State Heritage Resources Authority
- Free State Department Agriculture and Rural Development

## Summary of issues raised by I&APs

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

	Issues raised	EAPs response to issues as mandated by the applicant
<b>Municipality</b>		
Letsemeng Local Municipality Municipal Manager TL Mkhwane <a href="mailto:mm@letsemeng.gov.za">mm@letsemeng.gov.za</a> <a href="mailto:letse@letsemeng.gov.za">letse@letsemeng.gov.za</a> 053 330 0200	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Xhariep District Municipality Municipal Manager L Moletane <a href="mailto:ndoyisilef@gmail.com">ndoyisilef@gmail.com</a> 051 713 9300	<i>To be included in the Final</i>	<i>To be included in the Final</i>
<b>Organs of state</b>		
South African Heritage Resources Authority Online portal	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Free State Department Agriculture and Rural Development Communications Officer N Makubetsa <a href="mailto:hodoffice@fsworks.gov.za">hodoffice@fsworks.gov.za</a> 051 861 8509	<i>To be included in the Final</i>	<i>To be included in the Final</i>
Free State Department of Water and Sanitation N Musekene <a href="mailto:MusekeneN2@dws.gov.za">MusekeneN2@dws.gov.za</a> <a href="mailto:NtitiT@dws.gov.za">NtitiT@dws.gov.za</a> <a href="mailto:KumaloZ@dws.gov.za">KumaloZ@dws.gov.za</a> <a href="mailto:MasekaneK@dws.gov.za">MasekaneK@dws.gov.za</a> <a href="mailto:MahlaleL@dws.gov.za">MahlaleL@dws.gov.za</a> <a href="mailto:LetloenyaneM@dws.gov.za">LetloenyaneM@dws.gov.za</a> <a href="mailto:LenongP@dws.gov.za">LenongP@dws.gov.za</a> 051 4059281	<i>To be included in the Final</i>	<i>To be included in the Final</i>

**APPENDIX 4**  
**IMPACT AND RISK**  
**ASSESSMENT REPORT**



### Introduction

This report describes the environmental impacts and risks identified during the environmental impact assessment carried out for the borrow pit.

Environmental Impact Assessment is a structured approach for obtaining and evaluating environmental information prior to its use in decision-making in the development process. This information consists, basically, of predictions of how the environment is expected to change if certain alternative actions are implemented and advice on how best to manage environmental changes if one alternative is selected and implemented. NEMA through the EIA regulations requires that listed activities that have or are likely to have a detrimental effect on the environment should be authorised and a license applied for before commencement. An EIA must be done as stipulated in the EIA regulations made under section 24(5) of NEMA. The EIA process used for this project refers to the process dictated by the 2014 EIA regulations which involves the identification and assessment of direct, indirect and cumulative environmental impacts of a proposed project. In addition to this the specific requirements for environmental assessments as stipulated in the Minerals and Petroleum Resources Development regulations were also taken into account to ensure that all aspects of the impacts and risks were taken into account.

The report contains the following appendixes to comply with the requirements of the Basic Assessment Report and Environmental Management Plan:

APPENDIX 4.1: Nature of the Impacts and Risks Identified.

APPENDIX 4.2: Methodology Used in Assessing the Impacts and Consequences.

Appendix 4.3: Assessment of the Impacts and Risks before Mitigation.

Appendix 4.4: Possible Mitigation Measures that could be applied and the level of risk.

Appendix 4.5: Assessment of the Impacts and Risks after Mitigation.

Appendix 4.6: Assessment of the No-Go Alternative.

<b>APPENDIX 4.1: IMPACTS AND RISK IDENTIFIED INCLUDING THEIR NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, PROBABILITY AND REVERSIBILITY</b>
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1) DESCRIPTION OF THE NATURE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

a) Destruction of Flora and Habitat Loss

The borrow pit establishment will result in net vegetation loss during the establishment and the operational phases. Net vegetation loss will result in secondary impacts on fauna due to habitat loss. Direct loss or damage to habitat leads to reduced foraging/food resources, disturbance and displacement of fauna. If invasive weeds find themselves in the area as a result of being accidentally carried into the area, for example along tyres of vehicles, there might be a weed invasion/proliferation of opportunist species. This will threaten indigenous vegetation species. Whilst assessment noted that the site does not have endangered or protected plant species, the removal of vegetation needs to be carefully managed to limit the impacts.

b) Air Quality Deterioration

Stripping of soil and vegetation and excavating for gravel can result in dust emissions. Dust can cause adverse environmental impacts such as soiling of property or surfaces, visual impacts and personal discomfort (for example, gritty eyes) and can also cause considerable annoyance to people and respiratory problems for sensitive people. It can be a very contentious issue, particularly for heavy dusty activities. Wind whipping can result in dust emission from stockpiles and bare surfaces. The mobilisation of vehicles and equipment on site can result in excessive vehicular emissions such as smoke if they are not properly maintained. Dust pollution can also be very problematic due to the concentration of heavy machinery and vehicle on the gravel access roads in the area during the operational phase.

c) Visual Impact

Disturbance of the borrow pit area and excavated areas can cause visual scarring of the environment if not properly handled. Before rehabilitation, during operational phase, the borrow pit surfaces with bare patches may contrast with the surrounding area that has vegetation, making the site unpleasant.

d) Land and Soil Contamination and Erosion Impacts

Soil surface erosion, loss of topsoil and deterioration of soil quality and productivity may occur due to the removal of stabilising vegetation from certain areas in order to facilitate construction. Soils may also be compacted by heavy vehicles and construction equipment. Once disturbed, soils become more susceptible to erosion. Also associated with land pollution is the disposal of waste. Careless unregulated waste management practices during operation of the borrow pit will exacerbate this problem. Oil and fuel leakages from the vehicle and material stored can cause soil contamination by hazardous substances if they occur. Improper disposal of food cartons and other domestic forms of mining garbage could lead to littering of the site and pollution.

e) Water Conservation and Water Pollution

The borrow pit operation will require use of water mainly for dust suppression. Water is a scarce resource and needs to be conserved. The impact of using water resources for dust suppression should be weighted up against the impact of dust.

f) Disruption of Surface Drainage

Failure to incorporate drainage control systems on site and from excavated area can lead to interruption of natural drainage. Natural movement of surface water might be changed. The

borrow pit might form a pool(s), depriving areas that normally get surface water, of the resource. Ecosystem functions that depend on natural water surface drainage of the area will be negatively affected. Drowning of animals may occur in the formed pools.

g) Slope Instability

Unstable slopes or slope failure of excavated surfaces may result in safety problems if the excavation is not managed.

h) Erosion

Removal of vegetation cover and the disturbance of soils can lead to soil erosion during rainy periods where soil is loose.

i) Noise and Vibration

The proposed borrow pit development is anticipated to cause increased noise levels in the area during the operational phase, due to the movement of construction vehicles and machinery. If drilling and blasting is done this can be a major source of noise. Noise and vibration generated during operational phase has the potential to cause annoyance and disturbance effects on noise sensitive receptors, ear damage to workers and cause damage to structures as a result of vibration if operations are not handled properly. While there are not houses nearby noise will still require to be properly managed to reduce its impact.

j) Increased Risk of Fire

The presence of construction workers and borrow pit operational related activities poses an increased risk of veld fires. The potential risk of veld fires is heightened during windy conditions in the area. Fire may result in the loss of grazing vegetation and would therefore impact negatively on the affected community's livelihoods. Changes to the fire regime may impact on ecosystem integrity and biodiversity in the long term.

k) Increased Water Consumption

Although no mineral processing will take place, the borrow pit operation will require water mainly for dust suppression. This has the effect of adding to the current water consumption in the area.

l) Safety and Security Risks

Conduct of quarry workers is also important in considering public safety. Trespassing and illegal access onto private land may compromise the safety of local communities. The presence of workers also increases the potential risk of stock theft and poaching. The movement of construction workers on and off the site also poses a potential threat to farm/plots/communal infrastructure, such as fences and gates, which may be damaged. It can also overload community infrastructure/facilities. Stock and game losses may also result from gates being left open and/or fences being damaged. The applicant and the appointed contractor will need to have the necessary management and control procedures in place for this. Excessive dust generated on the un-surfaced gravel access road due to the high concentration of vehicles at operational phase may affect visibility and create dangerous road conditions. As the borrow pit development is taking place in a farming area, collisions with livestock are likely to be present as a hazard.

m) Creation of Employment Opportunities and Skills Development

The development of the borrow pit is expected to create employment opportunities during construction of roads in the area. Some will be low skilled positions (i.e. labourers and security staff etc.) and semi-skilled workers (i.e. drivers, equipment operators etc.) and some skilled personnel (i.e. engineers, land surveyors, project managers etc.) Although the development of

the borrow pit is a small operation and does not guarantee the generation of significant employment opportunities there is need to maximise the employment opportunities for the locals.

n) Skills Development Impacts

In terms of training, the contractors are likely to provide on-site training and skills development opportunities. The training should provide for meaningful skills development for members from the local community.

<b>APPENDIX 4.2: METHODOLOGY USED IN DETERMINING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF THE POTENTIAL IMPACTS</b>
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The borrow pit development will result in a number of environmental impacts and risks so it is important to determine the critical ones so that effort can be concentrated in managing them. The following criterion was used to determine the significance of the impacts. The criterion takes into account the nature of the impact, the duration, the extent, the magnitude and the likelihood of occurrence to determine the significance of the potential impact.

The following ratings will be used.

The extent indicates whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high). The scores are as follows:

- 1 - Local immediate area
- 2 - Local immediate area and surroundings
- 3 - Regional
- 4 - National
- 5 - International

The duration was assigned a score of 1 to 5 where:

- 1 - The lifetime of the impact will be of a very short duration.
- 2 - The lifetime of the impact will be of a short duration.
- 3 - Assigned to medium-term (5–15 years)
- 4 - Assigned to long term (> 15 years)
- 5 - Permanent.

The magnitude, quantified on a scale from 0-10, where a score is assigned:

- 0 - is small and will have no effect on the environment
- 2 - is minor and will not result in an impact on processes
- 4 - is low and will cause a slight impact on processes
- 6 - is moderate and will result in processes continuing but in a modified way
- 8 - is high (processes are altered to the extent that they temporarily cease)
- 10 - is very high and results in complete destruction of patterns and permanent cessation of processes

The probability of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, score of 1–5 where:

- 1 - is very improbable (probably will not happen)
- 2 - is improbable (some possibility, but low likelihood)
- 3 - is probable (distinct possibility)
- 4 - is highly probable (most likely)
- 5 - is definite (impact will occur regardless of any prevention measures)

The significance, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high. The significance is determined by combining the criteria in the following formula:

$S = (E+D+M) P; \text{ where } S = \text{Significance weighting}$
---

E = Extent, D = Duration, M = Magnitude, P = Probability

The status of the impact describes whether the impact will have positive, negative or neutral ramifications of the environment.

The significance weightings for each potential impact are as follows:

<u>Value</u>	<u>Significance</u>
<30 points	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
30-60 points	Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
>60 points	High (i.e. where the impact must have an influence on the decision process to develop in the area)

**APPENDIX 4.3: THE ASSESSMENT OF IMPACTS BEFORE MITIGATION OF THE IMPACTS**

	Activity	Impact	Positive /Negative	Duration	Magnitude	Extent	Probability	Significance Rating Before Mitigation		Is Impact Reversible? Yes/No	Irreplaceable Loss of Resources? Yes/No
	START-UP ACTIVITIES										
1	Site establishment activities, vegetation stripping	Loss of vegetation	Neg	2	2	1	5	30	Low	Reversible	No
		Habitat destruction	Neg	2	4	1	3	30	Low	Reversible	No
		Visual scarring	Neg	2	4	2	4	32	Medium	Reversible	No
		Air quality deterioration	Neg	2	2	2	4	24	Medium	Reversible	No
		Soil erosion	Neg	2	2	2	4	24	Low	Reversible	No
		Potential loss of agricultural potential	Neg	1	8	2	2	22	Low	Reversible	No
		Impact of use of water during all operations	Neg	2	2	2	3	28	Low	Reversible	No
		Safety and security	Neg	2	2	2	1	6	Low	Reversible	No
2	Soil stripping and stockpiling	Dust	Neg	2	4	2	4	32	Medium	Reversible	No
		Disruption of drainage	Neg	3	2	2	3	21	Low	Reversible	No
	DURING OPERATIONAL PHASE										
3	Clearance of area for mining	Visual impact	Neg	2	6	1	5	45	Medium	Reversible	No
		Destruction of flora and habitat	Neg	2	3	1	5	30	Low	Reversible	No
		Loss of agricultural potential	Neg	1	8	2	2	22	Low	Reversible	No
4	Gravel excavation	Dust emissions	Neg	2	4	2	5	40		Reversible	No
		Drainage disruption	Neg	1	2	2	2	26	Low	Reversible	No
		Slope instability	Neg	2	4	1	3	21	Low	Reversible	No

	Activity	Impact	Positive /Negative	Duration	Magnitude	Extent	Probability	Significance Rating Before Mitigation		Is Impact Reversible? Yes/No	Irreplaceable Loss of Resources? Yes/No
		Noise	Neg	1	4	1	4	24	Low	Reversible	No
		Visual Scarring	Neg	2	4	2	4	32	Medium	Reversible	No
		Soil erosion	Neg	2	2	2	4	24	Low	Reversible	No
		Altered topography	Neg	2	4	2	4	32	Medium	Irreversible	No
5	Drilling & blasting	Noise and vibrations	Neg	1	8	1	5	50	Medium	Reversible	No
		Dust	Neg	1	4	1	5	30	Medium	Reversible	No
6	Stockpiles	Dust	Neg	2	4	1	3	21	Low	Reversible	No
		Surface disturbances	Neg	2	2	1	3	15	Low	Reversible	No
		Drainage disruption	Neg	2	2	1	3	15	Low	Reversible	No
7	Material handling, hauling and transportation	Dust	Neg	2	2	2	4	24	Low	Reversible	No
		Increased risk of accidents	Neg	2	2	1	2	10	Low	Reversible	No
		Noise	Neg	2	2	1	3	15	Low	Reversible	No
		Soil contamination from oil/fuel leaks	Neg	2	2	1	3	15	Low	Reversible	No
8	Waste Disposal and Material storage	Soil contamination	Neg	2	2	1	3	15	Low	Reversible	No
		Water pollution	Neg	2	2	2	3	18	Low	Reversible	No
		Increased risk of fire	Neg	2	2	1	3	15	Low	Reversible	No
<b>DURING CLOSURE AND POST CLOSURE</b>											
9	Decommissioning of site and shaping of borrow pit	Noise	Neg	1	2	1	3	12	Low	Reversible	No
		Dust	Neg	1	2	1	3	12	Low	Reversible	No
		Soil contamination from oil/fuel	Neg	1	2	1	3	12	Low	Reversible	No
		Disruption of surface drainage	Neg	1	2	1	3	12	Low	Reversible	No

	Activity	Impact	Positive /Negative	Duration	Magnitude	Extent	Probability	Significance Rating Before Mitigation		Is Impact Reversible? Yes/No	Irreplaceable Loss of Resources? Yes/No
	<b>SOCIO ECONOMIC IMPACTS</b>										
10	Negative socio-economic impacts	Community conflicts and tensions	Neg	2	2	2	2	12	Low	N/A	N/A
		Increase risk of fire	Neg	2	2	1	2	10	Low	N/A	N/A
		Reduced security in area	Neg	2	2	1	2	10	Low	N/A	N/A
11	Positive socio-economic impacts	Employment opportunities	Pos	2	2	1	2	10	Low	N/A	N/A
		Training and Skills Development	Pos	2	2	1	2	10	Low	N/A	N/A
	<b>HERITAGE RESOURCES IMPACTS</b>										
11	Heritage impacts	Potential impacts associated with site of a cultural or archaeological importance	Neg	5	2	1	1	8	Low	Irreversible	Irreplaceable if it occurs
	<b>CUMULATIVE IMPACTS</b>										
12		Increased loss of vegetation	Neg	2	4	1	4	30	Low	Reversible	No



## **APPENDIX 4.4: POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK**

### **1. INTRODUCTION**

These technical and management processes in this section have been developed to enable the applicant to mitigate negative environmental impacts and to provide a proactive approach to manage identified environmental risks. It provides systematic and explicit mitigation and monitoring measures for the proposed borrow pit to ensure implementation during the planning, construction, operational and decommissioning phase of the project.

### **2. PERMITS AND PERMISSIONS**

All pertinent permits, approvals and agreements are to be obtained before activities commence on site and the conditions are to be strictly adhered to.

### **3. GENERAL SITE ESTABLISHMENT**

Objective: To ensure proper control of the mining area

Management measures

- Access at the borrow pit shall be controlled and adequate precautions taken to prevent unauthorised entry to the borrow pit. A fence or other barrier should be erected to restrict access.
  - The area must be clearly demarcated along its boundaries.
  - Permanent beacons must be firmly erected and maintained in their correct position throughout the life of the operation.
  - Resultant operations shall only take place within this demarcated area.
  - Borrow pit boundaries shall be signposted and laid out so as to be clearly visible and identifiable.
  - Entry to the borrow pit area shall be controlled and unauthorised entry prohibited.
  - Adequate precautions shall be taken to protect persons present at, or in the vicinity of, the borrow pit from risks that may arise from borrow pit operations.

Time Schedule for Implementation: At start up and throughout life of mine.

### **4. MINING AREA LAYOUT PLAN**

Objective: To ensure proper control of the mining area

Management measures

- A copy of the layout plan of the borrow pit must be available at the mining site for scrutiny when required.

- The plan should be updated on a regular basis with regards to the actual progress of establishment of surface infrastructure, mining operations and rehabilitation.
- The final layout plan must be submitted to DMR at the closure of the borrow pit or when operations have ceased.
- Beacons as indicated on the layout plan or as prescribed by the DMR must be firmly erected and maintained in their correct positions throughout the life of the operations.

Time Schedule for Implementation: At start up and throughout life of mine.

## 5. ESTABLISHMENT OF SITE OFFICE / CAMP

- The planning and design for the Construction Camp must ensure that there is a minimum impact on the environment. Where possible existing infrastructure and disturbed areas must be used.
- No construction camps will be allowed in sensitive areas such as wetlands and offices and camp sites shall be established, as far as is practicable, outside the flood plain, above the 1 in 50 flood level mark within the boundaries of the road area.
- The area chosen for these purposes shall be the minimum reasonably required and which will involve the least disturbance to vegetation.
- No trees or shrubs will be felled or damaged for the purpose of obtaining firewood. Fires will only be allowed in facilities or equipment specially constructed for this purpose and only in areas demarcated for that purpose. If required by applicable legislation, a firebreak shall be cleared around the perimeter of the camp and office sites.
- Adequate firefighting equipment must be available at all areas that might pose a fire risk.
- Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner/tenant/persons lawfully living in the vicinity shall be kept to a minimum.
- Chemical toilet facilities or other approved toilet facilities should be sited in such a way that they do not cause water or other pollution. The use of existing facilities must take place in consultation with the owners of the facilities.
- In cases where facilities are linked to existing sewerage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to.
- Only domestic type wash water shall be allowed to enter a French drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and treated prior to discharge or removed from the site for appropriate disposal at a recognised facility.
- Adequate waste receptacles should be made available for waste collection on site prior to removal for disposal at an authorised waste disposal facility.
- Adequate storage facilities should be available for materials. The nature of the storage facilities should be as per the recommendations of the manufacturer. The storage areas shall be securely secured and appropriately marked to indicate the goods in the storage.
- Provisions shall be made for the storage of hazardous substances and stocks. Diesel and oil, etc. shall be stored in areas with impervious flooring such as concrete and

will be bunded with a total capacity to obtain 110% of the volume stored. Drip pans, a thin concrete slab or other impervious surfaces shall be installed in such storage areas with a view to prevent soil and water pollution.

Time Schedule for Implementation: At start up and throughout life of mine.

## 6. ACCESS ROADS ON THE SITE

- The access road to the area and the campsite/site office must be established in consultation with the landowner/tenant and existing roads shall be used as far as practicable.
- Should a portion of the access road be newly constructed, the route shall be selected that a minimum number of bushes or trees are felled, and existing fence lines shall be followed as far as possible. Adequate drainage and erosion protection shall be provided where necessary.
- The erection of gates in fence lines and the open or closed status of gates in new and existing positions shall be clarified in consultation with the landowner/tenant and maintained throughout the operational period.
- No other routes will be used by vehicles or personnel for the purpose of gaining access to the site except designated areas only.
- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities must be made with the other users. If not, the maintenance of access roads will be the responsibility of the appointed contractor/borrow pit operator.
- Traffic controls/signage should be installed as appropriate, particularly in advance of temporary route changes or deviations and alternatives should be provided as necessary to maintain required access.
- Movement of heavy earth moving machinery should be restricted to certain access roads.
- Access roads shall be adequately maintained to minimise dust, erosion or undue surface damage. Spraying with water or use of dust suppressants shall be done as is necessary.

Time Schedule for Implementation: At start up and throughout life of mine.

## 7. MANAGING SOCIAL IMPACT RELATED ISSUES

- Effective two-way public disclosure and public consultation should be implemented to allay community perceptions. There should be an opportunity provided for the resolution of grievances or complaints received and recorded from individuals in the community.
- Community should be adequately informed in advance of activities being done at the borrow pit that are likely to affect them.
- Labour recruitment should occur in a manner that is objective, transparent, and wherever possible, provide opportunities for people from the local area.
- The activities of contractors, consultants, and company employees should be routinely reviewed to ensure good community relations are being maintained. The

project proponent should use its influence as employer to encourage responsible behaviour among employees.

- The landowner should be fully compensated prior to usage of his land for mining and he should be notified when operations commence and who will work on the site.
- An agreement should be made with the landowner that he is satisfied with the level of rehabilitation on completion of the mining.

## 8. SPECIFIC MITIGATION MEASURES FOR ENVIRONMENTAL IMPACTS AND RISKS

### 4.1 MANAGING SOIL IMPACTS

These measures are targeted at managing soil erosion, soil contamination, compaction of soil and removal of topsoil.

- The area that is stripped of vegetation should be kept to an absolute minimum.
- The contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage and unnecessary movements should be prohibited.
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. The soil is to be stored and the soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- Topsoil shall be stored separately from subsoil and other overburden material.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
- The contractor shall apply soil conservation measures to the stockpiles to prevent erosion.
- Ensure regular maintenance of equipment to prevent diesel and hydraulic spillages.
- Where possible ensure low work surface gradients so that run-off flows at a controlled rate so as to minimize channelling and soil erosion during high rainfall.
- At the end of operations, all disturbed areas shall be re-vegetated.

**TIMING:** At Start up and throughout the operational phase of the borrow pit

### 4.2 LOSS OF VEGETATION AND HABITAT DESTRUCTION

- Clearance of vegetation should be restricted to the absolute minimum required to facilitate access and undertake borrow pit activities. Disturbance of topsoil and vegetation rootstock must be minimized as far as possible.
- Trees larger than 2m should not be removed unless it is absolutely necessary and cannot be avoided.
- No protected species must be removed without a permit. A final walk-through must be done by an ecologist to ensure that the areas where vegetation is to be cleared do not have protected species.
- Any alien species identified should be cleared.
- Burning of any waste material is not permitted under any circumstances.

- Rehabilitation strategies following operational activities must ensure that appropriate indigenous plant species are used and should be done as per rehabilitation plan.

TIMING: At Start up and throughout the operational phase of the borrow pit

#### 4.3 DUST AND VEHICLE FUMES

- Avoid unnecessary excessive vehicle movement.
- Limit vehicle speeds on unsurfaced roads.
- Rehabilitate disturbed areas with vegetation as soon as operation is completed.
- Maintain equipment and vehicles in good working order to avoid excessive emissions.
- Borrow pit working floors should be sprayed with water from time to time to reduce dust emission during operations.
- The use of rubber curtains/other material to limit dust during screening should be considered.
- Spray roads, material stockpiles and screening areas with water if dust becomes problematic.
- No fires should be allowed on the borrow pit site.

TIMING: Throughout life of mine

#### 4.4 WASTE DISPOSAL

- All personnel must be instructed to dispose of waste in a proper manner.
- Suitable receptacles shall be available at all times and conveniently placed for the disposal of waste.
- No waste shall under any circumstance be disposed of in the veldt. No burning of waste is permitted on site and the borrow pit area should be protected from illegal dumping of waste.
- All used oils, grease or hydraulic fluids shall be placed in appropriate impervious containers and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility or sent for recycling/reuse with a registered facility.
- Spills should be cleaned up immediately by removing the spillage together with the polluted soil and by disposing thereof at a recognised facility. In areas where the spills are small, a tested absorbent agent can be used, and the area treated accordingly.
- Contaminated materials and residues from machinery maintenance and other sources contaminated with hazardous waste should be stored in proper containers that avoid seepage to the ground.
- The 'reduce, reuse, recycle' waste management philosophy will be used where possible.
- Only authorized registered waste disposal contractors should be hired for collection of waste for all waste streams

TIMING: At Start – up and throughout the operational phase of the borrow pit

#### 4.5 STABILITY OF EXCAVATIONS

- Excavations shall take place only within the approved demarcated borrow pit area and appropriate barriers should be put as necessary.

- The appointed contractor/borrow pit operator shall ensure that a place of work, whether temporary or permanent in or near the excavation has a structure and solidity appropriate to its use and is operated, supervised and maintained, so as to withstand the environmental forces anticipated and be safe.
- The appointed contractor/borrow pit operator shall ensure that material is not placed, stacked or used at the borrow pit near the edge of any excavation, where it is likely to endanger people at work and equipment or where it is likely to cause collapse of the side of the excavation.
- Excavations should be routinely inspected. If cracks occur in any structure they need to be investigated to ascertain if there is a risk to safety.
- Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the mineral or gravel has been excavated.
- Appropriate drainage provisions must be constructed as necessary to accommodate the surface water movement. If the water table is reached during excavations, appropriate pumping facilities should be provided.
- Excavated areas should be kept in a safe and stable manner. No unstable block should be present. Reshaping of the borrow pit may need to be done to ensure that this objective is reached. The profiling should be done to match the surrounding landscape.
- The borrow pit should be finished in such a manner that it is self-draining as far as is possible.
- Topsoil should be put back on the surfaces and the areas re-vegetated.

TIMING: During operational phase, closure and post closure of the borrow pit

#### 4.6 VISUAL IMPACTS

- The excavated area must serve as a final depositing area for the placement of overburden. Rocks and coarse material removed from the excavation must be backfilled into the excavation.
- Once excavation parts that can be filled have been refilled with overburden, rocks and coarse natural materials, the borrow pit shall be profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area. The profiling shall be done to match the surrounding landscape as far as is reasonable possible.
- The area shall be fertilised if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, then there may be need for the soil to be analysed and any deleterious effects on the soil arising from the borrow pit, be corrected and the area be re-seeded with a suitable vegetation seed mix

TIMING: At Start up and throughout the whole life of the borrow pit

#### 4.7 EQUIPMENT USED ON SITE

- Only well-maintained vehicles and equipment should be operated on site and all machinery should be serviced regularly during the borrow pit operation to limit environmental impacts as a result of spillage, emissions and noise.
- The maintenance of vehicles and some equipment used for any purpose during the borrow pit operation will take place only in the maintenance workshops which are not located on the borrow pit. No vehicle may be extensively repaired in any place other than in the maintenance yard.
- A maintenance schedule should be prepared in order to ensure that equipment is in its best form
- Machinery or equipment used on the borrow pit area must not constitute a pollution hazard. No equipment leaking oil, fuels etc should be used. Drip tray should be used to prevent pollution

TIMING: At Start up and throughout the operational phase of the borrow pit

#### 4.8 NOISE

- Construction activities required outside normal working hours must be approved by the Project Manager, and where necessary, advance warning provided to adjacent residents.
- Noise levels exceeding 85dB shall only be permitted where approved and with appropriate advanced warning to adjacent residents (minimum of 2 days) being provided.
- Noise that could cause a major disturbance should only be carried out during daylight hours and with advance warning provided as above.
- Adequate ear protection should be provided to employees in noisy areas.
- No amplified music shall be allowed at the site.
- Construction vehicles and plant to be in good working order.

TIMING: At Start up and throughout the operational phase of the borrow pit

#### 4.9 SAFETY AND SECURITY RISKS

- The borrow pit should be fenced off and adequate beacons put in place. Entry to the borrow pit area shall be controlled and unauthorised entry prohibited.
- Adequate precautions shall be taken to protect persons present at, or in the vicinity of, the borrow pit from risks that may arise from borrow pit operations.
- Adequate signage should be put in place regarding safety and to warn the public it is a mine.
- The appointed contractor/borrow pit operator should be held liable for damage to farm/community infrastructure that can be linked to construction workers.
- The appointed contractor/borrow pit operator should have a code of conduct governing activities of workers during the work at the borrow pit and ensure that all workers are informed of the conditions, specifically trespassing on adjacent farms/plots.
- Workers are only to use designated access roads for movement of material from or to site.
- Safety rules, such as the implementation of speed limits in particularly, restriction of heavy vehicle movements to specific access roads should be in place.

- There should be procedures for managing and storing waste on site that may pose a threat to livestock if ingested e.g. plastics.
- There should be mechanism to inform police of theft that occur on site.

TIMING: At Start up and throughout the operational phase of the borrow pit

#### 4.10 ALTERED TOPOGRAPHY IMPACTS

- Mining techniques used should try to avoid the creation of steep slopes.
- On completion of mining, the borrow pit is to be profiled and profiling shall be done to match the surrounding landscape as far as is reasonable possible.
- Slopes on finishing off the borrow pit should not exceed 3:1 to ensure slope stability and the easy re-establishment of vegetation. Gentler slopes are preferred.
- Appropriate drainage provisions must be constructed as necessary to accommodate the free surface water movement.
- On completion all slopes and disturbed areas are to be re-top soiled and re-vegetated in order to prevent erosion, improve aesthetics and regenerate the biodiversity of the site.

TIMING: During the operational and closing phase

#### 4.11 DEALING WITH EMERGENCIES

- The appointed contractor/borrow pit operator should identify all situations that can lead to emergency situations and provide response strategies. The situations should include fire and major chemical spill.
- Contact details of all departments/service providers to be contacted in case of an emergency shall be made available to employees.
- Equipment for dealing with emergencies such as spill kits, firefighting equipment, first aid boxes etc. shall be made available and personnel properly trained in its use.
- All the emergency equipment should be serviced, repaired and maintained as per supplier's specification or as per engineering specification to ensure that the equipment is in order. Service certificates should be kept on site and be available on inspection.
- All staff on site should be trained on how to handle emergency situations and emergency drills/ rehearsals should be conducted periodically to ensure that staff is prepared. The training shall be recorded.

TIMING: During the operational phase and whenever an emergency occurs during the operational and closing phase.



**APPENDIX 4.5 ASSESSMENT OF IMPACTS AFTER MITIGATION MEASURES**

	<u>Activity</u>	<u>Impact</u>	<u>Positive /Negative</u>	<u>Duration</u>	<u>Magnitude</u>	<u>Extent</u>	<u>Probability</u>	<u>Significance Rating after mitigation</u>	
	START-UP ACTIVITIES								
1	Site establishment activities, vegetation stripping	Loss of vegetation	Neg	2	4	1	3	21	Low
		Habitat destruction	Neg	2	4	1	3	21	Low
		Visual scarring	Neg	2	3	2	3	21	Low
		Air quality deterioration	Neg	2	2	2	3	18	Low
		Soil erosion	Neg	2	2	2	3	18	Low
		Potential loss of agricultural potential	Neg	1	6	2	2	18	Low
		Safety and security	Neg	2	2	1	1	5	Low
2	Soil stripping and stockpiling	Dust	Neg	2	4	2	2	16	Low
		Disruption of drainage	Neg	3	2	1	2	12	Low
	DURING OPERATIONAL PHASE								
3	Clearance of area for mining	Visual impact	Neg	2	4	1	3	21	Low
		Destruction of flora and habitat	Neg	2	4	1	3	21	Low
		Loss of agricultural potential	Neg	1	7	1	2	16	Low
4	Gravel excavation	Dust emissions	Neg	1	4	2	2	14	Low
		Drainage disruption	Neg	3	2	1	4	24	Low
		Slope instability	Neg	2	3	1	1	6	Low
		Noise	Neg	1	2	1	3	12	Low
		Visual Scarring	Neg	2	3	2	3	21	Low
		Altered topography	Neg	2	4	2	3	24	
		Soil erosion	Neg	2	1	2	3	15	Low
5	Drilling & blasting (if done)	Noise and vibrations	Neg	1	4	1	1	6	Low
		Air quality deterioration	Neg	1	3	1	1	5	Low
6	Stockpiles	Dust	Neg	1	2	1	2	8	Low
		Surface disturbances	Neg	1	2	1	2	8	Low
		Drainage disruption	Neg	1	2	1	2	8	Low
7	Material handling, hauling and transportation	Dust	Neg	2	2	1	3	15	Low
		Increased risk of accidents	Neg	1	2	1	3	12	Low
		Noise	Neg	1	2	1	3	12	Low
		Soil contamination from oil/fuel leaks	Neg	1	2	1	3	12	Low
8	Waste Disposal and Material storage	Soil contamination	Neg	1	2	1	3	12	Low
		Water pollution	Neg	1	2	1	3	12	Low
		Increased risk of fire	Neg	1	2	1	3	12	Low
	DURING CLOSURE AND POST CLOSURE								
9		Noise	Neg	1	2	1	2	8	Low

	<u>Activity</u>	<u>Impact</u>	<u>Positive /Negative</u>	<u>Duration</u>	<u>Magnitude</u>	<u>Extent</u>	<u>Probability</u>	<u>Significance Rating after mitigation</u>	
	Decommissioning of site and shaping of borrow pit	Air quality deterioration (dust)	Neg	1	2	1	2	8	Low
		Soil contamination from oil/fuel	Neg	1	2	1	2	8	Low
		Disruption of surface drainage	Neg	1	2	1	2	8	Low
	SOCIO ECONOMIC IMPACTS								
10	Negative socio-economic impacts	Community conflicts and tensions	Neg	1	2	2	2	10	Low
		Increased risk of fire	Neg	1	2	1	2	8	Low
		Reduced security in area	Neg	1	2	1	2	8	Low
11	Positive socio-economic impacts	Employment opportunities	Pos	2	2	2	3	18	Low
		Training and Skills Development	Pos	2	2	2	3	18	Low
	HERITAGE RESOURCES IMPACTS								
11	Heritage impacts	Potential impacts associated with site of a cultural or archaeological importance	Neg	5	1	1	1	7	Low
	CUMULATIVE IMPACTS								
12	Cumulative impacts	Increased loss of vegetation	Neg	2	4	1	2	14	Low

## APPENDIX 4.6: ASSESSMENT OF NO-GO ALTERNATIVE

The no-go alternative means that no further mining activities will take place on the site.

<u>Activity</u>	<u>Impact</u>	<u>Positive /Negative</u>	<u>Duration</u>	<u>Magnitude</u>	<u>Extent</u>	<u>Probability</u>	<u>Significance Rating</u>	
NO GO ALTERNATIVE								
Leaving area as is	Possible Land degradation	Neg	2	4	1	3	21	Low
	Potential for soil erosion	Neg	2	2	2	3	18	Low

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