

# DRAFT BASIC ASSESSMENT REPORT

## FOR BORROW PIT 5 & 9 ON

## REMAINDER PORTION OF MOILOS 412- JO

**DMR REF:**

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# **DRAFT BASIC ASSESSMENT REPORT**

## **FOR BORROW PIT 5 & 9 ON**

### **REMAINDER PORTION OF MOILOS**

#### **412-J0**

**Conducted on behalf of:**

North West Department of Public Works



**dpwr**

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Department:  
**Public Works and Roads**  
North West Provincial Government  
Republic of South Africa

**Compiled by:**

A handwritten signature in black ink, appearing to read 'Chigurah'.

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Charles Chigurah

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**mineral resources**

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

## **FINAL BASIC ASSESSMENT REPORT**

**And**

## **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**DMR REF:**

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

**NAME OF APPLICANT:** North West Department of Public Works and Roads

**TEL NO:** 018 388 1371

**FAX NO:**

**POSTAL ADDRESS:** Private Bag X 2037

**PHYSICAL ADDRESS:** Modiri Molema Road, Old Parliament Complex, Provincial Head Office,  
Mmabatho

**FILE REFERENCE NUMBER SAMRAD:**

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## IMPORTANT NOTICE

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

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

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

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

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

## OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

## **PART A**

### **SCOPE OF ASSSMENT AND BASIC ASSESSMENT REPORT**

## **2 CONTACT PERSON AND CORRESPONDENCE ADDRESS**

### ***2.3 Details of the***

#### **2.3.1 Details of the EAP**

Name of The Practitioner: Charles Chigurah

Tel No.: 073 565 8847

E-mail address : [charles@senzomanzi.co.za](mailto:charles@senzomanzi.co.za)

#### **2.3.2 Expertise of the EAP**

##### **2.3.2.1 The qualifications of the EAP (with evidence)**

Charles Chigurah holds an honors degree in Environmental Management from the Midlands State University in Zimbabwe. Postgraduate Diploma in Water Supply and Sanitation from the Institute of Water Supply, Sanitation and Development in Zimbabwe. He holds SAMTRAC and he is currently finalizing his NEBOSH International Diploma in Occupational Safety and Health. He is a Senior SHE Consultant and a member of International Association of Impact Assessors (IAIA), South African Council for Natural Scientific Professions (SACNASP). Charles is a member of Institute of Waste Management in Southern Africa (IWMSA), and he is registered with the South African Council for Project and Construction Management Professions (SACPCMP) as a Construction Health and Safety Manager (CHSM). He has more than 9 years working experience in the field of Construction, Waste Management, Environmental Management and Environmental Management Systems (EMS) Implementation and Auditing and has published a paper in Geographical Information Systems (GIS) and Remote Sensing. He has worked on a number of municipality projects and herewith is selected few completed projects:

- a) Integrated Waste Management Plan for Nkonkobe Local Municipality
  - b) Integrated Waste Management Plan for Tokologo Local Municipality
  - c) Integrated Environmental Management Plan for Xhariep District Municipality
  - d) Environmental Management Framework for Amajuba District Municipality
-

## e) Integrated Waste Management Plan for Tubatse-Fetakgomo Local Municipality

Apart from doing municipality projects, Charles has also managed more than fifty (50) Environmental Impact Assessment Projects both in Zimbabwe and South Africa. He has also worked as a Construction SHE Advisor and Consultant on a number of major construction projects across South Africa, among them include the construction of multi-storey buildings in Mpumalanga and Limpopo Provinces; the construction of gas pipelines for Sasol in Gauteng, the construction and upgrades of road networks in Limpopo Province as well the construction and upgrades of Bulk Water and Sewer Systems for Ekurhuleni Metropolitan Municipality and was also a Safety Advisor for Eskom Hendrina Power Station responsible for managing sub-contractor's safety officers. For detailed CV of the EAP refer to Appendix 5

## 2.4 Location of the overall Activity

**Table 1: Location details**

Farm Name:	Remainder Portion of Moilos 412-J0
Application area (Ha):	3.510ha
Magisterial district:	Lobatla
Distance and direction from nearest town:	60km West of Zeerust town.
21-digit Surveyor General Code for each farm portion:	T0J000000000412000001

## 2.5 Locality map

**(Show nearest town, scale not smaller than 1:250000)**

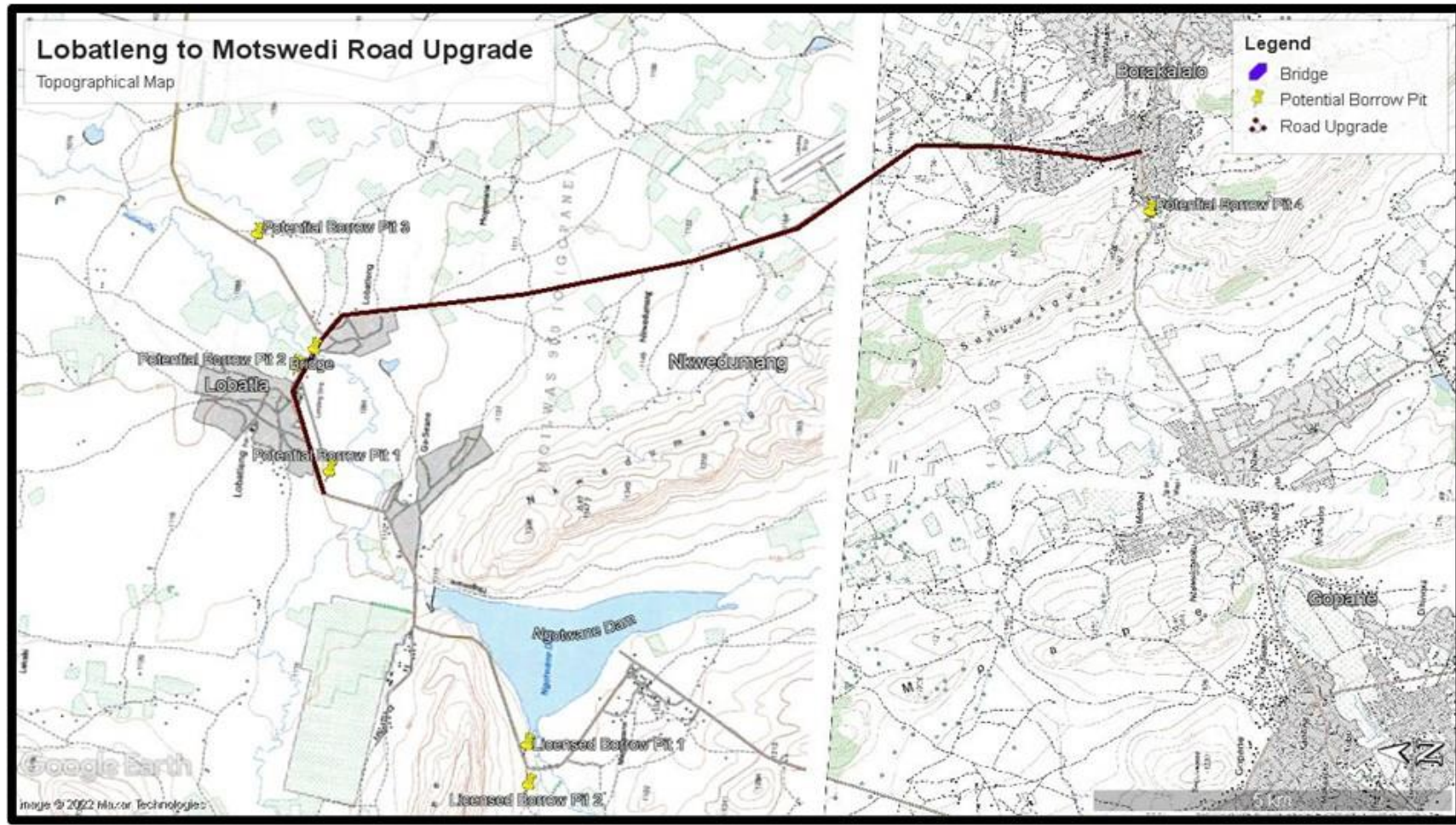


Figure 1: Topographical locality map of the proposed project area





Figure 2: Google earth map of the study area

## ***2.6 Description of the scope of the proposed overall activity***

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

Refer to Figure 3 for a Site Plan of the Area.

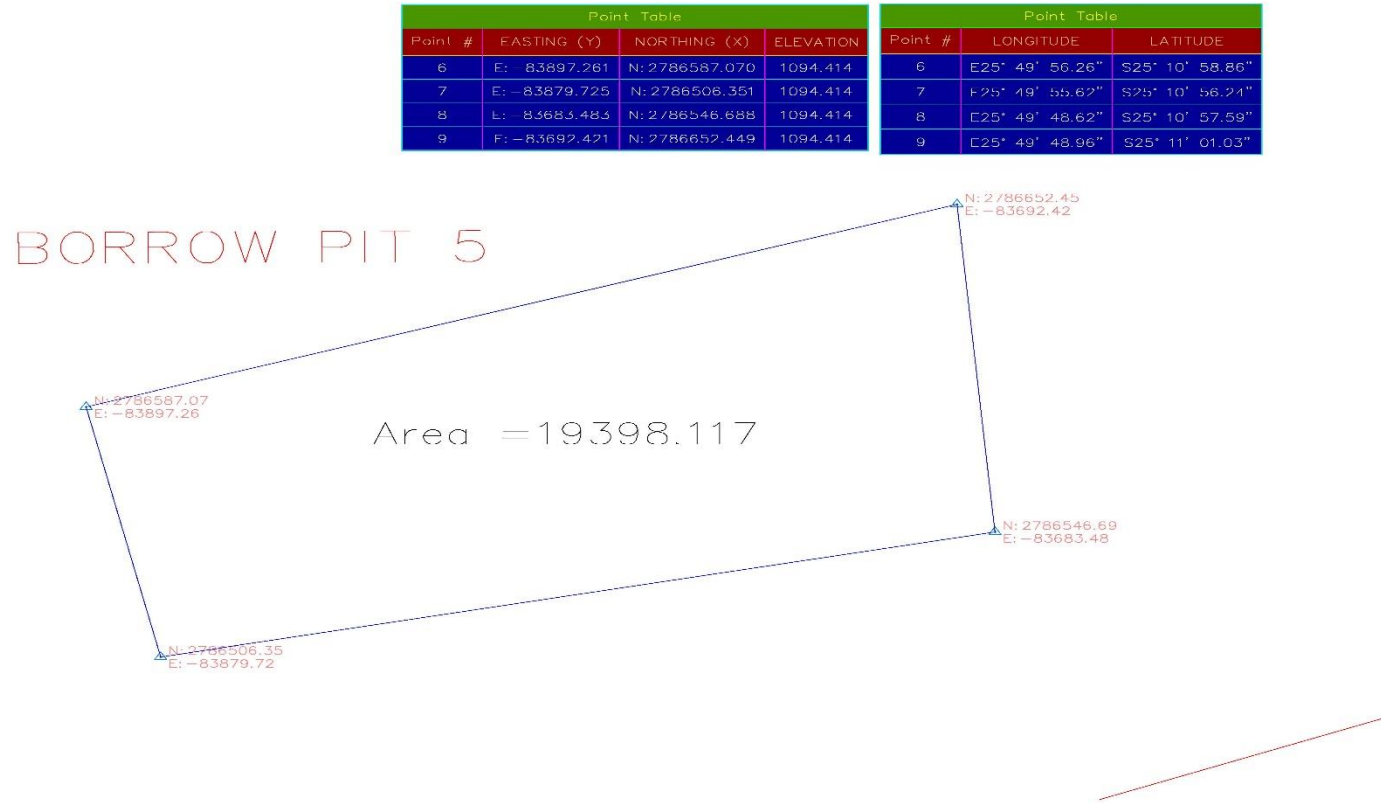


Figure 3: Site layout for borrow pit 5

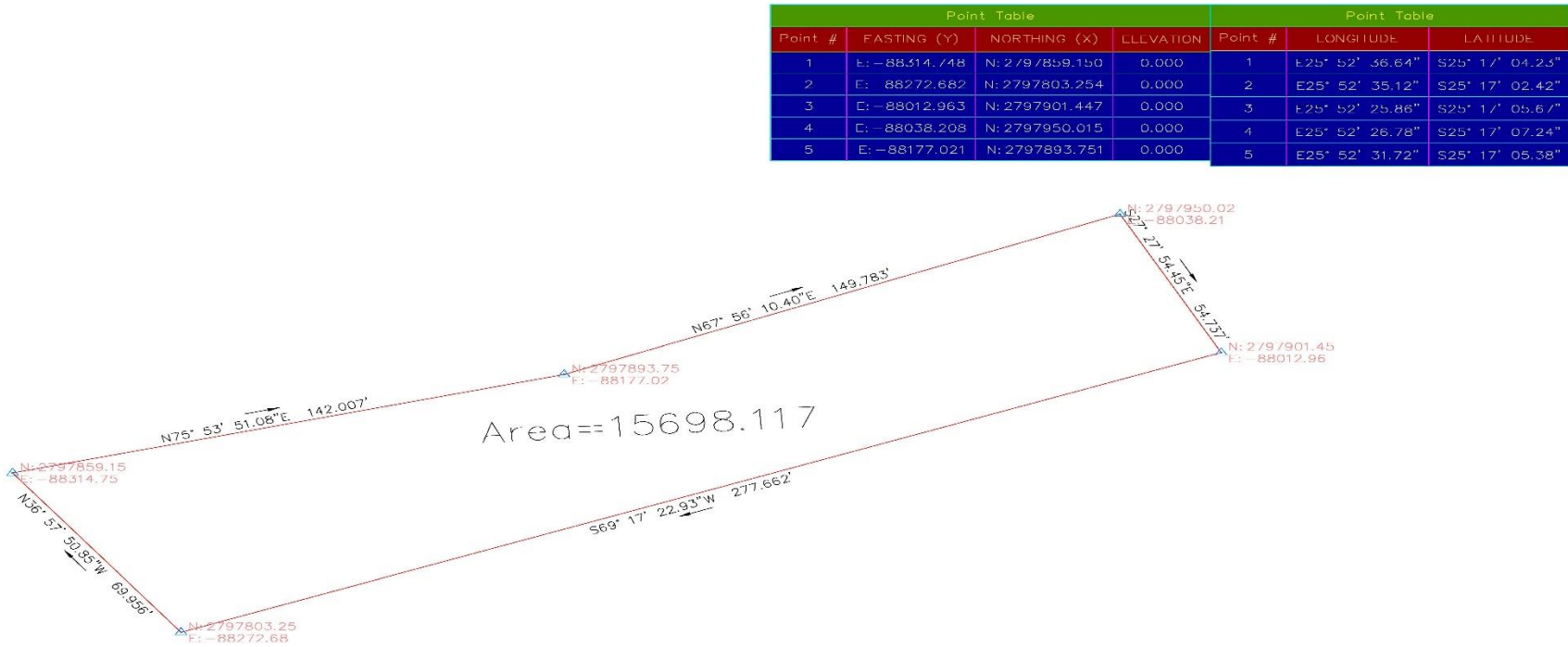


Figure 4: Site layout for borrow pit 9

## 2.6.1 Listed and specified activities

Section 16 of the MPRDA requires, upon request by the Minister that an EMPr be submitted, and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that activities, which may potentially affect the environment negatively, must obtain an environmental authorisation from a relevant authority before the activities may commence.

Such activities are listed under the Environmental Impact Assessment (EIA) Regulations (2014 which has been amended in 2017) and consist of:

- EIA Process (Government Notice Regulation (GNR) 982);
- Listing Notice 1, GNR 983 – Basic Assessment process,
- Listing Notice 2, GNR 984 – Scoping and EIA process;
- Listing Notice 3, GNR 985 – Activities in specific identified geographical areas only.

GNR 982, 983, 984 and 985 have been amended in 2017 through GNR 324, 325, 326 and 327, respectively. The purpose of these regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed mining activity triggers activities listed in NEMA GNR 983: Listing Notice 1 as follows:

*Activity 21: “Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including —*

*(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or*

*(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies”.*

*Activity 27: “The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for:*

*(i) The undertaking of a linear activity; or*

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(ii) Maintenance purposes undertaken in accordance with a maintenance management plan

Table 2 below indicates the listed activities being applied for

**Table 2: Summary of NEMA Listed activities applied for**

<b>NAME OF ACTIVITY</b> <b>(E.g., For prospecting -</b> drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route <b>etc...etc...etc</b> <b>E.g. for mining, -</b> excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	<b>Aerial extent of the Activity</b> <b>Ha or m<sup>2</sup></b>	<b>LISTED ACTIVITY</b> (Mark with an <b>X</b> where applicable or affected).	<b>APPLICABLE LISTING NOTICE</b> <b>(GNR 544, GNR 545 or GNR 546)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b> (Indicate whether an authorisation is required in terms of the Waste Management Act). <b>(Mark with an X)</b>
Mining ; sourcing construction material for borrow areas The excavation of borrow pits for material to be used for the road construction	13.37 Ha	X	GNR327 (EIA Listing Notice 1) Activity 20	N/A
Access road establishment	Less than 4 m	Not triggered	N/A	N/A
Laydown area	1 Ha	X	GNR327 (EIA Listing Notice 1) Activity 20	N/A

## **2.7 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)

### **2.7.1 Pre-Mining**

The primary activities associated with the pre-construction (pre-mining) of the borrow pit areas include the following:

- Detailed geotechnical investigations to be completed.
- Contractor to confirm the mining process and to develop a method statement for the excavation and operation of the borrow pits.
- Contractor to develop a Mining Plan, which includes the layout of mining activities and features such as fencing arrangements, access, aggregate stockpiles, topsoil stockpiles, container stores, crushing plant, office and support facilities, haul roads, 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 areas.
- Remove and safe storage (temporary stockpiles) of topsoil and remaining overburden material for rehabilitation.

### **2.7.2 Mining**

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

- Site drainage and stormwater to be managed e.g., construct sediment holding basins and divert up-slope water around the borrow pit area).
- Manage borrow pits, 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 pits 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 and businesses 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 construction, will be loaded onto haul vehicles (i.e. tipper trucks) by a front-end loader, where the material will then be transported to the necessary construction sites.

### **2.7.3 Closure and Rehabilitation**

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

- 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 pits excavated; and
- Site stabilisation:
  - ✓ The borrow pits will be graded, re-vegetated and grassed with indigenous grasses in order to blend with surrounding environment. Hydro-seeding and fertilisation will be applied to the borrow pits.
- Closure of borrow area:
  - ✓ A Closure Plan will also be required for the proposed borrow pits. 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:

- Excavators
  - Bulldozers, front-end loaders, backactors;
  - Tipper trucks;
  - Graders
  - Water trucks; 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.

Rehabilitation measures to be implemented 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.
- The contractor must re-establish any grass and vegetation within the road reserve and borrow pit areas that was disturbed during construction. All alien vegetation must be removed from the road reserve and borrow pit areas.
- Upon completion of all construction activities, all structures, equipment, materials, waste, rubble, notice boards along the entire length of the road and at the borrow pit areas must be removed from site.
- The decommissioning of the site camp must be done in such a manner to cause the least environmental impact.
- 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 construction activities
- Re-vegetation shall take place at the start of the rainy season to maximise water availability and minimise the need for watering.
- All topsoil including mulched vegetation material removed during vegetation clearing, but excluding invasive species), removed and stockpiled must be spread evenly all scared areas.
- Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.
- Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species.
- All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state, or better where possible, in agreement with the ECO.

## 2.8 Policy and Legislative Context

**Table 3: Applicable Legislation and Guidelines for the proposed Project**

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p><i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i></p>	<p><b>REFERENCE WHERE APPLIED</b></p>
<p>The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996).</p>	<p>The Bill of Rights, in the Constitution of South Africa (No. 108 of 1996), Section 24 states that everyone has a right to an environment that is not harmful to health and wellbeing and requires that reasonable measures are applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. These principles are embraced in NEMA and given further expression. The development will ensure that as little damage as possible will be left on the surrounding environment and local</p>

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p><i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i></p>	<p><b>REFERENCE WHERE APPLIED</b></p>
	<p>community. This report is drafted to ensure compliance to this piece of legislation.</p>
<p>National Environmental Management Act (Act 107 of 1998) (NEMA). The Environmental Impact Assessment Regulation GNR. 982 dated 04 December 2014 as amended in April 2017.</p>	<p>The National Environmental Management Act (Act 107 of 1998 as amended on the 8<sup>th</sup> of December 2014) (NEMA) and the Regulations and associated listed activities identified under Regulations 982, 983, 984 and 985, is the key national legislation underpinning environmental Authorisations in South Africa.</p> <p>NEMA requires that environmental authorisation is obtained for any development activity prior to its commencement. The Act requires that all environmental impacts (including social impacts) due because of the development are assessed and where possible, minimised or mitigated.</p>

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>  <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	<b>REFERENCE WHERE APPLIED</b>
	NEMA and associated regulations are directly relevant to this authorisation Application
Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)	<p>Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) including-</p> <p>Associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>
Occupational Health and Safety Act (No. 85 of 1993)	The employer needs to manage his/her staff and crew in strict accordance with the Occupational Health and Safety Act in order to prevent injuries to the staff.

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>  <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	<b>REFERENCE WHERE APPLIED</b>
National Water Act (Act 36 of 1998) (NWA).	In terms of Chapter 4 of the NWA, activities and processes associated with the proposed mine and associated infrastructure, are required to be licensed by the Department of Water and Sanitation (DWS). The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is primary legislation regulating both the use of water and the pollution of water resources.
National Environmental Management Waste (No 59 of 2008) (NEM: WA).	In terms of section 18, Schedule 3 of the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014) (NEMWAA), by default the mining residues are classified as hazardous wastes. According to the Regulations GN R.632 and R.633, that was inaugurated on the 24 of July 2015, the mining residues must be characterised and classified, and the design and management of residue

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p><i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i></p>	<p><b>REFERENCE WHERE APPLIED</b></p>
	<p>stockpiles and deposits must be based on an assessment of the potential impacts and risks.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004).</p>	<p>The objectives of the Act are to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.</p>
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004).</p>	<p>The Act identifies that all people and organizations should act with due care to conserve and avoid negative impacts on biodiversity, and to use biological resources sustainably, equitably and efficiently. Biodiversity is</p>

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p><i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i></p>	<p><b>REFERENCE WHERE APPLIED</b></p>
	<p>defined to include “the number and variety of living organisms on earth, the millions of plants, animals, and microorganisms, the genes they contain, the evolutionary history and potential they encompass, and the ecosystems, ecological processes and landscapes of which they are integral parts. Biodiversity thus refers to the life-support systems and natural resources upon which we depend”.</p> <p>The National Environmental Management: Biodiversity Act provides for: The sustainable usage of resources, the fair and equitable sharing benefits arising from the use and application of genetic resources and material and the management and conservation of the biological diversity of South Africa.</p>

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>  <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	<b>REFERENCE WHERE APPLIED</b>
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) (CARA)	CARA provides for control over the utilization of the natural agricultural resources of the Republic of South Africa to promote the conservation of soil, water sources and vegetation and the combating of weeds and invader plants.
Restitution of Land Rights Act, 1994,  Land Reform (Labour Tenants) Act, 1996 and the  Extension of Security of Tenure Act, 1997	Department of land affairs confirmed that there are no existing claims on the affected properties.



<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p><i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i></p>	<p><b>REFERENCE WHERE APPLIED</b></p>
<p>National Heritage Resources Act (Act 25 of 1999).</p>	<p>The National Heritage Resources Act requires all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 ha. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities.</p> <p>The document will be approved by The South African Heritage Resources Agency (SAHRA) as part of the impact assessment process.</p>
<p>Promotion of Access to Information Act, 2000 (Act 2 of 2000 as amended)</p>	<p>To give effect to the constitutional right of access to any information held by the State and an information that is held by another person and that is required for the exercise or protection of any rights.</p>

## ***2.9 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).

The identified borrow pits are already existing, unlicensed, and currently used as illegal dumping sites by the communities. As far as possible, modern mining techniques will be used to minimize operational costs and environmental impacts. Due to the simplified nature of mining in a borrow pit no other technology alternatives are recommended/ available

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

### **Preferred Site**

The application for the borrow pit has been proposed in order to source material that can be used for the construction of the re-aligned road. The applicant has chosen these sites due to their proximity to the road being upgraded, making it more cost effective and efficient in contrast to importing the material from elsewhere.

## ***2.11 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.

### **2.11.1 Details of the development footprint alternatives considered.**

#### **(a) The property on which or location where it is proposed to undertake the activity**

No location alternatives were identified, as the location of the proposed project is determined on initial assessment of the geological data available and the borrow pits are already existing although not licensed.

#### **(b) The type of activity to be undertaken**

The proposed and preferred option is thus far, the most preferred activity owing to the presence of these borrow pits.

**(c) The design or layout of the activity**

Since no complicated surface infrastructure will be required for the Proposed Project, no design and layout alternatives were assessed.

## ***2.12 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 Draft Basic Assessment Report was circulated for comment to the competent authority, commenting authorities, landowner, surrounding property owners and other identified stakeholders for review (see Table 4 for a list of identified stakeholders). Comments received were recorded and included in the Final Basic Assessment Report. The following public participation process was applied for the proposed project:

- Identification of stakeholders, including occupiers of the property, owners, and occupiers of land adjacent to the site, municipal officials and relevant State Departments as part of the Public Participation Process. Stakeholders will be placed on the project database. The database will be used throughout the process to inform the stakeholders of the project activities.
  - In order to canvass the issues and concerns of the broader public and to ensure that all IAPs are afforded the opportunity to comment on the application, the proposed project will be announced as follows:
    - Erection of site notices (size A2) advertising informing the public of the application by Black South Energy and displaying the contact details of the EAP. The site notices serve the purpose of informing potential IAPs of the project and therefore afford them the opportunity to comment.
    - Distribution of the Background Information Document (BID) with a registration and comment sheet, and the locality map to state departments and other potential stakeholders through emails.
    - An advert was placed in the Citizen newspaper to notify the public about the Basic Assessment and Borrow Pit Application process, invite members of the public to register as I&APs on the project's database.
    - A copy of the Draft Basic Assessment Report will be made available for public review for a 30-day review period.
-

- All comments received during the review period of the draft Basic Assessment as well as responses provided have will be captured and recorded within the Comments and Response Report and included in the Final BAR.
- Once DMR has decided on the Application, all registered I&APs will be notified of the outcome of the application. Stakeholder Database will be updated throughout the various phases associated with the proposed project.

### 2.12.1 Summary of issues raised by I&APs

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

No comments have been received at this stage regarding the proposed project.

**Table 4: Summary of issues raised by I&APs (To be completed in the final report)**

<b>Interested and Affected Parties</b>  List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	<b>Date Comments Received</b>	<b>Issues raised</b>	<b>EAPs response to issues as mandated by the applicant</b>	<b>Section and paragraph reference in this report where the issues and or response were incorporated.</b>
<u>AFFECTED PARTIES</u>				
<b>Landowner/s</b>				
<b>Landowners or lawful occupiers on adjacent properties</b>				

<p><b>Interested and Affected Parties</b></p> <p>List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.</p>	<p><b>Date Comments Received</b></p>	<p><b>Issues raised</b></p>	<p><b>EAPs response to issues as mandated by the applicant</b></p>	<p><b>Section and paragraph reference in this report where the issues and or response were incorporated.</b></p>
<p><b>Municipal councillor</b></p>				
<p><b>Municipality</b></p>				
<p><b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWAE)</b></p>				

<b>Interested and Affected Parties</b>  List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	<b>Date Comments Received</b>	<b>Issues raised</b>	<b>EAPs response to issues as mandated by the applicant</b>	<b>Section and paragraph reference in this report where the issues and or response were incorporated.</b>
<b>Communities</b>				
<b>Dept. Land Affairs</b>				
<b>Interested and Affected Parties</b>				



## ***2.13 The Environmental attributes associated with the alternatives***

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical, and biological aspects)

### ***2.14 Bio Physical Environment***

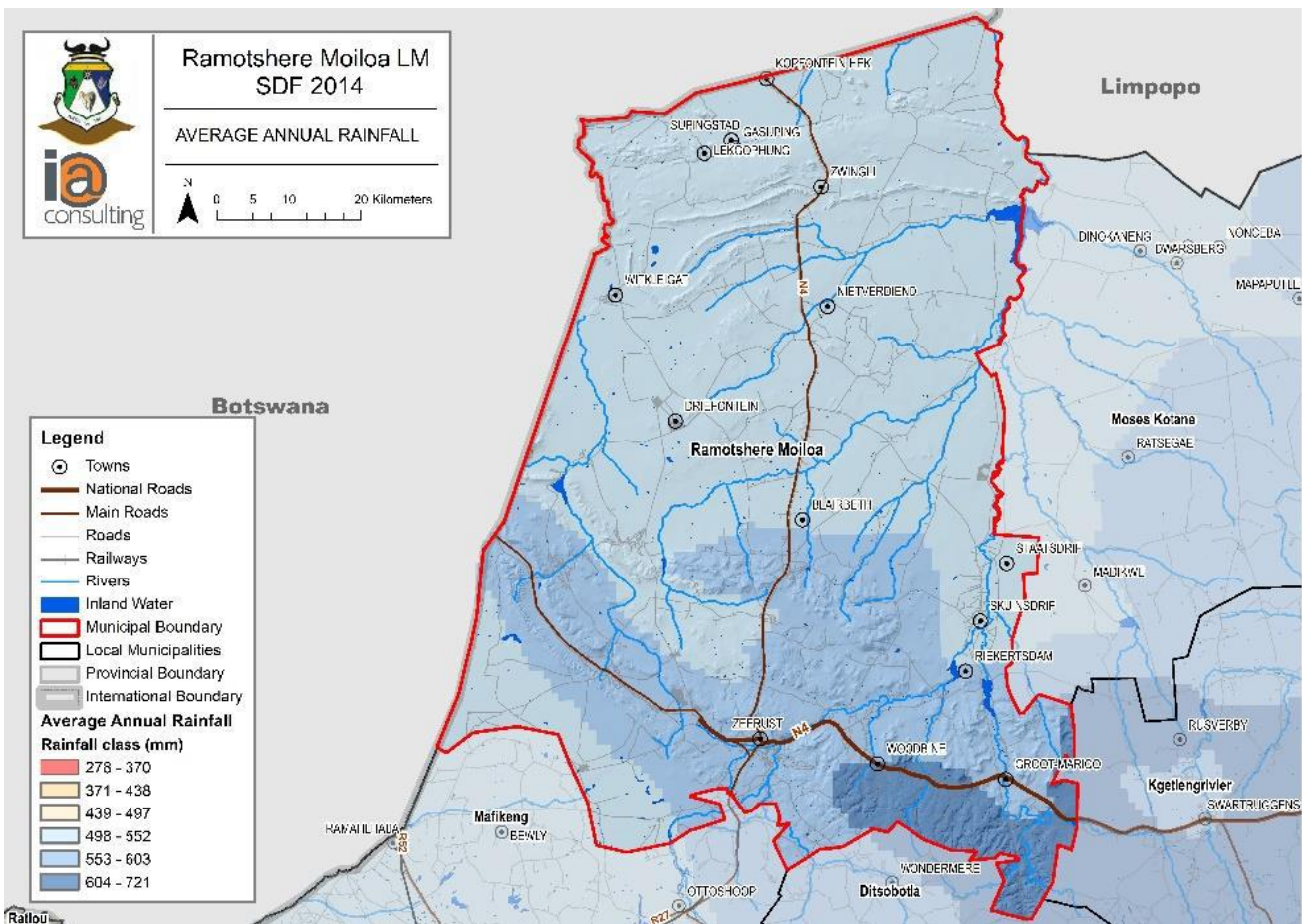
#### **2.14.1 Climate**

Climate change is predicted to directly impact South Africa's mean annual temperature and rainfall ranges, influencing pest and disease distributions, flowering and fruiting seasons, and ground water resources . The increase in precipitation will increase the risk of periodic and extreme flood events. This will have positive effects on water resources in terms of quantity of water in rivers, increased groundwater and filling of dams. There are, however, negative impacts in terms of flooding, increased erosion and the effect on water quality.

**Temperature** - The absolute maximum temperatures of Zeerust are in excess of 40, 6°C (SoER, 2002). The absolute minimums recorded varies between -3,3°C and -7, 8°C. The days with temperatures below freezing is still in the order of 23 to 32, but days with temperatures of less than -2,5° care less than on the Highveld.

- North West is notorious for the high temperatures levels in the summer. The northern parts of RMLM experience, on average, temperatures between 30 – 36 ° C during the summer season
- In winter time, the majority of the municipal area experiences a drop in the mercury as low as 2.1° C on average. The south-western parts of the municipal area experience temperatures that drop to -1.5° C.

**Rainfall** - Rainfall occurs mainly during late summer (February) and can be highly erratic. Annual rainfall varies from 498 mm to 552 mm, which is the generally accepted average of 500 mm for dry land cropping. The Southern part of the municipality experience an average annual rainfall of 553 mm to 603 mm per annum which is much higher than in the northern parts of the municipality.



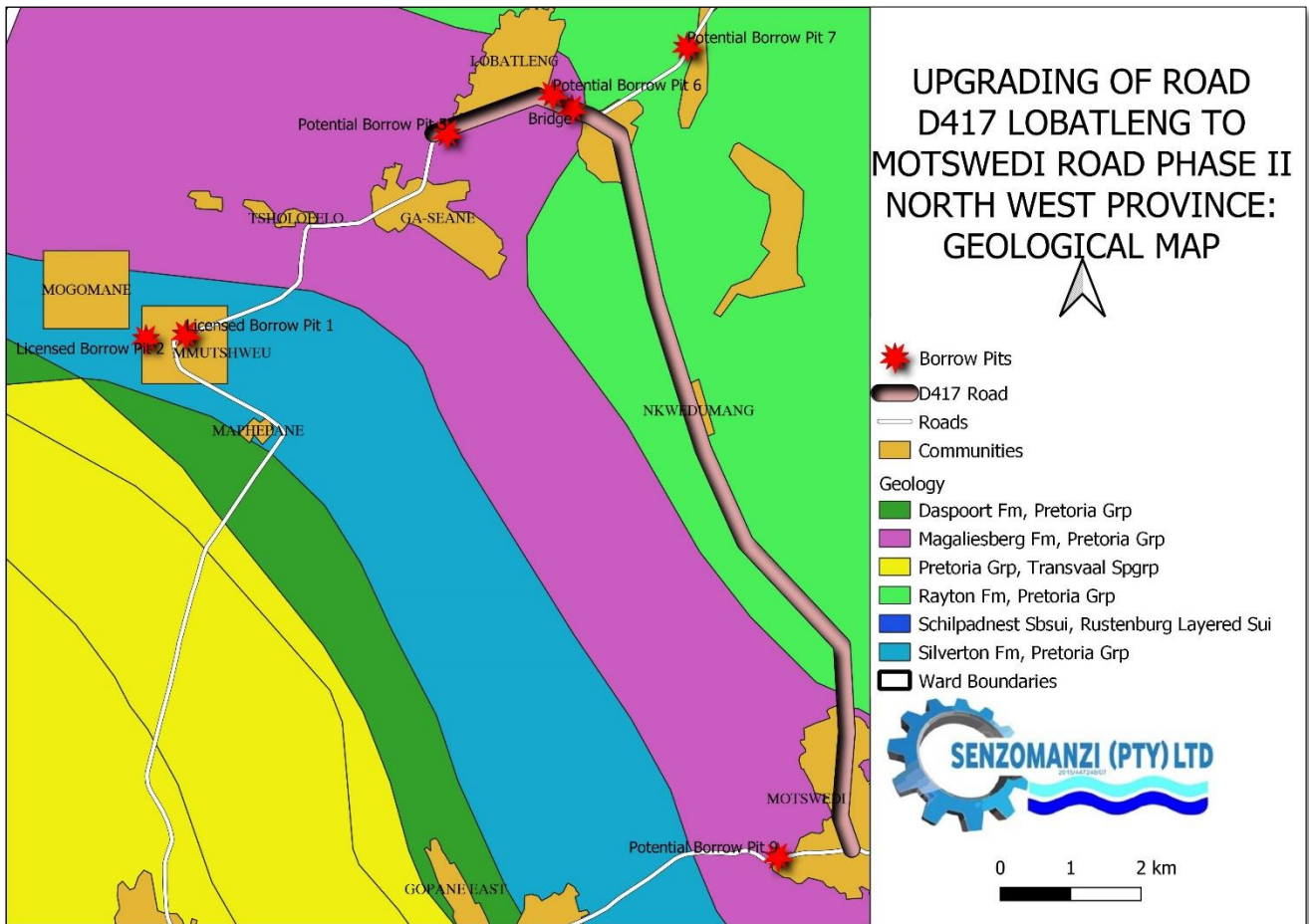
**Figure 5: Annual rainfall**

### 2.14.2 Heritage resources

The heritage of the Northwest Province is diverse and can be categorised into historical sites, archaeological sites, cultural significance sites, and natural heritage sites of significance. A full heritage Impact assessment will be conducted to ascertain the presence or absence of artefacts of archaeological important.

### 2.14.3 Geology

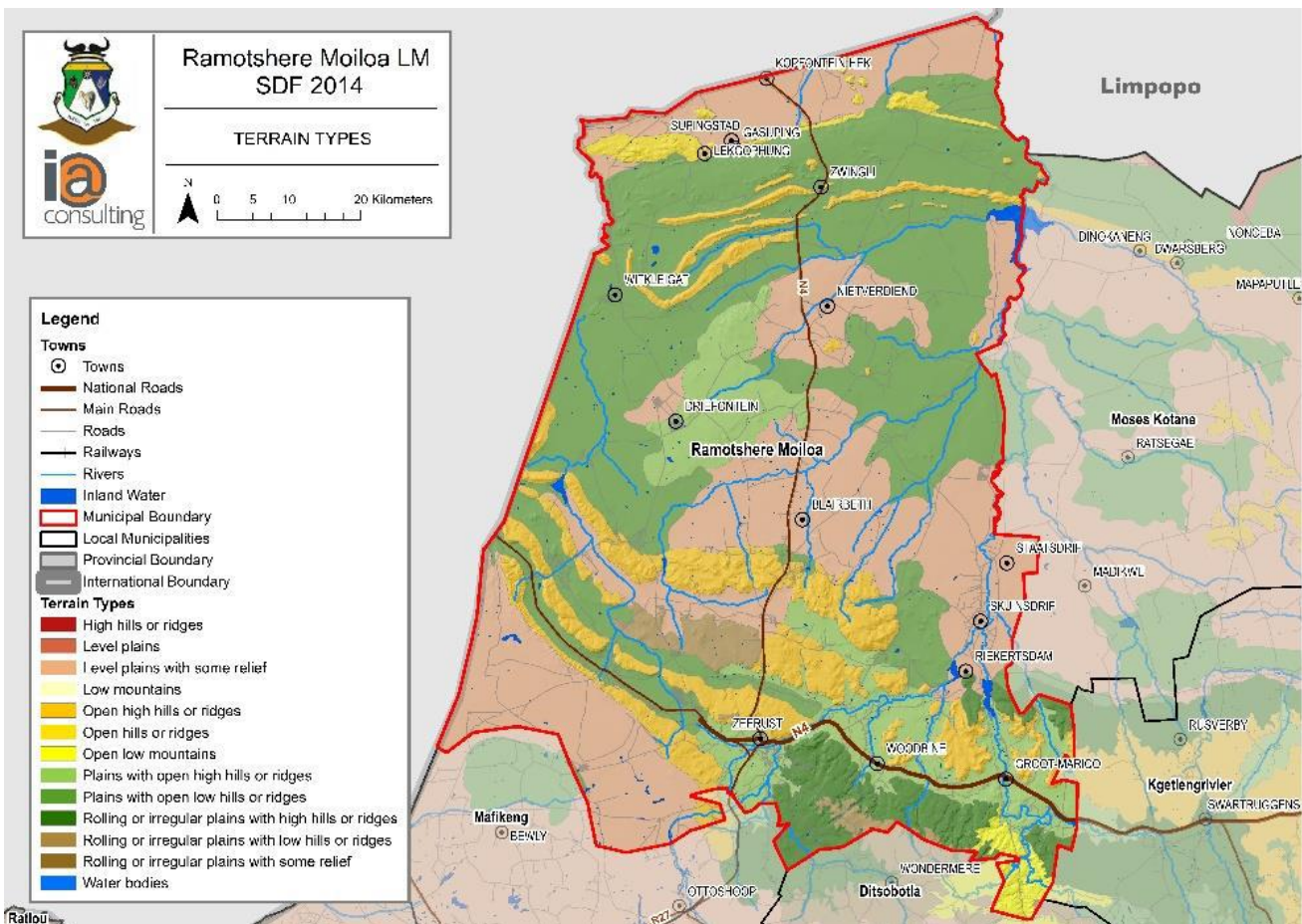
The geological nature of an area influences the topography. It also has an influence on soil types and potential for agriculture. The biggest part of the municipal area is covered by Sedimentary, Shale, Clinopyroxenite and dolomite. From a health and safety perspective dolomitic areas are prone to formation of sinkholes. The bridge is underlain by Magaliesberg Fm, Pretoria Grp as illustrated in Figure 6.



**Figure 6: Local geology**

**2.14.4 Terrain**

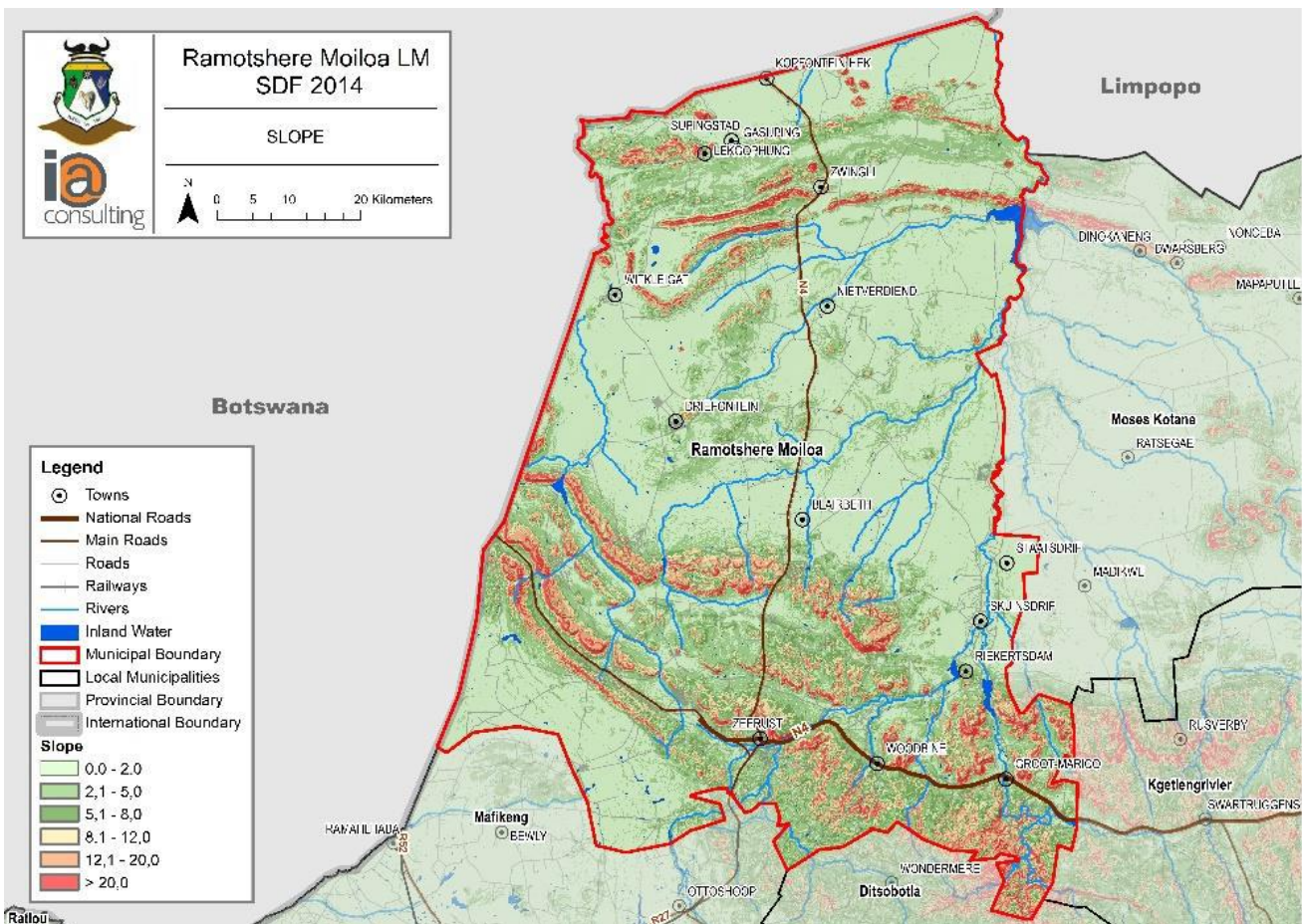
Terrain type data is a method for quantitatively describing relief. It describes the terrain or relief of an area by means of percentage level land and local relief. The terrain is illustrated by means of a gradient from level plains or plateaus to high mountains. The terrain of RMLM consists of prominent hills that run in an east to west direction as evident from the attached map. In areas that are mainly occupied the terrain consists of level plains with some relief. Towns such as Zeerust and Groot Marico consist of plains with open high hills or ridges as indicated in Figure 7.



**Figure 7: Terrain types**

### 2.14.5 Slope

Slope steepness is used by municipalities to determine how a particular site can be developed. As slopes become steeper, grading the provision of infrastructure become more difficult and expensive. Slopes is generally measured in the form of a percentage and steep slope are usually classified as slopes in a range of 12-33%. The average slope of a site is used in regulating steep slopes. The footprint of proposed development typically must be outside the areas of slope that are defined as steep by the municipality. As with the information of the terrain, the slope analysis of RMLM concludes that the majority of the area, with primary focus on settled areas, at 0,00% - 8% is noticeably safe for human settlement and building of structures as illustrated in Figure 8.

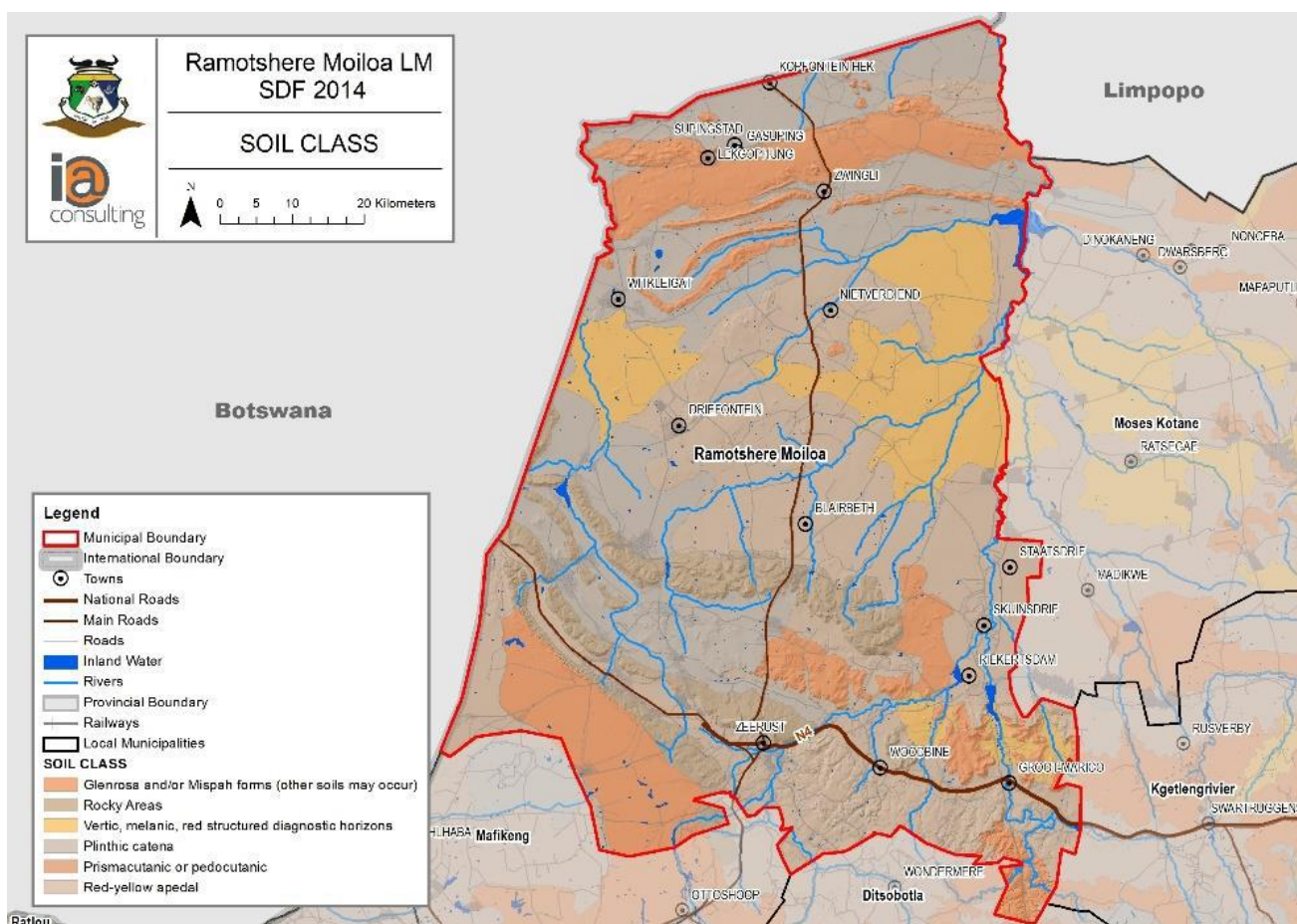


**Figure 8: Slope**

### 2.14.6 Soils

A soil can be regarded as any un-cemented or weakly cemented build-up of mineral particles formed by weathering rock with void spaces filled with air and/or water between the particles. Soils are shallow on hard or weathered rock. Deep, rich soils are not found on steep slopes and therefore most of the areas with a higher gradient have shallow soils. Deep soil deposits are found along rivers and streams on level to moderate slopes.

The majority of the area of the municipality consists of Glenrosa and Mispah forms of soils in the north and south with the red-yellow apedal occupying the central parts of the municipality as illustrated in Figure 9.



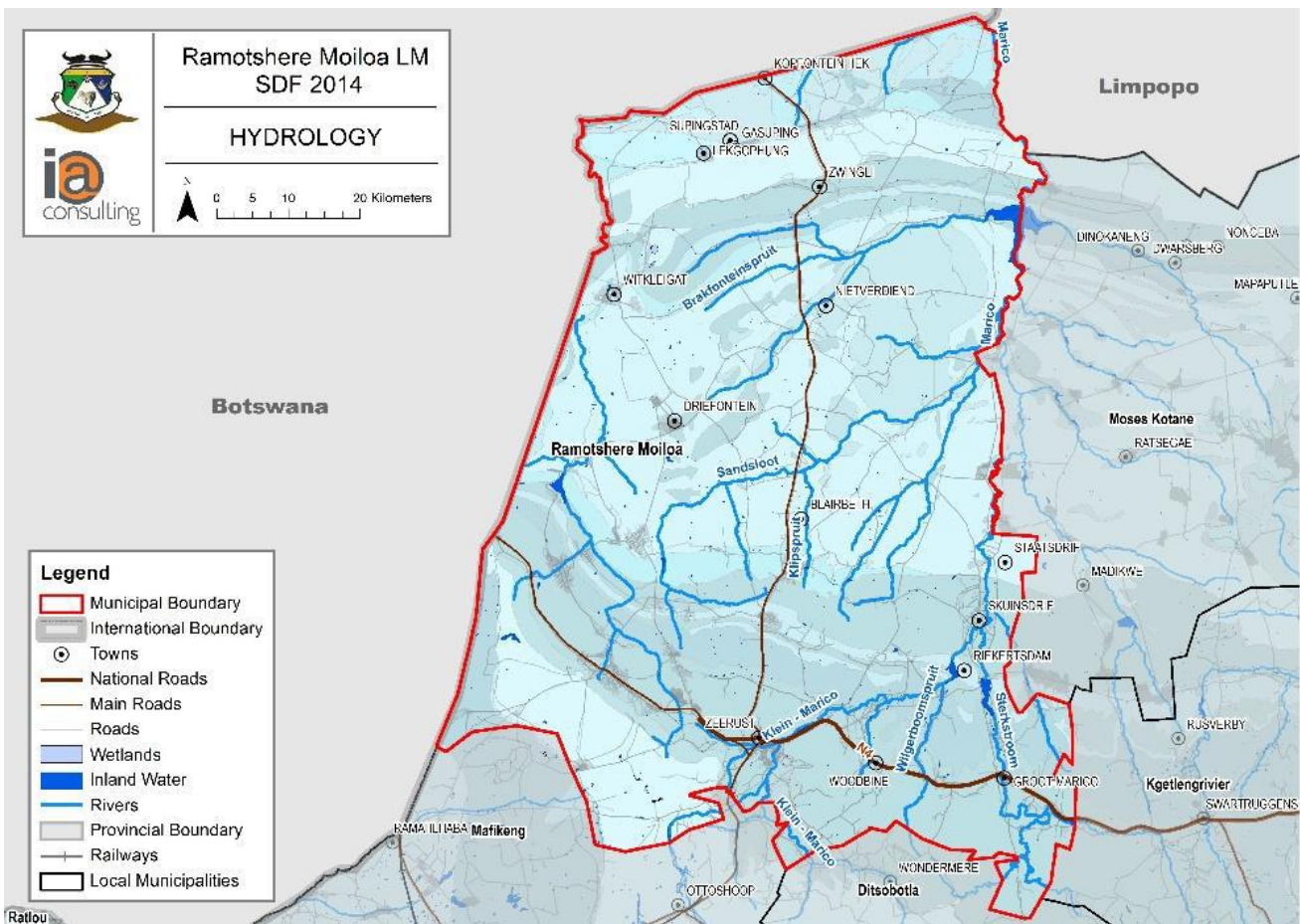
**Figure 9: Soil class**

### 2.14.7 Hydrology

Good quality water and adequate water flow are required to sustain the growth of specific riverine ecosystems. Aquatic habitat integrity and water quality are major determinants of the biological communities in a system. If habitat is lost or degraded for any number of reasons, the biological integrity of the system will be adversely affected. Thus, habitat availability and diversity are important in supporting diverse biological communities and provides an indication of the current ecological integrity of an ecosystem. The major constraint to development in the Marico sub-management area is the water deficit that existed already in the year 2000 and has increased since. RMLM lies within the Crocodile West and Marico Water Management Area (WMA). The two major rivers in the Crocodile West and Marico Water Management Area are the Crocodile River and the Groot Marico River. These two form part of the Limpopo river drainage system, which ultimately drains eastwards to the Indian Ocean.

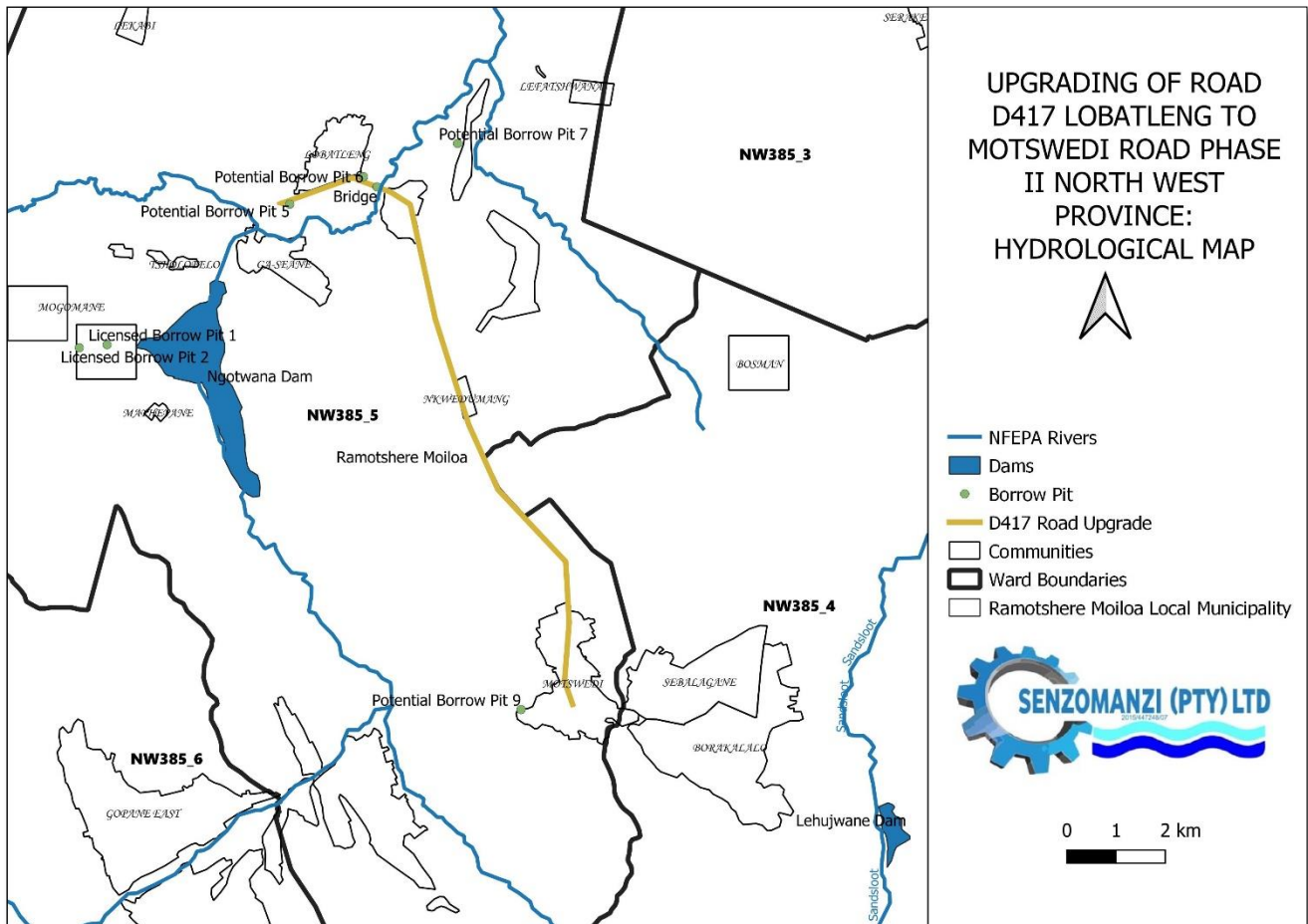
The main water user sectors are commercial irrigation farming, urban water use in the main towns, i.e., Zeerust, Groot Marico and rural domestic supply. The increasing demand for water in the domestic sector and because of employment creation strategies (i.e. land reform for small-scale irrigation developments), will increase the water scarcity in the area. Rivers and tributaries cut across the municipality. The

majority of wetlands are located throughout the municipal area. Inland water is specifically located to the southeast, north east and west of the municipal area



**Figure 10: Hydrology**

**Rivers** - The area is covered by a number of streams, providing habitable areas along it and its branches. The main rivers in the area includes the Brakfontein; Groot-Marico; Klein-Marico; Malmanielloop; Marico; Ngotwane (Figure 11) ; Sandsloot; Sehubyane and the Madikwene river



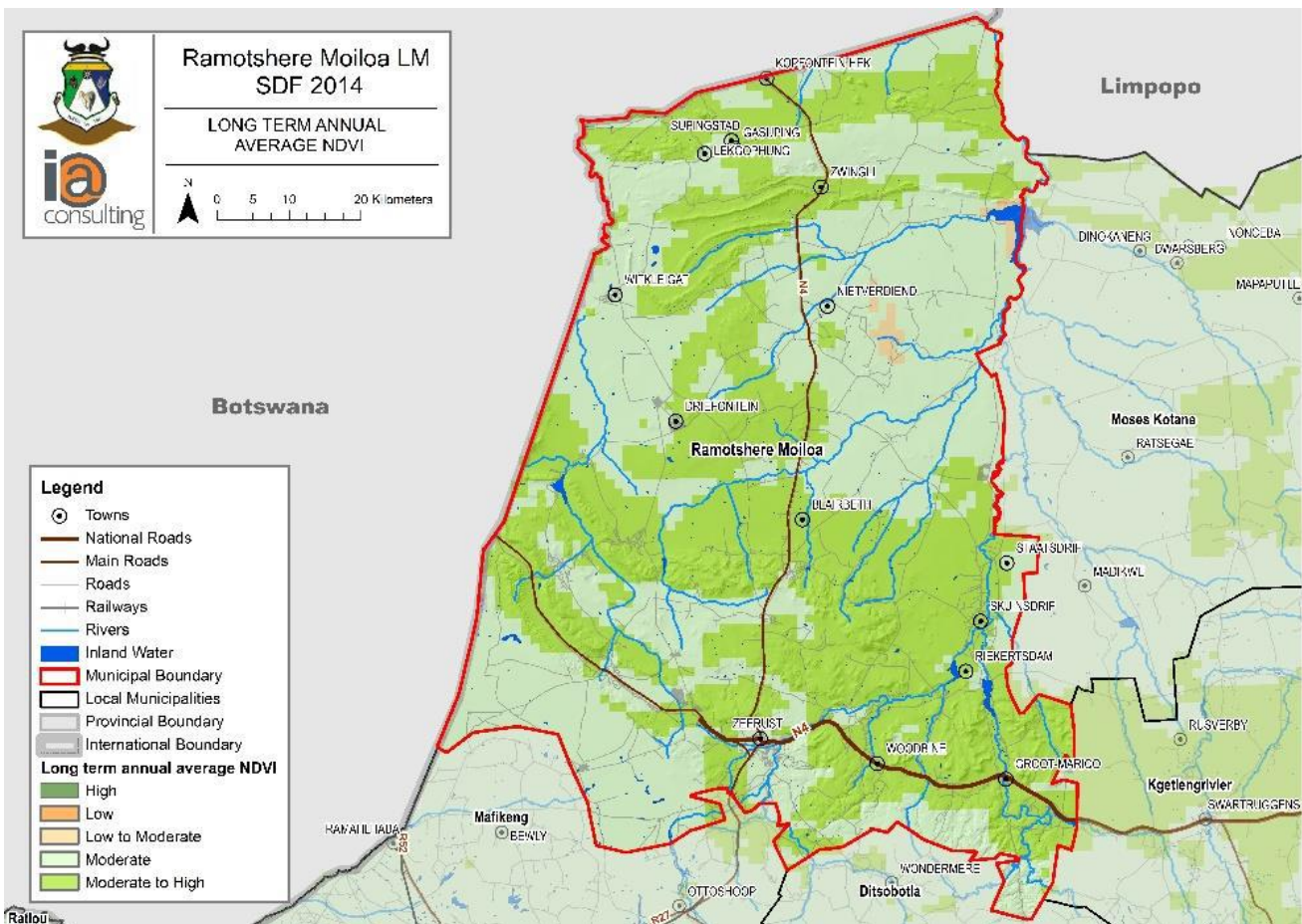
**Figure 11: Site Hydrology**

## 2.14.8 Vegetation

### 2.14.8.1 Long Term Annual Average NDVI

The Normalized Difference Vegetation Index (NDVI) is a mathematical formula applied to satellite imagery to provide information on plant activity. It indicates active vegetation and the presence of live green plants or vegetation calculated from satellite imagery. It shows the conditions during the periods of highest vegetation activity. Vegetation tend to low in areas of low rainfall. The close correlation to rainfall confirms the importance of rainfall in primary production. The municipality has a moderate to high long term annual average Normalized Difference Vegetation Index as illustrated in Figure 12, which also indicates a high average annual rainfall.





**Figure 12: Long-term Annual Average (NDVI)**

### 2.14.8.2 Acocks veld type groups

Natural vegetation is made up of individual plants, few or many, according to the habitat. These usually belong to a number of different species competing and perhaps assisting each other. A balance is maintained at a level determined by the locality or environment. Vegetation changes according to the way it is treated. The main driving force causing vegetation change is selective grazing which causes the actual veld condition at a given time to differ from the modal veld type composition. The primary veld type in the municipal area is the pure Grassveld type. The site dominated by Dwaalboom Thornveld as indicated in Figure 14.

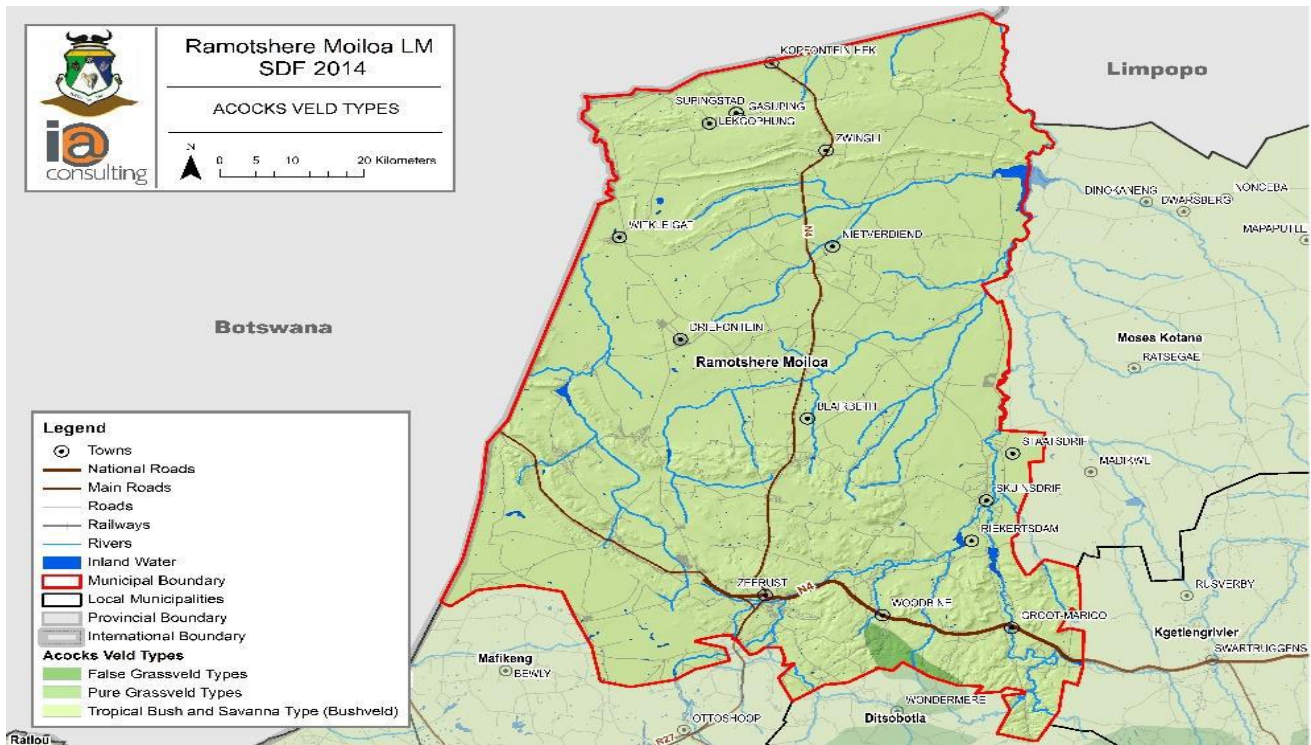


Figure 13: Acocks veld type groups

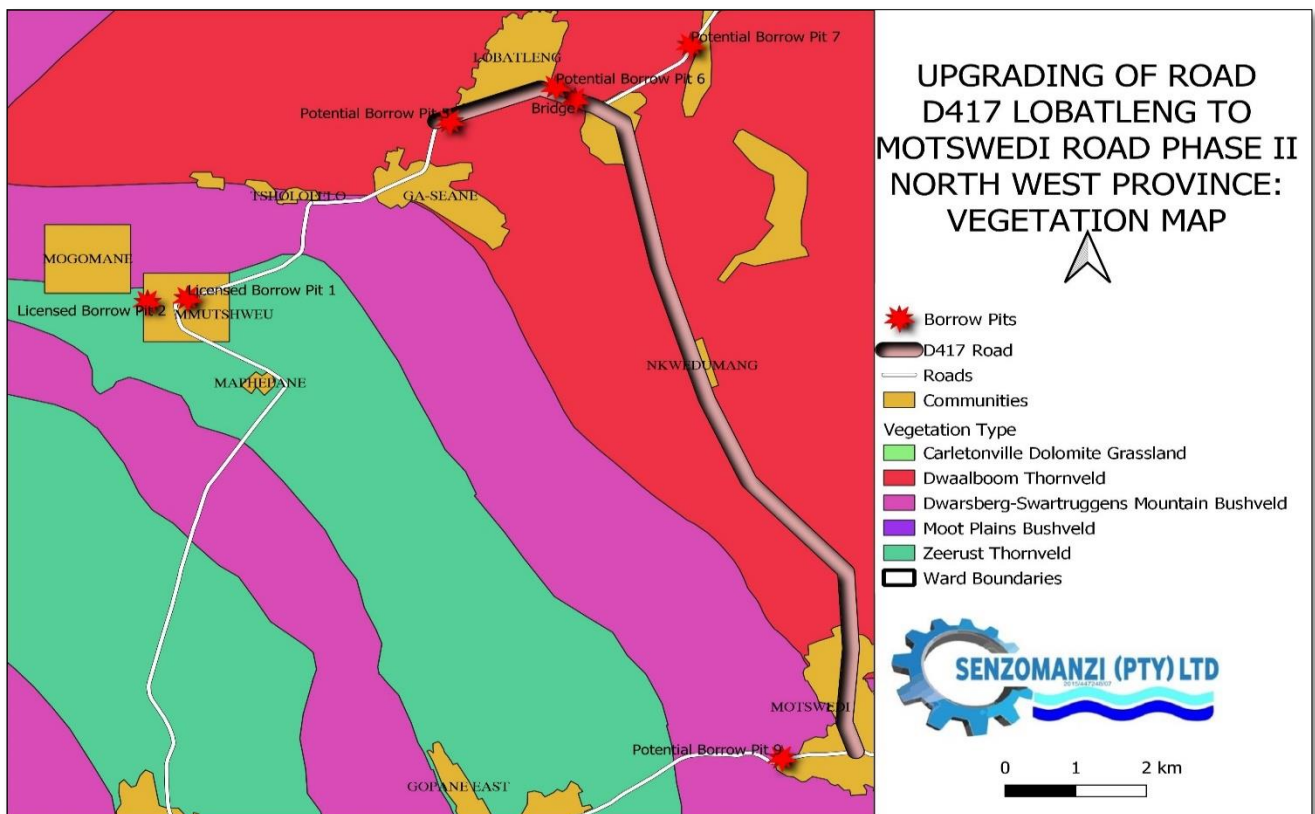


Figure 14: Site vegetation type

### 3 TRADITIONAL AREAS

The majority of the rural settlements within the RMLM are under traditional rule. The following Chiefs participate in the both the district and local municipalities' Executive Councils.

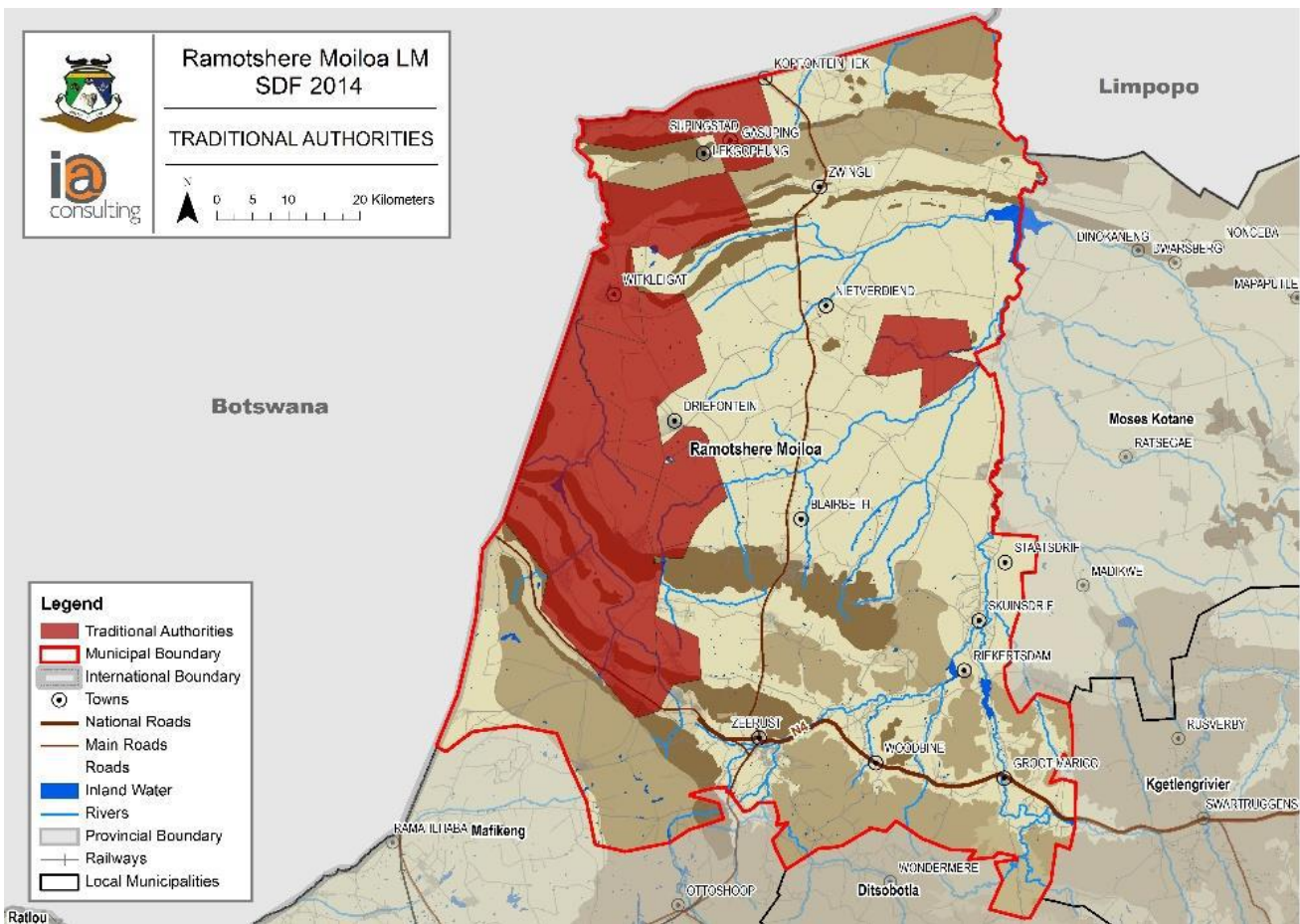


Figure 15: Traditional authorities

### **3.3 Cultural Historic Sites**

#### **3.3.1 Borrow Pit No.05**

Borrow Pit N0.05 is situated on the southeastern side of Lobatla Village along the road to the North (GPS S25.1825145° E25.8305278°).

#### **Results**

This study has been informed by comprehensive review of relevant literature and consultation with the local communities. No archaeological or any other cultural heritage resources was located within the direct path of the proposed borrow pit site. The proposed extraction of gravel material can continue as planned.



**Figure 16: View of Borrow Pit No.05**

#### **3.3.2 Borrow Pit No.09**

Borrow Pit N0.09 is situated in the western side of Motswedi Village GPS S25.283938° E25.875257°).

#### **Results**

This study has been informed by comprehensive review of relevant literature and consultation with the local communities. No archaeological or any other cultural heritage resources was located within the direct path of the proposed borrow pit site.



**Figure 17: View of borrow pit No.09 in Motswedi Village**

**(a) Description of the current land uses**

The borrow pits are located within communal lands under the jurisdiction of the tribal authority. Land is mostly used for cattle grazing .

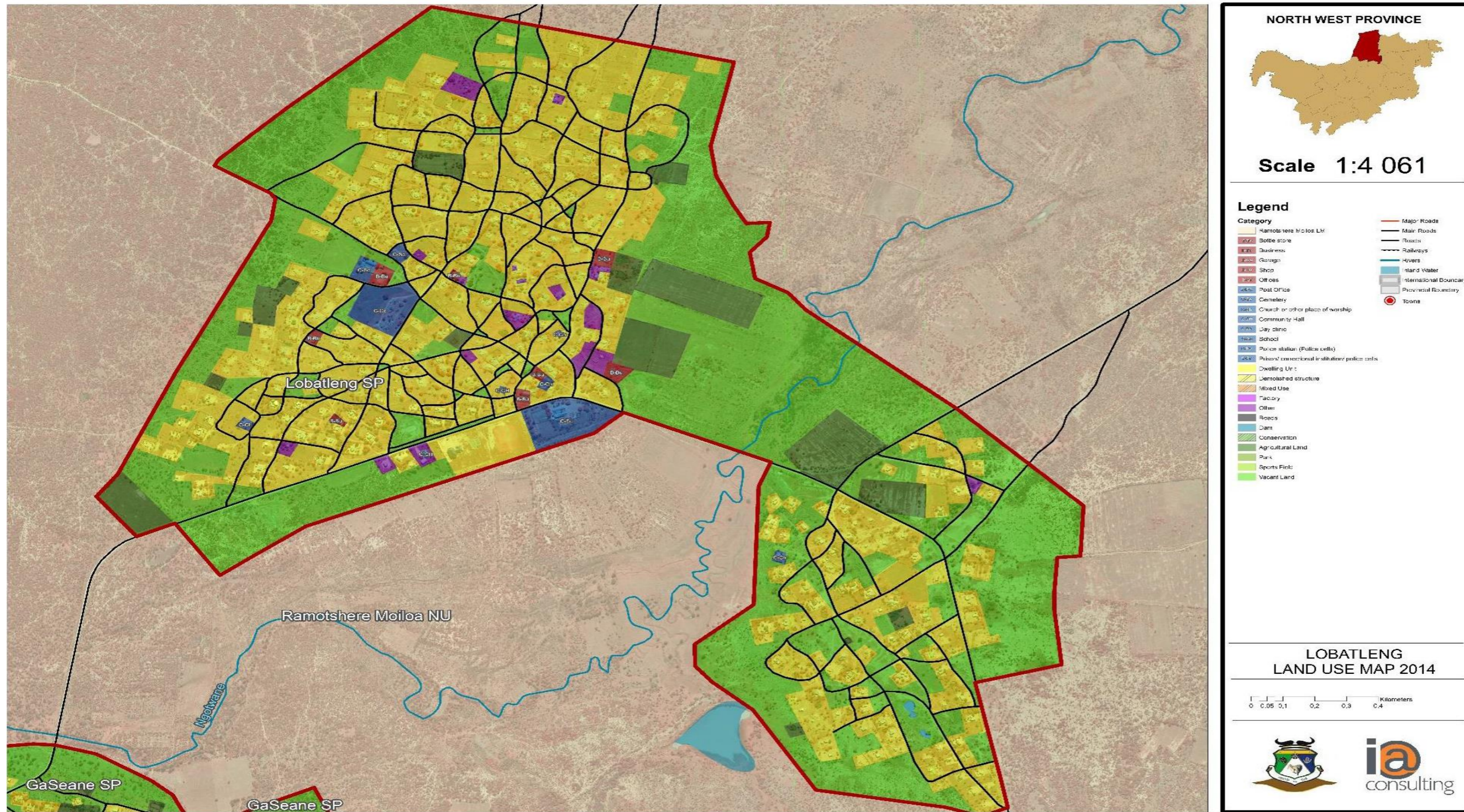


Figure 18: Different land uses in the study area

### **3.4 Socio-Economic Assessment**

This section provides an analysis of the socio-economic characteristics of the Ramotshere Moiloa Local Municipality in the North West Province of South Africa. The current municipal area demarcation applied in this study is based on the post-2011 municipal demarcation boundaries. Various sources of demographic, labour, economic, poverty, employment and income data available in South Africa, were analysed, interpreted and put together in order to provide the socio-economic characteristics and background for the study area. Most suited to this type of analysis and fairly recent is the Quantec Easydata's Standard Regional Dataset and Stats SA 2012., which is the dataset that was used for this analysis.

- **Number of People and Gender** - According to Census 2011, RMLM has a total population of 155 513 people of which the majority 51, 4% of the population are female.
- **Population Group** - 99,6% Were recorded as being black African, with the other population groups making up the remaining 0,4%.
- **Population Age** - The population age distributions indicates that 32,9% of the RMLM population is aged between (0-14) years of age, 69,7% area within the working age of (15-64) and 7,5% are Elderly (56+).
- **Education** - According to Census 2011, 5,0% people who are aged 20 years and older have completed primary school, 27,5% have some secondary education, 21,1% have completed matric and 6,4% have some form of higher education. The figures also showed that 20,7% have no form of schooling.
- **Enumeration Area Type** - Census 2011, indicates that 70, 5% of the municipalities population resides in Tribal or traditional areas.
- **Population Density** - The average population density calculated in RMLM is 5, 02 Pp/Ha (people per hectare).
- **Population Growth Rate** - The population growth rate for RMLM was calculated at 0,92% between year 2001 and 2011. Looking at the time frame increments proposed by SPLUMA (5, 10 and 20 year's population projection) Ramotshere Moiloa will experiences major population growth in the next 20 years. In the next 5 years, the population will increase with 7 278 people, in the next 10 years with 14 557 (from base year 2015) people, and in the next 20 years with 29 114 people. A total number of approximately 185 980 people will be reached in year 2035. This means that an additional sum of 29 114 people needs to be planned for.



- **Number of Households** - There are 40 740 households in the municipality, with an average household size of 3,6 persons per household.
- **Type of Dwelling** - 78% of the municipal area resides in house or brick structures on a separate stand or yard while, informal dwellings/shacks and shelter make up a combined 11% of the municipal area. Blocks of flats, town houses, and house/flat/room in back yard form a meagre 7% of the shelter housing the market area while 4% resides in traditional dwelling hut made from traditional materials.
- **Tenure Status** - 53,1% of the formal dwellings within the municipality is owned and paid off.
- **Household Income** - Households in RMLM are relatively poor with almost 14,66% earning no income at all. 93,90% of the households earn less than R12 800/month. There has been significant growth in the income bracket earning between R3 500 and R12 800/month (growth of 17,46%) – a clear signal for rental or gap market housing options. Within the next 5 years, households earning below R 3 500per/month will increase with 3 008 households, in the next 10 years with 9 502 households, and in the next 20 years with 12 033 households.
- **Access to services** - It is reported that 19% of households have access to piped water in their dwelling and 38,2% have access to piped water in the yard. Only 8,3% of households do not have any access to piped water. In the municipality. According to the 2011 census 65% of households utilise a pit latrine and 6% have no toilet facilities. This means that effectively 71% of households do not have adequate sanitation facilities. According to 2011 Census, 20, 5% of households have refuse removed by the local authority and only 5, 9% of households have no refuse removal at all. 81,9% of households have access to electricity for lighting.
- **Employment & Unemployment** - According to Census 2011, there are 22 437 employed persons, 12 743 unemployed person and 9 030 are classified as discouraged work-seekers. The unemployment rate is 36,2%. Amongst the youth aged 15–34, 9 329 are employed while 5 609 are unemployed. The unemployment rate for this group is 45,8%..
- **Economic Sector** - The dominant economic sector in RMLM is a combination between Retail which contributes to more than 29, 2% of the GVA of the municipality and General Government which contributes 21, 1% of the municipal GVA. Finance is also relevant to the municipal GVA share at 13, 8%, 8 the share GVA. Retail also has the highest employment percentage at 37, 6%.
- **Transportation** - There is a lack of passenger transport services in the municipality. The mode of travel predominantly used for work or school relates to trips is by foot 34.3%. Minibus/taxi mode represents only 3.2% of trips to work or school. Only 2.0% of trips are undertaken by car drivers whilst 1.9% of trips with private cars relate to passengers

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

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

The summary of the impact assessment during all phases is provided in Table 5below.

**Table 5: Impact Assessment for Planning Phase**

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation									
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating				
Site Establishment: Establishment of the campsite and Site Clearing																		
Socio-economic	Employment will be created for the clearing of the land and establishing of the borrow pits sites.	2	2	2	2	12	L	Recruitment practises will favour locals. Where possible, first preference should be given to locals for job opportunities that will be created through the project. Implement a transparent process of recruiting construction staff, following pre-established and accepted criteria.  All operations will be carried out under the guidance of a strong experienced manager with proven skills in public consultation and conflict resolution. All personnel will be made aware of the local conditions and sensitivities in the mining area and the fact that some of the local residents may not welcome the mining activities in the area. There will be a strict requirement to treat local residents with respect and courtesy at all times. The Applicant will keep a complaint register and implement a grievance procedure to address any issues, concerns and grievances that may arise during the mining activities on the borrow pits.	1	1	1	2	6	L				
	Friction between residents/landowners and construction personnel.	2	2	2	2	12	L		1	1	1	2	6	L				
Fauna	Movement of vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	2	2	2	12	L	No trapping or hunting of fauna shall be permitted. No informal fires in the vicinity of the borrow pits shall be permitted. Edge effects of all borrow pit mining activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed.	1	1	1	1	3	L				
	Loss of faunal diversity and ecological integrity as a result of borrow pit mining activities, erosion, poaching and faunal species trapping.	2	2	2	2	12	L		1	1	1	1	3	L				
Flora	Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.	2	1	2	2	10	L	All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants. Exotic or invasive plants shall be controlled as they emerge.	1	1	1	1	3	L				

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
Heritage and Palaeontological Resources	Borrow Pit mining has potential to impact on palaeontological resources.	3	1	4	2	16	L	If archaeological sites or graves are exposed during clearing, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. No clearing activities may be undertaken within 50m of the heritage and/or cultural sites.	2	1	3	1	6	L
Surfacewater	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	3	3	3	3	27	ML	Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited. Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water. Ensure that topsoil is properly stored, away from the streams and drainage areas.	2	2	2	2	12	L
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	3	3	3	3	27	ML		2	2	2	2	12	L
Groundwater	Localised spillages of oils, fuels, lubricants, and other chemicals from machinery leaching to groundwater contamination.	3	3	3	3	27	ML	All construction equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is not used for some time. Refuelling of vehicles will only be allowed in designated areas. No washing of vehicles shall be allowed outside demarcated areas. Spill kits shall be made available, and all personnel shall be trained on how to use the kits and training records shall be made available on request.  Storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material. Bund areas shall contain 110% of the stored volume and must be impermeable. Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater.  Regular inspections shall be carried out to ensure the integrity of the bund walls. All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site. Runoff from this area shall be contained.	2	2	2	2	12	L

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
Air Quality	Increase in carbon emissions and ambient air pollutants (NO <sub>2</sub> and SO <sub>2</sub> ) because of movement of vehicles and operation of machinery/equipment.	2	2	2	2	12	L	Appropriate dust suppression measures may include spraying with water. Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities. A speed limit of 20 km/hr shall apply to limit vehicle entrained dust from the unpaved road. All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. Dust control suppression shall be implemented on dry weather days and periods of high wind velocities. Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance, and spraying with water.	1	1	1	1	3	L
	Possible increase in dust generation, PM10 and PM25 as a result of excavations, operation of heavy machinery, and material movement.	2	2	2	2	12	L		1	1	1	1	3	L
Visual	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	10	L	The number of vehicles and machinery to be used shall be kept to a minimum. Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents. Materials transported on public roads must be covered, and where possible.	1	1	1	1	3	L
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	10	L		1	1	1	1	3	L
	Scarring of the landscape as a result of the clearance of vegetation.	2	1	2	2	10	L		1	1	1	1	3	L
Noise	The use of vehicles and machinery during the borrow pit mining phase may generate noise in the immediate vicinity.	2	2	2	2	12	L	Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive in advance. Surrounding communities must be notified in advance of noisy activities. All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise.  Equipment must be operated within specifications and capacity (eg, no overloading of machines). Regular maintenance of equipment must be	1	1	1	1	3	L

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation						
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating	
								undertaken, particularly regarding lubrication. Equipment shall be switched off when not in operation. Appropriate directional and intensity settings must be maintained on all hooters and sirens.							
Soil, Land use and Land Capability	Loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	2	10	L	Erosion control measures shall be implemented where deemed necessary. In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised. If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion. Runoff from stockpiles shall be detained in order to support growth of vegetation. Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA or can be removed by a service provider that is qualified to clean the soil. The time in which soils are exposed during mining activities should remain as short as possible. Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff.  A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity. Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes.	1	1	1	1	3	L	
	Clearing of vegetation and compaction of the mining footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	2	10	L		1	1	1	1	3	L	
	Chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	2	10	L		1	1	1	1	3	L	
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices.	2	3	3	2	16	L	All waste shall be separated into general waste and hazardous waste. General waste can be separated into waste that can be recycled and or reused. No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste. Where necessary dedicate a storage area on site for collection of waste. Bins must have lids to keep rainwater out. Bins shall be emptied regularly to prevent them from overflowing. All work areas shall be always kept clean and tidy. All waste management facilities will be maintained in good working order. The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. Hazardous and general wastes shall be removed and disposed of by	1	2	2	2	10	L	

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation						
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating	
								a service provider at an appropriate licensed landfill site. A safe disposal certificate must be kept onsite at all times.							
Traffic	Increase in traffic volumes in the vicinity of the mining site.	4	3	2	3	27	ML	Traffic signs to be put around the site to notify motorists of the activities. Local speed limits and traffic laws shall always apply to minimise the occurrences of accidents on public roads. The number of construction vehicles and trips shall be kept to a minimum. Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	3	2	2	2	14	L	

**Table 6: Impact Assessment for Operational Phase**

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
<b>MINING ACTIVITIES</b>														
Fauna and Flora	Loss of animal species because of collisions with vehicles or hunting and trapping by personnel.	2	3	2	2	14	L	<p>Where possible available access tracks will be used. Avoid all plant species of conservation concern (in the unlikely event that they are present) by changing the location of sites accordingly prior to clearing. Avoid clearing trees where possible. The collection of any plant material for firewood or medicinal purposes shall be strictly prohibited. No uncontrolled fires must be allowed. Intervening by planting indigenous vegetation in disturbed areas should natural revegetation prove unsuccessful. The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the demarcated mining site.</p> <p>Ensure that borrow pit mining is done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material.</p> <p>Oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the borrow pit mining and the campsite will be collected in proper receptacles and removed to a registered disposal facility.</p>	1	2	1	1	4	L
	Loss of vegetation (possible plant species of conservation concern) from clearing or harvesting by personnel or uncontrolled fires set by personnel.	3	2	2	2	14	L		2	1	1	1	4	L
	The use of vehicles during mining activities may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	3	2	2	3	21	L		2	1	1	2	8	L
Air Quality	Dust generated by moving vehicles and borrow pit mining activities may result in nuisance impacts.	2	2	2	3	18	L	Areas to be cleared will be limited to the minimum extent possible. Wet suppression must be implemented where dust plumes are noted. A speed limit of 20 km/hr shall apply to limit vehicle entrained dust from the unpaved roads.	1	1	1	2	6	L



Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
Noise	Increase in ambient noise levels as a result of the borrow pit mining activities.	3	3	2	2	16	L	<p>All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fan-belts, worn bearings and other sources of noise. Regular maintenance of equipment must be undertaken, particularly with regard to lubrication.</p> <p>Equipment shall be switched off when not in operation. Adjacent landowners shall be notified in writing if work needs to be carried out after hours or if any blasting will be required. All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order.</p> <p>Staff working in areas where the ambient noise levels exceed 85 dB should wear ear protection equipment. Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive in advance.</p>	2	2	1	1	5	L
Soil, Land Use and Land Capability	Soil contamination as a result of borrow pit mining activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	2	2	3	21	L	<p>Soil disturbance within the site shall be kept to a minimum. Ensure that topsoil is properly stored, away from open water sources. The soils must be used for the backfilling and rehabilitation of the pit. The rehabilitated pits must be seeded with recommended seed mix consisting of indigenous species.</p>	2	1	1	2	8	L
Traffic	Increase in traffic volumes as a result of vehicles moving to and from site.	3	3	2	2	16	L	<p>Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and where possible the transportation of mining materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.</p>	2	2	1	1	5	L

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
Heritage and Archaeological Resources/ Palaeontology impacts	Borrow Pit mining may result in the destruction of graves and any other heritage sites during operational phase of the project. Damage to buried archaeological or paleontological resources of significance.	4	2	3	3	27	ML	Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites.	3	1	2	2	12	L
Surfacewater	Borrow pit operations may result in the generation of surface water runoff contamination. The sedimentation will have negative impacts on the surrounding clean water environment. These will cause an increase in the turbidity and will decrease acidity of the water in the streams, which will affect the aquatic habitat of the wetland, hence important habitats may be lost.	2	3	4	3	27	ML	No mining operations will be undertaken within 100 metres from the nearby streams.  Stormwater generated around the site will be diverted away to the clean water environment. All hydrocarbons will be stored on protected storage areas away from the streams.	1	2	3	2	12	L
Groundwater	Borrow pit mining operations may result in the drawdown, which may affect the yield to the surrounding groundwater users.	3	3	3	3	27	ML	All pits will be rehabilitated to pre-mining conditions. Oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the site and the campsite will be collected in proper receptacles and removed to a registered disposal facilities.	2	2	2	2	12	L
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	3	3	3	3	27	ML		2	2	2	2	12	L
	The use of vehicles during borrow pit mining may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	3	3	3	3	27	ML		2	2	2	2	12	L

**Table 7: Impact Assessment for Rehabilitation Phase**

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation					
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating
Soils and Vegetation	The use of vehicles/machinery during the rehabilitation of the mining site may result in compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	2	1	2	2	10	L	Ensure that contamination of the rehabilitate area by hydrocarbon liquids are prevented. Ensure that the rehabilitation work is done in such a manner that the environment is protected from probable spillages. All pits will be rehabilitated to pre-mining conditions.  All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities.	1	1	1	1	3	L
Soils, Land Capability and Land Use	Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and borrow pits site.	-	-	-	-	-	-		-	-	-	-	-	-
	The removal of the campsite equipment and the rehabilitation of the borrow pit mining sites and associated access infrastructure will result in the affected soil and land use being restored.	-	-	-	-	-	-		-	-	-	-	-	-

Environmental Aspect	Nature of potential impact/risk	Environmental Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Significance After Mitigation						
		Severity	Spatial	Duration	Probability	Significance	Significance Rating		Severity	Spatial	Duration	Probability	Significance	Significance Rating	
	This will also result in the resumption of the use of the land since the infrastructure would have been removed.														
Surfacewater	<p>During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, open pits will be backfilled, levelled, topsoiled and the area re-seeded.</p> <p>During the process of rehabilitation, surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.</p>	3	3	3	3	27	ML	Ensure that water leaving the site does not have elevated silt load. Adequate stormwater management shall be conducted on site to ensure that dirty water is kept separate from clean water. Ensure that the rehabilitated areas are free draining and that water from these areas is clean.	2	2	2	2	12	L	
Noise	Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	2	1	2	2	10	L	<p>Where necessary, provide employees with ear plugs and employees must be instructed to use the ear plugs. Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.</p> <p>Maintaining equipment and machinery in good working order. Switching off equipment when not in use.</p>	1	1	1	1	3	L	

### ***3.6 Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks***

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

The EIA utilises a rigorous, numerical environmental significance rating process which is based on the accepted impact assessment methodology that uses the probability of an event occurring and the severity of the impact, should an event occur, as factors to determine the significance of a particular environmental risk.

To determine the severity of any potential environmental impact, the criteria that are taken into consideration are the spatial of the impact, the duration of the impact and the severity of the impact. The probability of an impact occurring is determined by the frequency at which the activity takes place and by how often the type of impact in question has taken place or takes place in similar circumstances. The values assigned to these factors (weighting) are discussed as part of the EIA.

The first stage of any impact assessment is the identification of potential environmental activities, aspects and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

**The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in, Table 5, Table 6 and Table 7. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in**

Table 9. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Details of the impact assessment methodology used to determine the significance of physical, socio-economic and heritage impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

$$\text{Consequence} = \text{Severity} + \text{Spatial Scale} + \text{Duration}$$

And

$$\text{Probability} = \text{Likelihood of an impact occurring}$$

**Table 8: Criteria for Assessing Significance of Impacts**

Criteria	Description
Severity (S)	The severity of an impact on the receiving environment: <ul style="list-style-type: none"> <li>• No Impact- (Weight value- 0)</li> <li>• Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1)</li> <li>• Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2)</li> <li>• High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)</li> <li>• Low- Low potential that impact might be reversed (weight value- 4)</li> <li>• Impact cannot be reversed (weight value- 5)</li> </ul>
Spatial (S)	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges:

Criteria	Description
	<ul style="list-style-type: none"> <li>• Onsite – within specific site boundary (weight value – 1)</li> <li>• Project area specific – within the mining area boundary (weight value – 2)</li> <li>• Local area - within 5 km of the borrow pit boundary (weight value – 3)</li> <li>• Regional –Municipal boundary (weight value- 4)</li> </ul>
Duration (D)	<p>Time span associated with impact:</p> <ul style="list-style-type: none"> <li>• Immediate – 1 Year or less (weight value – 1)</li> <li>• Short term – 1-5 Years (weight value –2)</li> <li>• Medium term – Longer than 5 Years (weight value – 3)</li> <li>• Long term- life of the activity/ operation (weight value-4)</li> <li>• Permanent (weight value- 5)</li> </ul>
Probability (P)	<p>The likelihood of an impact occurring:</p> <ul style="list-style-type: none"> <li>• Unlikely – chance of the potential impact occurring (weight value – 1)</li> <li>• Possible –chance of the potential impact occurring (weight value – 2)</li> <li>• Likely - chance of the potential impact occurring (weight value – 3)</li> <li>• High probability - chance of the potential impact occurring (weight value- 4)</li> <li>• Definite - chance of the potential impact occurring (weight value- 5)</li> </ul>
Impact Significance/Consequence	<p>Adding the extent, duration and intensity together provides the significance of the impact (High, Medium, or Low).</p> <p><b>Severity + Spatial + Duration + Frequency of Impact = High/Medium/Low Impact</b></p>

**Table 9: Probability Consequence Matrix**

		Significance														
		Consequence (Severity + Spatial + Duration)														
Likelihood	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	



**Table 10: Significance Threshold Limits**

<b>Significance Points</b>	<b>Environmental Significance</b>	<b>Description</b>
<b>76- 150</b>	<b>High (H)</b>	A very serious impact which, if negative, may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects, or very beneficial effects.
<b>40- 75</b>	<b>Medium High (MH)</b>	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to the (natural &/or social) environment and result in severe effects or beneficial effects.
<b>26- 39</b>	<b>Medium Low (ML)</b>	An important impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or negative medium to long-term effect on the social and/or natural environment.
<b>1- 25</b>	<b>Low (L)</b>	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment.

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

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

**Table 11: Positive and Negative impact of the proposed activity**

Alternative		Advantages	Disadvantages
Activity alternatives (mining method alternatives)	Preferred Alternative (Opencast mining methods)	Economically and socially empowerment of the local communities through easy accessibility enabled by the upgrade of the road	Mining methods may result in direct and indirect impacts on several aspects of the environment including: Soil (compaction), flora (clearance and dust), fauna (habitat destruction, noise), air quality (dust, vehicle emissions), noise (animal life and surrounding communities), and surface- and groundwater (spillages, inadequate separation of clean and dirty water, potential leaching of water)
Technology Preferred (No technology Alternative was identified).	Excavators, bulldozers, trucks	The technologies have long-term success in terms of mining history. According to Mclanahan (2018), due to their long service life with low-maintenance applications.	No disadvantages have been identified presently

Alternative		Advantages	Disadvantages
Operation Preferred (No Operation Alternative was identified)	The operation includes the open cast mining, material stockpiles, storage, excavations.	The borrow pits and their related activities will generate employment opportunities.	Relocation and loss of cattle grazing area.

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

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

#### **a) Air Quality**

The main impacts on air quality will be from material handling (soil, waste rock, ore), vehicle entrainment from unpaved road. Proposed mitigation measures that will be employed include drop height reduction, avoidance of temporary storage piles, covering and/or enclosure of all transfer points and wet suppression. The main aim will be to maintain low dust concentrations

#### **b) Terrestrial Ecology**

Common impacts will comprise of vegetation clearance, habitat destruction, encroachment of alien invasive plant species and loss of species of conservation concern. Implementation of alien invasive plant management plan during decommissioning to prevent the growth of invasive plants on rehabilitated areas to a low level and the rehabilitation of site with indigenous vegetation that occurs in the vicinity of the project area. This will help restore the site to its pre-mining condition

#### **c) Surface Water**

The possibility of surface water contamination will result due to:

- Clearing the surface and site preparations, for the infrastructure will result in exposure of soil surfaces to erosion factors. When a large area of vegetation is cleared and topsoil disturbed, exposing a large area of loose material, susceptible to erosion. During rainfall events, runoff from the exposed site will transport the eroded soil material into the nearby watercourses.
- Uncontrolled spills of contaminants such as fuel and oils, and subsequent washing away of these into the surface water resources

This will be reduced to a lower level if the following measures are implemented:

- Waste storage facilities should be on a hard parked, roofed and bunded facility.
- Prevent and contain hydrocarbon spillages that may wash off into nearby watercourses

#### **d) Soil, land use and land capability**

Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of solid waste, is considered to be a moderate deterioration of the soil resource. This impact will be localised within the site boundary and have medium-high significance on the soil resource. Another major impact will be soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). Impact significant will be lower if the following measures are implemented:

- Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation
- To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum
- A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled

#### **e) Noise**

The risk level of noise will be medium to members of the public who will be exposed. Proposed mitigation measures will involve the following:

- Regular noise monitoring on site and the surrounding areas
- Locating topsoil and overburden stockpiles to act as acoustic barriers between the borrow pits and receptors where practical.

#### **f) Heritage and Cultural Aspects**

Despite that no archaeological objects were observed during the survey, and that the area is disturbed due to agricultural activities, the client is reminded that unavailability of archaeological material does not mean absentee, archaeological material might be hidden underground. It is thus the responsibility of the developer to notify contractors and workers about archaeological material (e.g., pottery, stone tools, remnants of stonewalling, graves, etc) and fossils that may be located underground to keep the impact low. Furthermore, the client is reminded to take precautions during construction.

### **3.7.2 Motivation where no alternative sites were considered**

The borrow pits are already existing but not licensed. No history is available on the previous use of the borrow pits

### **3.7.3 Statement motivating the alternative development location within the overall site**

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

It is worth noting that as much as the no go option may result in the protection of the environment in situ. It would further suggest that no new employment opportunities would be created as well as any resultant community upliftment and development programs would likely take place in the surrounding communities.

### ***3.8 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.)

In order to identify the potential impacts associated with the proposed mining activities, the following steps were undertaken:

- A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to determine the significance and sensitivity of the various environmental considerations.
- The stakeholder consultation process is currently being conducted in an interactive manner, providing landowners, and interested and/ or affected parties (I&APs) with the opportunity to provide input into the project. This is considered a key focus, as the residents can provide site-specific information, which may not be available in desktop research material. I&APs are requested as part of the Background Information Document (BID), and notification letters, to provide their views on the project and to state any potential concerns they may have. All comments, concerns and responses provided by I&APs will be captured into the Comments and Responses Report, which will be attached to the final BAR, and will also be incorporated into the final impact assessment; and
- A site visit was undertaken to ensure that the information gathered as part of the desktop investigation reflects the current status of the land.

The rating of the identified impacts was undertaken in a quantitative manner. The ratings were undertaken in a manner to calculate the significance of each of the impacts. The identification of management and mitigation measures was done based on the significance of the impacts and measures included are considered sufficient, appropriate, and practical to protect the environment.

### 3.9 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).

Table 12: Air Quality Impact Assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction</b>			
Vegetation clearing	Dust emissions due to the erosion of open storage piles and exposed areas occur when the threshold wind speed is exceeded (Cowherd, Muleski, & Kinsey, 1988; US EPA, 1995).	<ul style="list-style-type: none"> <li>a) Wet suppression, applied sparingly, to ensure the absence of visible dust;</li> <li>b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-A-Side may also be used;</li> <li>c) Enforce low vehicle speeds on unpaved areas (&lt;40 km/h);</li> </ul>	Medium
Vehicle movement on roads	Same as above	Road mitigation measures include: <ul style="list-style-type: none"> <li>a) Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions.</li> </ul>	Low
<b>Operational</b>			
Vehicle Movement	Vehicle entrainment from unpaved roads	<ul style="list-style-type: none"> <li>a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads;</li> <li>b) Wet suppression on haul roads, with the addition of a chemical binder if necessary</li> </ul>	Medium
Materials handling	Materials handling operations which are predicted to result in significant fugitive dust emissions from mining operations include the transfer of material by means of loading and offloading of trucks and loading. The quantity of dust which will be generated will depend on various non-climatic parameters such as the nature (moisture content and silt content) and volume of the material handled.	<ul style="list-style-type: none"> <li>a) Reduced tipping and drop heights where practicable;</li> <li>b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles;</li> <li>c) Maintaining all vehicles in good condition at all times; and</li> <li>d) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS</li> </ul>	Medium
<b>Decommissioning and Rehabilitation</b>			



Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Backfilling and Rehabilitation	Particulate mobilisation can be caused by the backfilling of the borrow pit and ripping and shaping of compacted areas	<ul style="list-style-type: none"> <li>a) Wet suppression during landscaping and materials handling activities;</li> <li>b) Enforcement of low vehicle speeds on unpaved areas (&lt;40 km/h);</li> <li>c) Vegetation of bare surfaces with locally indigenous grass species as soon as possible;</li> <li>d) Requiring contractors to maintain construction vehicles in good condition</li> </ul>	Medium

Table 13: Noise impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction Phase</b>			
Site clearing	Clearing and stripping of topsoil and vegetation	Earthwork activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Low
<b>Operational Phase</b>			
Borrow pit activities	Noise increase at the boundary of the borrow pit footprint and at the abutting residential	a) All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off. b) Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the boundaries of the borrow pit have not changed.	Medium
Additional traffic		Speed limit to be adhered to at all times.	Low
<b>Decommissioning Phase</b>			
Planting of grass and vegetation at rehabilitated area	Noise increase at the boundary of the borrow pit footprint	Rehabilitation activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Low
Maintenance of disturbed area		Maintenance activities to be done during daytime working hours.	Low

Table 14: Traffic impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction Phase</b>			
Transportation of materials and labourers	Construction materials being transported to site will contribute to the addition of traffic on the road network	Road network able to support additional trucks.	Low
	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Low
<b>Operational Phase</b>			
Transportation of staff	Haulage to/ from site.	Road network able to support additional trucks.	Low
Dust from vehicle movement	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Low
Noise from vehicle movement	Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.	Medium-Low
<b>Decommissioning and Rehabilitation Phase</b>			
Removal of rubble and other materials from site	Added traffic on the road network	Road network able to support additional trucks.	Medium-Low

Table 15: Groundwater impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction Phase</b>			
Storage of fuels and lubricants and movement of vehicles	Spills from improper storage of fuels and lubricants and also from leaking vehicles	a) Place drip trays under vehicles when parked. b) If in-field refuelling is done from a tanker, it should be done in a designated dirty area and a spill kit and clean-up team must be available on site; c) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; d) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards	Low

Table 16: Soil, land use and land capability impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction Phase</b>			
Transport of materials and labour	This will compact the soil of the existing roads and fuel, and oil spills from vehicles may result in soil chemical pollution	a) Management and supervision of construction teams	Medium-Low
Earthworks	Clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling as well as drilling and blasting for the initial removal of overburden at the planned borrow pits as well as the construction of infrastructure. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil.	The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. In addition, compliance to these instructions must be monitored.	Low
Handling and storage of building material	This will have the potential to result in soil pollution when not managed properly.	b) Location of stockpiles  Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Vegetation clearance	Soil erosion is also anticipated due to vegetation clearance.	<p>Refrain from locating stockpiles as close as possible to the development for cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden materials removed during construction in their final closure location, or as close as practicable to it.</p> <p><b>c) Topsoil stripping</b></p> <p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example, the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p><b>d) Stockpiling of topsoil</b></p> <p>To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum.</p> <p><b>e) Management of access and services roads</b></p> <p>Existing established roads should be used wherever possible. Where possible, roads that will carry heavy-duty traffic should be designed in areas previously disturbed rather than clearing new areas, where possible. The moisture content of access road surface layers must be maintained through routine spraying or the use of an appropriate dust suppressant.</p> <p>Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts will be installed to permit free drainage of existing water courses.</p> <p><b>Prevention of soil contamination</b></p> <p>During the construction phase, chemical soil pollution should be minimised as follows:</p>	Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> <li>• Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material;</li> <li>• Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area;</li> <li>• Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;</li> <li>• Containing potentially contaminating fluids and other wastes; and</li> <li>• Cleaning up areas of spillage of potentially contaminating liquids and solids.</li> </ul>	
Operational Phase			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Spills of fuel and lubricants	Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have medium-high significance on the soil resource.	<p>Management of potential soil contamination during the operational phase</p> <p>The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:</p> <ul style="list-style-type: none"> <li>a) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal;</li> <li>b) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled;</li> <li>c) Processing areas should be contained, and systems designed to effectively manage and dispose of contained stormwater, effluent and solids;</li> <li>d) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids</li> </ul>	Medium-low
Vehicle movement	Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a permanent impact that will be localized within the site boundary with medium-low consequence and significance in the mitigated scenario.	Same as above	
Vegetation clearance	During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion.	Same as above	Medium-low
<b>Decommissioning and Rehabilitation</b>			
Traffic movement	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	<p>a) Site preparation</p> <p>Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) to</p>	Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Earthworks	Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land capability but may increase soil compaction	approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles	Medium-low
Handling and storage of materials	Other activities in this phase that will impact on soil are the handling and storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	<p>b) Seeding and re-vegetation</p> <p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated</p>	Medium-low
Revegetation	With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion	<p>c) Prevention of soil contamination</p> <p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> <li>○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site;</li> <li>○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;</li> <li>○ Containing potentially contaminating fluids and other wastes; and</li> <li>○ Cleaning up areas of spillage of potentially contaminating liquids and solids.</li> </ul>	



Table 17: Surface water impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
<b>Construction</b>			
Exposure of topsoil	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	<ul style="list-style-type: none"> <li>a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites</li> <li>b) Vegetation should only be removed where absolutely necessary;</li> <li>c) Hydrocarbons should be stored on hard park bunded facilities to ensure that all spillages are contained; and</li> <li>d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities</li> </ul>	Low
<b>Operational Phase</b>			
Mining of gravel activities	Pollution of surrounding watercourses as a result of activities during the operational phase (spills, overflows and contaminated runoff)	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment	Medium-Low
<b>Decommissioning and Rehabilitation Phase</b>			
Post-closure activities	Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored	Medium-Low

Table 18: Socio-economic impact assessment

Activity	Impact Description	Mitigation Measures
<b>Construction Impacts</b>		
Construction activities	The residual impacts associated with the creation of employment and business opportunities and training during the construction phase is that the workers can improve their skills by gaining more experience.	<ul style="list-style-type: none"> <li>a) Adopt recruitment strategies that ensure local people are given employment preference;</li> <li>b) Effective implementation of training and skills development initiatives;</li> <li>c) The recruitment process has to be transparent and equitable;</li> <li>d) Maximise and monitor local recruitment;</li> <li>e) Consult local labour recruitment offices;</li> <li>f) Prevent nepotism/corruption in local recruitment structures;</li> <li>g) Promote employment of women and youth;</li> </ul>
	Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> <li>a) Access control to all project elements, including fencing;</li> <li>b) Personal Protective Equipment for workers;</li> <li>c) Notification of blasting schedules;</li> <li>d) Blasting and storage of hazardous materials to adhere to prescribed regulation;</li> <li>e) Measures suggested minimising the impact of flyrock on surrounding roads and structure;</li> <li>f) Community education to sensitize community members to potential traffic and blasting safety risks</li> </ul>
<b>Operational Impacts</b>		
Operational activities	The impact may be reversible over time as workers and jobseekers leave the area, consequences such as HIV/AIDS and unwanted pregnancies will be permanent	<ul style="list-style-type: none"> <li>a) Limit, as far as reasonably possible, social ills caused by influx of workers and jobseekers;</li> <li>b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project;</li> <li>c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that the contractor has no control over activities related to workers' behaviour; however it is recommended that HIV/AIDS campaigns are conducted within the affected area;</li> <li>d) Discourage influx of jobseekers by prioritising employment of unemployed members of local communities;</li> <li>e) Clear identification of workers – prevention of loitering;</li> <li>f) Liaison with police or establish/support community policing forum;</li> </ul>

Activity	Impact Description	Mitigation Measures
	The increase in nuisance factors and associated changed sense of place will be negative, and direct as a result of Project activities, and indirect as a result of migrant jobseekers	<ul style="list-style-type: none"> <li>a) Minimise all nuisance factors such as noise, air quality, traffic, and visual- Implement all mitigation measures as specified in the relevant specialist studies;</li> <li>b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders;</li> <li>c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors</li> </ul>
	Loss of grazing land	<ul style="list-style-type: none"> <li>a) Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner with the intention to acquire only the required servitude area;</li> <li>b) Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase</li> </ul>
	Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> <li>a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities;</li> </ul>
Operational activities	<ul style="list-style-type: none"> <li>a) Developed local economy;</li> <li>b) Increased capacity to develop and maintain livelihood strategies</li> </ul>	Maximise benefits from local employment, skills and economic development

### 3.10 Summary of specialist reports

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

**Table 19: Summary of Specialist**

<b>LIST OF STUDIES UNDERTAKEN</b>	<b>RECOMMENDATIONS OF SPECIALIST REPORTS</b>	<b>SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with an X where applicable)</b>	<b>REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</b>
Heritage Impact Assessment (HIA)	In conclusion it is possible to say that Phase 1 HIA for the proposed road upgrade and four (04) borrow pits has been conducted successfully. If any archaeological and historical sites, features or objects did exist here in the past it would have been severely disturbed or destroyed as a results of several developments on the area.	X	

	<p>The proposed Road Improvement will affect Lobatleng to Motswedi Villages.</p> <p>Development projects that involve any form of earth-moving are potential threats to archaeological materials and sites. Archaeological sites are buried under the soil surface where they are relatively safe until natural forces such as erosion and human development actions such as road construction expose them. These sites are usually identified by exposed bone materials, pottery remains, burnt daga house remains, ash middens etc. The most sensitive of these are human burials.</p> <p>From a cultural heritage point of view the development should be allowed to continue taking careful attention of the above. Should any be uncovered during the development process the Archaeologist should be called in to investigate and recommend on the best way forward.</p>		
Wetland Assessment Report	<p>This study on the general has found no potential impacts that could be fatal flaws. Despite this, there is substantial environmental sensitivity, with the watercourses and their surrounds being the primary features of concern. The potential impacts on the systems have been assessed. Key concerns include</p>	X	

	<p>damage to the wetland and riparian vegetation, and to the deposition of sediment</p> <p>and waste materials into the systems. It will be possible to mitigate against the impacts and recommendations in this regard have been put forward. If the recommendations are adhered to then the proposed projects should have no long-lasting effects at all.</p> <p>The main wetland indicators used during the wetland delineation process included the terrain unit indicator, soil wetness indicator, and the presence or absence of hydric soils and hydrophytes. One hydro-geomorphic type was found to be occurring i.e a channeled valley bottom was identified and delineated on site.</p> <p>From a functional perspective, wetlands within the study area serve to improve habitat within and downstream of the study area through the provision of various ecosystem services such as streamflow regulation, flood attenuation, groundwater recharge, sediment trapping, toxicant removal, particle assimilation and provision of other natural resources. The Ecological Importance and Sensitivity (EIS) assessment was undertaken to rank water resources in terms of provision of goods and service or valuable ecosystem functions which benefit people, biodiversity support and ecological value, and reliance of subsistence users (especially</p>		
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	<p>basic human needs uses). The wetlands were ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers. The PES was determined to be Seriously Modified i.e The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitats features are still recognisable</p> <p>Based on the proposed activity and taking into consideration the present state of the wetlands and their associated functionality and biodiversity status the largest and most effective mitigation measure to mitigate the foreseen impacts is to ensure there is minimum disturbance by ensuring construction activities are limited within the proposed site boundaries</p>		
Vegetation Assessment	<p>The findings of the field assessment indicate that the vegetation of all the site is degraded / transformed, with low plant species richness and with no red data plant species present, and the proposed development can be supported. The terrestrial habitat associated with the study area is of medium to high sensitivity. Widespread anthropogenic impacts from human settlement, gravel mining for infrastructure developments urbanization, dumping of waste material and prolific alien and invasive plant</p>	X	

	<p>proliferation has degraded the available floral habitat associated with the site.</p> <p>It is the recommendation of the specialist that the proponent must apply for environmental authorisation to pave way for the proposed development and mining of gravel material if the borrow pits are not licensed.</p>		
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Attach copies of Specialist Reports as appendices



### 3.11 Environmental Impact Statement

#### (i) Summary of the key findings of the environmental impact assessment

Summary of construction impacts indicated in Table 20

Table 20: Summary of construction impacts

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	<b>Construction Phase</b>											
Air Quality Site clearance, civil works and vehicle movement will cause dispersion of PM10 and PM2.5 particulates and emissions from vehicles	1	3	3	3	21	Medium-High	1	2	1	1	4	Low
Noise Impact will be limited by distance, existing noise levels and relatively short construction period	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Traffic Impact	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	Increased traffic flow along gravel roads giving rise to dust production											
Groundwater Contamination from accidental spills and improper storage of fuels and lubricants	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium
Soil, land use and land capability Soil compaction resulting from vehicle movement and soil contamination resulting from accidental spills	1	1	2	3	12	Low-Medium	1	1	1	2	6	Low-Medium
Heritage Impacts will occur only if fossils are unearthed during earthmoving operations	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Visual Altering the topography and visual character, dust generation, visual intrusion of pit & heavy machinery	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	<b>Terrestrial Biodiversity</b> Removal of flora and stripping of topsoil and also the disturbance of faunal habitat	1	1	1	2	6	Low-Medium	1	1	1	1	3
<b>Surface water</b> Sedimentation of watercourses and altered drainage paths and loss of catchment yield.	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium
<b>Socio-economic</b> Employment creation	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
<b>Waste management</b> Poor waste management could cause soil contamination by hydrocarbons, chemicals, cement	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low

### 3.11.1 Summary of Operational Impacts

Potential impacts resulting for the operational phase are indicated in Table 21

Table 21: Summary of operational impacts

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	Operational Phase											
Air Quality Particulate mobilisation from stockpiles, and vehicular movement	1	3	1	3	12	Low-Medium	1	3	1	2	6	Low-Medium
Noise Noise unlikely to cause exceedances of guideline levels, but some receptors will experience intrusive noise	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium
Traffic Impact Increase in traffic on the road networks	1	3	1	3	15	Low-Medium	1	3	1	1	5	Low

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	Soil, land use and land capability Loss of current land uses and agricultural productivity and soil compaction from vehicle movements	1	3	3	3	21	Medium-High	1	3	1	1	5
Heritage Excavations may expose archaeological artefacts	1	3	2	3	18	Medium-High	1	3	1	1	5	Low
Terrestrial Biodiversity Displacement of faunal, habitat fragmentation	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Surface water Pollution of surrounding watercourses due to spills, overflows and contaminated run-off	3	3	3	2	18	Medium-High	1	3	1	1	5	Low
Socio-economic Strain on basic services and loss of livelihoods for relocated farmers. Possible increase in	3	3	3	3	27	High	1	3	1	2	10	Low-Medium

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
HIV/AIDS and unwanted pregnancies.												

### 3.11.2 Summary of Decommissioning and Rehabilitation Phase

Impacts emanating from decommissioning and rehabilitation phase are indicated in

Table 22.

Table 22: Summary of decommissioning and rehabilitation impacts

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
<b>Decommissioning and Rehabilitation Phase</b>												
Air Quality Considerations and impacts similar to construction phase, possibly greater due to larger area .	2	3	1	3	18	Medium-High	1	3	1	1	5	Low
Noise Noise unlikely to cause exceedances of guideline levels,	3	3	3	3	27	High	3	3	1	1	7	Low-Medium

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	but some receptors will experience intrusive noise											
<b>Traffic Impact</b>  Significantly less traffic than operational phase, but will have some effect on road safety, wear & tear, driver frustration.	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
<b>Soil, land use and land capability</b>  Soil impacts on footprints will be permanent. Elsewhere, mixing of topsoil with subsoil during rehabilitation would have an adverse impact	3	3	3	3	27	High	3	3	1	1	7	Low-Medium
<b>Heritage</b>  The closure and rehabilitation activities cannot possibly affect any items of archaeological or cultural significance unless earthmoving takes place on areas of the site where no such activities were undertaken	0	0	0	0	0	None	0	0	0	0	0	None

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
during the construction and operational phases. If any												
Terrestrial Biodiversity Habitat stabilisation and reconstruction	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Surface water Increase in surface water quantity	2	3	2	3	21	Medium-High	1	3	1	1	5	Low
Socio-economic Loss of jobs and local spend can be softened by skills training and support for entrepreneurs and proper rehabilitation of disturbed footprint.	2	3	3	3	24	Medium-High	1	3	1	1	5	Low



### **3.11.3 Cumulative Impacts**

#### **3.11.3.1 Terrestrial Biodiversity**

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales (IFC, 2013) i.e. cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time (Dutta, et al., 2012). The following cumulative impacts were identified:

- a) Permanent loss of and altered floral and faunal species diversity;
- b) Alien floral invasion; and
- c) Disturbed areas are highly unlikely to be rehabilitated to pre-development conditions of ecological functioning and a loss of floral and faunal habitat, species diversity and SCC will most likely be permanent.

#### **Mitigation Measures**

Some of the impacts can be avoided this may be achieved by:

- a) The placement of the pit area and infrastructure areas beyond sensitive habitats;
- b) Avoidance of protected plant and animal species
- c) The relocation of identified faunal species to similar and adequate habitat areas

#### **3.11.3.2 Hydrology**

Even with extensive mitigation, significant latent impacts on the receiving aquatic ecological environment are deemed likely. The following points highlight the key latent impacts that have been identified:

- a) Disturbance of ecologically sensitive aquatic habitats and downstream areas; Sedimentation of aquatic habitat;
- b) Deterioration of water quality of the aquatic resources;

#### **Mitigation Measures**

Proposed mitigation measures are as follows:

- a) Implementing a stormwater management plan with purpose to re-use the water for dust suppression.

### 3.12 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.

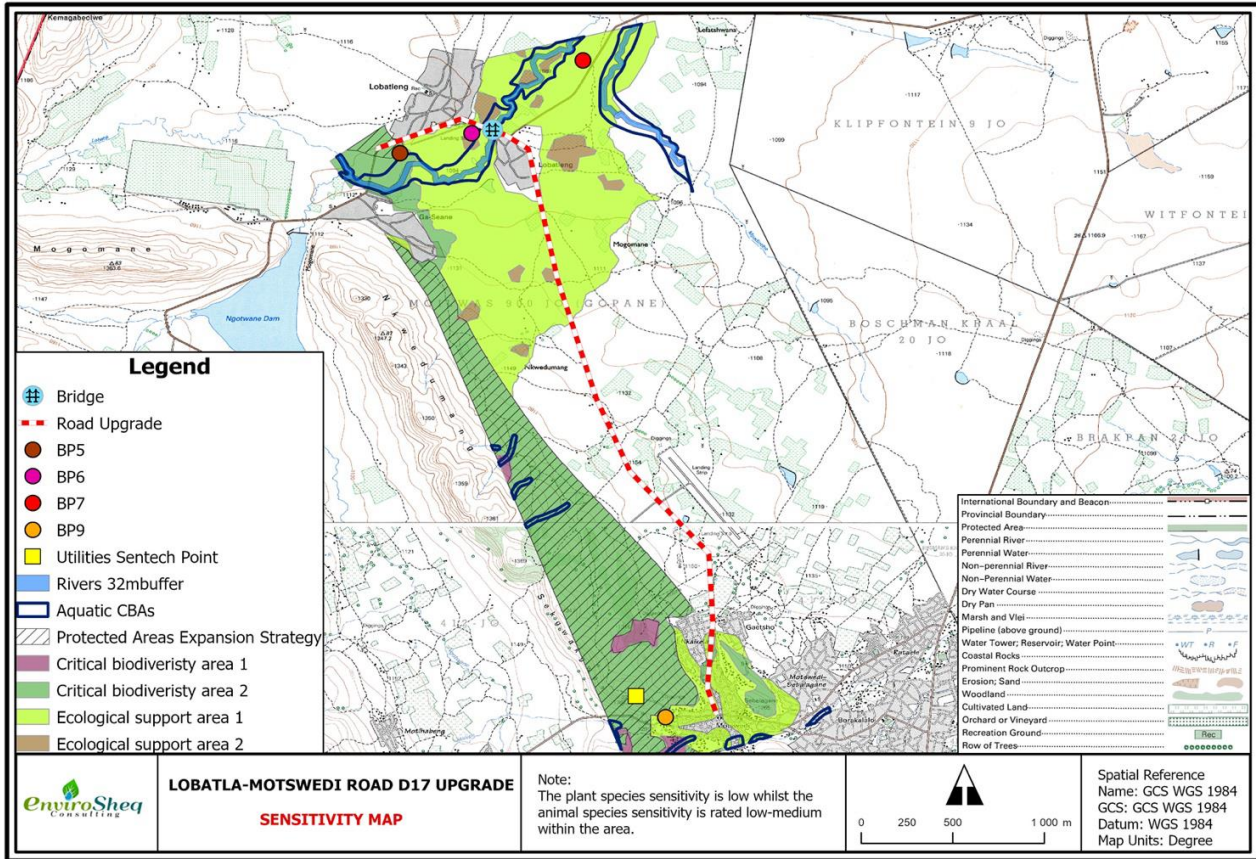


Figure 19: Sensitivity map

### Summary of the positive and negative impacts and risks of the proposed activity and

Refer to Table 11

### 3.13 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

The EMP will address the environmental impacts during the Construction, Operational, Decommissioning and Post-Closure Phases of the Project. Due regard must be given to environmental protection during the entire project; many environmental recommendations are made to achieve environmental protection. The impact management objectives and outcomes of the proposed project are as follows:

- a) Re-shape rehabilitated slopes to ensure free draining

- b) Monitor dust dispersion as per the Dust Regulations
- c) To establish a buffer zone between ecologically sensitive areas and the borrow pit boundaries
- d) To prevent soil compaction, contamination and soil erosion
- e) To prevent sedimentation and surface water contamination

### ***3.14 Aspects for inclusion as conditions of Authorisation***

The authorisation should include the following conditions:

- Compliance with the approved EMPr
- Undertaking of environmental performance assessment reporting once in every two (2) years.
- Revising quantum financial provision on an annual basis
- External auditing of the EMPr by an independent environmental auditor

### ***3.15 Description of any assumptions, uncertainties, and gaps in knowledge***

(Which relate to the assessment and mitigation measures proposed)

- It is assumed that the public consultation process to be undertaken as part of the Environmental Impact Assessment (EIA) will suffice and that the application will be considered objectively based on stakeholders' response to the proposed activities;
- The Draft BAR will be updated once the 30- day public review and comment period has lapsed. Comments from the stakeholders will be incorporated into the Final BAR to be submitted to the DMR; and
- It is assumed that the description of the proposed project, provided by the applicant is sufficient for providing the authorities with the right information for understanding the proposed project.

### ***3.16 Reasoned opinion as to whether the proposed activity should or should not be authorised***

The sections above provide a compact summary of pertinent findings, all of which can be mitigated by varying degrees depending on the type of mitigation measure applied. The EIA/EMPr is a comprehensive document with information provided through the specialist studies, none of which identified fatal flaws. It is, therefore, the applicant's reasoned opinion that the activity be authorised on condition that the EMP is fully adhered to, annually audited and amended where necessary based on audit findings.

### ***3.17 Rehabilitation requirements***

Rehabilitation of the project will aim to:

- a) Ensure that the final elevation around the site is free draining.
-

- b) Ensure that soil replaced in the same sequence to ensure soil characteristics are retained as far as possible.
- c) Ensure a self-sustaining post-mining land capability similar to pre-mining of grazing and limited low-intensity arable lands.
- d) Ensure that the rehabilitated areas are cleared of all contaminating substances and that runoff from the area is returned to the natural catchment.
- e) Ensure that vegetation growth and cover on the rehabilitated area is sustainable and local indigenous species are establishing on site and that succession and colonisation from surrounding areas is taking place on rehabilitated areas.
- f) Ensure that alien invasive growth is eradicated until the closure certificate is granted.

### ***3.18 Period for which the environmental authorisation is required***

The permit has been applied for a period of 5 years. The Environmental Authorisation should therefore allow for 5 years of mining, plus a potential to extend the permit by an additional 3 years. Therefore, a total period of 8 years may be required.

### ***3.19 Undertaking***

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the EIA Report and the EMPr.

### ***3.20 Financial Provision***

As per NEMA financial provision regulations, itemised costs must be provided within the financial provision. As the DMR's closure cost assessment provides itemised costs, this process was used to determine the quantum for financial provision. Financial Provision will be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

## **PART B**

### **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

#### **4 ENVIRONMENTAL MANAGEMENT PROGRAMME**

##### ***4.3 Introduction***

An Environmental Management Plan (EMP) is a document used to prescribe management mechanisms/methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a development. An EMP can be based on the National Environmental Management Act (Act No. 107 of 1998, (NEMA) (as amended), and also bestows a 'Duty of Care' on those who cause, have caused or may in future cause pollution or degradation of the environment, as per of Section 28(1) of NEMA

##### ***4.4 Objectives of the EMP***

The EMP has been compiled to provide recommendations and guidelines for environmental monitoring throughout the construction and operational phase of the proposed project. This is done to ensure that all relevant factors are considered, and to ensure for environmentally responsible development. More specific objectives for this EMP include:

- a) Provide an outline of the legal requirements;
- b) Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- c) The mitigation management of construction associated impacts such as water quality impairment, flow modification, loss of riparian habitat and loss of aquatic ecosystem services;
- d) To assign roles and responsibilities to parties involved regarding the implementation of this EMPr;
- e) To describe a monitoring / stakeholder engagement programme which will enable a review of the success of the EMPr;

- f) To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project;
- g) Identifying construction activities that might have detrimental impacts on the environment;
- h) To identify measures that could optimize beneficial impacts;
- i) To establish a method of monitoring and auditing environmental management practices during all phases of project
- j) Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- k) Propose mechanisms for monitoring compliance with the EMPr and reporting thereon;

#### ***4.5 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).

Details of the EAP are included in Part A Section 1 (a).

#### ***4.6 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).

The EAP hereby confirms 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) of this report as required.

#### ***4.7 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)

Refer Figure 19

#### ***4.8 Description of Impact management objectives including management statements***

The objectives of impact mitigation and management are to:

- a) Primarily pre-empt impacts and prevent the realisation of these impacts - PREVENTION.
- b) To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- c) To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- d) Implement an adequate monitoring programme to:
  - o Ensure that mitigation and management measure are effective.
  - o Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
  - o Reduce duration of any potential negative impacts.

Environmental management outcomes and related management statements are:

- a) Protect the biophysical environment as far as possible.
    - o Minimise impacts to the biophysical environment.
    - o Ensure relevant legislation are applied on site including but not limited to alien invasive management and protection of ecologically sensitive species and environments.
    - o Permits for any activities related to protected species on site will be sought prior to these species being affected. Preservation and 'offset' approaches will be applied to these species as far as possible.
  - b) Protect the water resources in the area.
    - o Use water responsibly and recycle water as much as possible.
    - o Ensure relevant legislation regarding the National Water Act are applied on site.
  - c) Ensure atmospheric pollution is to a minimum:
-

- Manage dust generation.
- Revegetate all bare soil.
- d) Contractor responsibly and ensure operation is compliant with legislative requirements.
  - Ensure an adequate rehabilitation model is compiled before decommissioning.
  - Ensure soil utilisation guide is applied on site and maintain soil berms and stockpiles at all times from the onset of activities.
- e) Ensure socially responsible mining:
  - Provide a safe environment for people to work in:
    - ✓ Ensure safety policies are established on site in line with national policy.
    - ✓ Ensure adequate PPE for staff, contractors and visitors to the site.
    - ✓ Ensure health and environmental policies are established and in line with national policies.
- f) Protect historical and cultural aspects:
  - Ensure all archaeological and cultural artefacts/sites are preserved in situ until such time that authorisation to remove these is obtained.
  - Ensure South African Heritage Resources Act principals are applied with regard to all the archaeological and cultural artefacts/sites
  - Ensure any relocation of culturally sensitive sites is done according to SAHRA principals, in a socially sensitive manner and with open and transparent communication with relevant I&APs.
- g) Maintain open and transparent dialogue with I&APs:
  - Conduct regular feedback meetings with I&APs (at least biannually).
  - Maintain a complaint register on site and respond to comments in a timely manner.
  - Ensure communications and any necessary agreements are made between any sensitive I&APs identified through any stage of the project.



### 4.8.1 Determination of Closure Objectives

(ensure that the closure objectives are informed by the type of environment described)

The overall closure objective is to restore the area disturbed by the project activities to condition that is safe for humans and animals and suitable for cattle grazing, and to ensure that off-site environmental quality is not adversely affected by physical effects and chemical contamination arising from the past mining activities. This will be done by:

- Conducting dedicated soil surveys over the operational footprint area and removing identified pockets of contaminated soil;
- Cleaning up of sources of possible soil contamination still present on the site to protect the downstream receiving environment;
- Ripping compacted areas and shaping all project-affected areas to be free draining and so that runoff from the rehabilitated project area is routed to the natural drainage lines;
- Spreading stockpiled subsoil and topsoil consecutively on areas from which it had been stripped, on the upper surface and sparingly onto the waste rock dumps;
- Testing the topsoil and ameliorating/fertilising it appropriately;
- Vegetating the site with locally indigenous species of grass, forbs, shrubs and trees
- Providing the required measures to limit at source the generation of contaminants which could adversely affect local groundwater quality.

### 4.8.2 Closure Objectives

Closure objectives must be met with regards to:

#### a) Topography

- To ensure that the final elevation will result in the continuation of the pre-mining surface drainage pattern.

#### b) Soil, Land Capability and Land Use

- To ensure that soil types are replaced in correct sequence, subsoil followed by topsoil, and at appropriate depths.
- To ensure post-mining land capability is at least similar to pre-mining, which is grazing and some arable lands.
- To ensure that the land capability is self-sustaining.

- To ensure that pre-mining land uses can continue.

**c) Surface Water**

- To ensure that no dirty water from the site enters the surrounding surface water systems.
- To maintain flow in downstream rivers to prevent deterioration of ecological status.

**d) Groundwater**

- To ensure that groundwater users that are impacted have alternative sustainable water sources of the similar quality and quantity.

**e) Flora and Fauna**

- To ensure that vegetation growth and cover on the rehabilitated areas is sustainable.
- To ensure that alien invasive growth is eradicated until the closure certificate is granted.
- To encourage surrounding animals to return into the rehabilitated areas to maintain the surrounding biodiversity.

**f) Wetlands**

- To minimize the disturbance on wetlands.
- To ensure that the adjacent wetland conditions are similar to that of the pre-mining Present Ecological State.
- All storm water diversion features will be designed to divert a 1:50 year 24hr storm event.

## ***4.9 Volumes and rate of water use required for the operation***

There will be no water use during the operation of the project.

### **4.9.1 Has a water use licence has been applied for?**

In terms of the NWA, a Water Use Licence was applied for

### 4.10 Impacts to be mitigated in their respective phases

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

Table 23: Environmental Management Programme for the proposed project

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
<b>Construction Phase</b>					
Air Quality	Excavations All infrastructure areas, development footprints and associated activities	Dust emissions due to erosion of open storage stockpiles and exposed areas when the threshold wind speed is exceeded.	<ul style="list-style-type: none"> <li>a) Wet suppression, applied sparingly, to ensure the absence of visible dust;</li> <li>b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-A-Side may also be used;</li> <li>c) Enforce low vehicle speeds on unpaved areas (&lt; 40 km/h);</li> </ul>	Dust fallout will be monitored and managed as per GNR827 and compared to baseline limits (which already exceed NEM:AQA limits). Conditions stipulated in licenses/rights/permits.	Dust management must be carried out through all phases of the borrow pit mining.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Vehicle movement	Emissions from the resuspension of loose material on the road surface. Vehicle-entrained dust emissions from the unpaved haul roads within the area	Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions. Other surface treatments include the use of chemicals such as calcium chloride or magnesium chloride. These chemicals attract moisture – drawing moisture out of the air during periods of high humidity, and also reducing the evaporation rate of water during hot periods. Some products contain surfactants which act as wetting agents. These not only reduce the amount of water required for wetting the roads, but also have slight binding properties. Another approach to dust control involves the application of organic or synthetic compounds that physically bind the dust particles together.		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Ecology	Site clearance for establishment or access roads, infrastructure and pit area	Clearing of vegetation	Avoid sensitive areas and implement buffer zones	Preservation of biodiversity in terms of NEM:BA	From day 1, through life of project until rehabilitation vegetation established
		Loss of plant	Limit the footprint area to the pit and infrastructure Avoid areas of remaining indigenous vegetation		
		Displacement of fauna species	Avoid high biodiversity sensitivity areas (natural vegetation, watercourses & wetlands) and comply to prescribed buffer zones		
		Loss of faunal	Avoid areas in which plant species of conservation concern may occur; If some areas cannot be avoided implement rescue of plant species of conservation concern		
Noise Impact	Site clearing	Clearing and stripping of topsoil and vegetation	Earthwork activities to be done during daytime working hours unless there is no heavy-duty		From day 1, through life of project until

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>machinery which may create a noise problem.</p> <p>Construction of borrow pit infrastructure</p> <p>Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem</p>	Environmental Conservation Act, Noise Regulations	rehabilitation vegetation established
	Vehicle movement and refuelling	Pollution of water resources as result of hydrocarbon spills	<p>a) Service all vehicles and machinery Refuel in hard park/bunded area Store hydrocarbons safely in bunded area</p> <p>b) Vehicle maintenance and inspection daily</p> <p>c) Spill kits must always be available and ready on-site</p>		
Soil, Land Use and Land Capability	Earthworks	Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling for the initial removal of	<p><b>a) Management and supervision of construction teams</b></p> <p>The activities of construction contractors or employees will be</p>	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any	Demarcate infrastructure area and fence off before any activity takes place and

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>overburden at the planned pits as well as the construction of infrastructure. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil. It will also change the current land use as well as land capability in areas where activities occur, and infrastructure is constructed</p>	<p>restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. In addition, compliance to these instructions must be monitored.</p> <p><b>b) Location of stockpiles</b></p> <p>Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. Refrain from locating stockpiles as close as possible to the development for</p>	<p>conditions stipulated in licenses/rights/permits</p>	<p>maintain these for life of the borrow pit. Rehabilitate areas completely as soon as activity in those areas ceases.</p>
	<p>Handling and storage of building material</p>	<p>This will have the potential to result in soil pollution when not managed properly.</p>	<p>cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden materials removed during construction in their final closure location, or as close as practicable to it</p>		
	<p>Vegetation clearance</p>	<p>Soil erosion is also anticipated due to vegetation clearance. The</p>			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>impacts of soil erosion are both direct and indirect. The direct impacts are the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. The off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation. Soil erosion is a permanent impact for once the resource has been lost from the landscape it cannot be recovered. Although there are off-site indirect impacts associated with this, the impact is mainly considered to be local.</p>	<p><b>c) Topsoil stripping</b></p> <p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p><b>d) Stockpiling of topsoil</b></p> <p>To minimise compaction associated with stockpile creation, it is recommended that</p>		



Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched.</p> <p><b>e) Prevention of stockpile contamination</b></p> <p>Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately</p> <p><b>f) Terrain stability to minimise erosion potential</b></p> <p>Management of the terrain for stability by using the following</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> <li>• Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures;</li> <li>• Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and</li> </ul>		
Groundwater	Storage of fuels and lubricants and movement of vehicles	Spills from improper storage of fuels and lubricants and also from leaking vehicles	<p>a) Place drip trays under vehicles when parked.</p> <p>b) If in-field refuelling is done from a tanker, it should be done in a designated dirty area</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSa will be complied with	Hydrocarbons will only be stored on site once bunded areas are constructed.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>and a spill kit and clean-up team must be available on site;</p> <p>c) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site;</p> <p>Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards</p>	<p>regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.</p>	<p>Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of borrow pit.</p>
Surface Water	Exposure of topsoil	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses	a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control. Surface	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		due to hydrocarbon and chemical spillages	<ul style="list-style-type: none"> <li>b) Vegetation should only be removed where absolutely necessary;</li> <li>c) Hydrocarbons should be stored on hardpark bunded facilities to ensure that all spillages are contained; and</li> <li>d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities</li> </ul>	water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of borrow pit.
	Vegetation removal	Altered drainage paths and loss of catchment yield due to the removal of vegetation and construction of diversion berms	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment.		
Traffic		Construction materials being transported to site will contribute to the	Road network able to support additional trucks.		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Transportation of materials and labourers	addition of traffic on the road network		Mine safety in terms of MHTS and relevant regulations	From day 1 until borrow pit closure
		Employees and labourers transported to/ from site	Road network able to support additional commuter trips		
		Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
Heritage	Site clearance	Site Clearance for construction activities might reveal or expose archaeological artefacts.	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken a) Education and training on heritage resources will be given to contractor employees	Heritage resources act	From construction until closure
Socio-Economic	Construction activities	The residual impacts associated with the creation of employment and business opportunities and training during the	a) The recruitment process has to be transparent and equitable; b) Maximise and monitor local recruitment; c) Consult local labour recruitment offices;	Good relations with communities	From construction until borrow pit closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>construction phase is that the workers can improve their skills by gaining more experience.</p>	<ul style="list-style-type: none"> <li>d) Prevent nepotism/corruption in local recruitment structures;</li> <li>e) Promote employment of women and youth;</li> <li>f) Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and</li> <li>g) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force</li> </ul>		
		<ul style="list-style-type: none"> <li>a) Improved economic development;</li> <li>b) Increased capacity to develop and maintain livelihood strategies</li> </ul>	<ul style="list-style-type: none"> <li>a) Ensure that there is stakeholder buy-in;</li> <li>b) Expanding its skills development and capacity building programmes for non-employees</li> </ul>		
		<p>Increase in injuries and possible loss of lives</p>	<ul style="list-style-type: none"> <li>a) Access control to all project elements, including fencing;</li> <li>b) Personal Protective Equipment for workers;</li> <li>c) Notification of blasting schedules;</li> </ul>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Waste Management	Construction activities	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials, general domestic waste. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution	a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers; b) Have recyclable wastes removed by responsible recyclers; and c) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfill	Waste management standards and Regulations	From construction until closure
<b>Operational Phase</b>					

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Air Quality	Vehicle movement	Vehicle entrainment from unpaved roads	a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads; b) Wet suppression on haul roads, with the addition of a chemical binder if necessary	Dust fallout will be monitored and managed as per GNR827 and compared to baseline limits (which already exceed NEM:AQA limits). Conditions stipulated in licenses/rights/permits.	Dust management plan must be in place at the start of the project and carried out through all phases of the borrow pit mining.
	Materials handling	Materials handling operations which are predicted to result in significant fugitive dust emissions from mining operations include the transfer of material by means of loading and offloading of trucks.	a) Reduced tipping and drop heights where practicable; b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles; c) Maintaining all vehicles in good condition at all times; and		
Ecology		Alien plant establishment	Implementation of alien invasive plant management plan needs to be continued during operation to		From day 1, through life of project until



Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			prevent the growth of invasive on cleared areas	Preservation of biodiversity in terms of NEM:BA	rehabilitation of vegetation established
		Disturbance/Displacement of Faunal species	Minimise footprint area Work only in clearly demarcated areas		
		Disturbance of vegetation communities	Minimise footprint area Work only in clearly demarcated areas		
		Habitat fragmentation	Minimise footprint area Work only in clearly demarcated areas		
		Killing of faunal species	Minimise footprint area Work only in clearly demarcated areas		
Noise	Pit activities	Noise increase at the boundary of the borrow pit footprint and at the abutting residential	a) All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off.	Environmental Conservation Act, Noise Regulations	From day 1, through life of project until rehabilitation vegetation established
	Hauling of waste rock to the waste dump				
	Additional traffic		Speed limit to be adhered to at all times		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Soil, land use and land capability	Spills of fuel and lubricants	Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as wells as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have medium-high significance on the soil resource.	<p><b>Management of potential soil contamination during the operational phase</b></p> <p>The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:</p> <ul style="list-style-type: none"> <li>a) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal;</li> <li>b) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled;</li> <li>c) Equipment, and vehicle maintenance and washdown areas, are contained and</li> </ul>	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any conditions stipulated in licenses/rights/permits	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of borrow pit. Rehabilitate areas completely as soon as activity in those areas ceases.
	Vehicle movement	Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>permanent impact that will be localized within the site boundary with medium-low consequence and significance in the mitigated scenario.</p>	<p>appropriate means provided for treating and disposing of liquids and solids.</p> <p>d) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors).</p>		
	<p>Vegetation clearance</p>	<p>During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion. Soil surfaces with infrastructure. This is a permanent impact that will be localized within the site boundary with medium-high consequence and significance. With proper mitigation measures it is anticipated that the significance of this impact will be reduced to low</p>			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Traffic	Transportation of staff	Haulage to/ from site; and staff to/from site	Road network able to support additional trucks.	Mine safety in terms of MHSA and relevant regulations	From day 1 until borrow pit closure
	Dust from vehicle movement	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
	Noise from vehicle movement	Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.		
Heritage Impact Assessment	Opening of pits	Opening of the pits might expose or reveal archaeological artefacts	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to employees	Heritage resources act	From construction until closure
Socio-Economic		The impact may be reversible over time as workers and job-seekers leave the area, consequences such as	a) Limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; b) Liaise openly and frequently with affected	Good relations with communities	From construction until borrow pit closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>HIV/AIDS and unwanted pregnancies will be permanent</p>	<p>stakeholders to ensure they have information about the Project;</p> <p>c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that Contractor has no control over activities related to workers' behaviour, however It is recommended that HIV/AIDS campaigns are conducted within the affected area;</p> <p>d) Discourage influx of jobseekers by prioritising employment of unemployed members of local communities;</p> <p>e) Clear identification of workers -prevention of loitering;</p> <p>f) Liaison with police or establish/ support community policing forum;</p> <p>g) Promote projects providing housing, especially low-cost housing, to link with the proposed</p> <p>h) Community education; and</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>i) Implement measures to address potential conflict between locals and non-locals</li> </ul>		
		<p>The increase in nuisance factors and associated changed sense of place will be negative, and direct as a result of Project activities, and indirect as a result of migrant job-seekers</p>	<ul style="list-style-type: none"> <li>a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies;</li> <li>b) Make available, maintain, and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders;</li> <li>c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors</li> </ul>		
		<p>Strain on the existing infrastructure which is already inadequate.</p>	<ul style="list-style-type: none"> <li>a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services;</li> <li>b) To work in partnership with government, industry, and relevant organisations to</li> </ul>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>enhance the existing infrastructure and services;</p> <p>c) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders</p>		
		Loss of grazing land	<p>a) Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner with the intention to acquire only the required servitude area;</p>		
		Altered sense of place and breakdown of existing social networks	<p>a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities;</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		a) Developed local economy; b) Increased capacity to develop and maintain livelihood strategies	Maximise benefits from local employment, skills and economic development		
<b>Decommissioning Phase</b>					
Ecology	Shaping of landscape	Loss of species of conservation concern	All infrastructure that could have a negative impact on faunal species (powerlines etc) needs to be decommissioned and removed	Preservation of biodiversity in terms of NEM:BA	From day 1, through life of project until rehabilitation vegetation established
	Revegetation of landscape	Impact on the growth and health of both fauna and flora	Implement rehabilitation strategy and rehabilitation interventions		
	Monitoring of plant species establishment	Establishment of vegetation	Implement rehabilitation monitoring plan and remedy actions		
		Habitat reconstruction	Implement rehabilitation monitoring plan and remedy actions		



Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		Habitat stabilisation	Implement rehabilitation monitoring plan and remedy actions		
Noise	Rehabilitate of disturbed areas	Noise increase at the boundary of the borrow pit footprint and at the abutting residential	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Environmental Conservation Act, Noise Regulations	From day 1, through life of project until rehabilitation vegetation established
	Planting of grass and vegetation at rehabilitated area		Mining activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.		
	Maintenance of disturbed area		Maintenance activities to be done during daytime working hours.		
	Vehicular and machinery movement	Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			c) Spill kits must always be available and ready on-site		
Soil, land use and land capability	Traffic movement	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	<p><b>a) Management and supervision of decommissioning teams</b></p> <p>The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.</p> <p><b>b) Site preparation</b></p> <p>Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to</p>	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any conditions stipulated in licenses/rights/permits	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of borrow pit. Rehabilitate areas completely as soon as activity in those areas ceases.
	Earthworks	Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land capability but may increase soil compaction			
	Handling and storage of materials	Other activities in this phase that will impact on soil are the handling and			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly</p>	<p>approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles.</p> <p><b>c) Seeding and re-vegetation</b></p>		
	<p>Revegetation</p>	<p>With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion</p>	<p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated.</p> <p><b>d) Prevention of soil contamination</b></p> <p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> <li>○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site;</li> <li>○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;</li> </ul>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>○ Containing potentially contaminating fluids and other wastes; and</li> <li>○ Cleaning up areas of spillage of potentially contaminating liquids and solids.</li> </ul>		

<b>Environmental Aspect</b>	<b>Activity</b>	<b>Potential Impacts</b>	<b>Mitigation Measures</b>	<b>Compliance with Standards</b>	<b>Time Period for Implementation</b>
Surface water	Post closure	Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of borrow pit.
Traffic Impact	Removal of rubble and other materials from site	Added traffic on the road network	Road network able to support additional trucks.	Mine safety in terms of MHSA and relevant regulations	From day 1 until borrow pit closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Heritage	Ripping and shaping of compacted areas	Ripping and shaping all compacted areas to be free draining, followed by re-vegetation might expose human remains or archaeological artefacts	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to employees	Heritage resources act	From construction until closure

## ***4.12 Impact Management Outcomes***

Refer to Heading 3.13

## ***4.13 Impact Management Actions***

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

### **4.13.1 Project Phases**

The environmental impacts of the project were considered and assessed for the following phases:

- a) Construction;
- b) Operational; and
- c) Closure and rehabilitation

#### **Construction Phase**

The construction phase will comprise of the following:

- a) Site survey and putting up pegs
- b) Vegetation clearing within the footprint
- c) Demarcate mining area and topsoil, overburden and waste rock storage areas

#### **Operational Phase (Mining Phase)**

Activities will include the following:

- a) Stripping and stockpiling of topsoil and overburden ahead of pit opening
- b) Equipment and vehicle maintenance at the workshop

#### **Closure and Rehabilitation**

Activities of closure and rehabilitation will involve:

- a) Revegetating the backfilled areas
- b) Post-closure monitoring of surface water, groundwater, and vegetation



### 4.14 Summary of Environmental Impact Management and Monitoring Actions

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
<b>Construction Phase</b>							
Air Quality	Excavations of infrastructure areas, development footprints and associated activities	Remain within the Air Quality Regulations and Dust Regulations standards	Dust emissions due to erosion of open storage stockpiles and exposed areas when the threshold wind speed is exceeded.	<ul style="list-style-type: none"> <li>a) Wet suppression, applied sparingly, to ensure the absence of visible dust;</li> <li>b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-ASide may also be used;</li> <li>c) Enforce low vehicle speeds on unpaved areas (&lt;40 km/h);</li> <li>d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust;</li> <li>e) Requiring contractors to maintain construction vehicles in good condition</li> </ul>	ECO Occupational hygienist	Monthly Monthly Dust Monitoring Report	
	Vehicle movement	Same as above	Emissions from the resuspension of loose material on the road surface. Vehicle-entrained dust emissions from the unpaved haul roads within the proposed mining area potentially represent the most significant source of fugitive dust for the borrow pit	Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions. Other surface treatments include the use of chemicals such as calcium chloride or magnesium chloride. These chemicals attract moisture—drawing moisture out of the air during periods of high humidity, and also reducing the evaporation rate of water during hot periods. Some products contain surfactants which act as wetting agents. These not only reduce the amount of water required for wetting the roads, but also have slight binding properties. Another approach to dust control involves the application of organic or synthetic compounds that physically bind the dust particles together.			
Ecology	Site clearance for establishment or access roads, infrastructure and pit area		Clearing of vegetation	<ul style="list-style-type: none"> <li>Avoid sensitive areas and implement buffer zones</li> <li>Limit the footprint area to the pit and infrastructure</li> <li>Avoid areas of remaining indigenous vegetation</li> </ul>	ECO	Monthly	

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
			Displacement of fauna species	Avoid high biodiversity sensitivity areas (natural vegetation, & wetlands) and comply to prescribed buffer zones  Avoid areas in which plant species of conservation concern may occur; If some areas cannot be avoided implement rescue of plant species of conservation concern			
Noise Impact	Site clearing	To prevent indiscreet noise levels to surrounding environment	Clearing and stripping of topsoil and vegetation  Construction of infrastructure	Earthwork activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem  Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem	ECO  Occupational hygienist	Monthly	
	Vehicle movement and refuelling	Same as above	Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site			
Soil, Land Use and Land Capability	Transport of materials and labour  Earthworks	To preserve quality of topsoil until it is needed for closure	Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling as well as drilling and blasting for the initial removal of overburden at the pits. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil. It will also change the current land use as well as land capability in areas where activities occur, and infrastructure is constructed	<b>a) Minimize the footprint of the Project.</b>  All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined. This measure will significantly reduce areas to be compacted by heavy construction vehicles and regular activities during the operational phase.  <b>b) Management and supervision of construction teams</b>  The activities of construction contractors or employees will be restricted to the planned areas.	ECO	Monthly	
	Handling and storage of building material		This will have the potential to result in soil pollution when not managed properly.	Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site.	ECO	Monthly	

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports
	Vegetation clearance		<p>Soil erosion is also anticipated due to vegetation clearance. The impacts of soil erosion are both direct and indirect. The direct impacts are the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. The off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation. Soil erosion is a permanent impact for once the resource has been lost from the landscape it cannot be recovered. Although there are off-site indirect impacts associated with this, the impact is mainly considered to be local.</p>	<p>In addition, compliance to these instructions must be monitored.</p> <p><b>c) Location of stockpiles</b></p> <p>Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. Refrain from locating stockpiles as close as possible to the development for cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden materials removed during construction in their final closure location, or as close as practicable to it</p> <p><b>d) Topsoil stripping</b></p> <p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p><b>e) Prevention of stockpile contamination</b></p> <p>Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately</p> <p><b>f) Terrain stability to minimise erosion potential</b></p>	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
				<p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> <li>• Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures;</li> <li>• Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and</li> <li>• Using drainage control measures and culverts to manage the natural flow of surface runoff</li> </ul> <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> <li>• Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures;</li> <li>• Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces.</li> </ul> <p><b>g) Prevention of soil contamination</b>                      During the construction phase, chemical soil pollution should be minimised as follows:</p> <ul style="list-style-type: none"> <li>• Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material;</li> <li>• Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;</li> <li>• Containing potentially contaminating fluids and other wastes; and</li> <li>• Cleaning up areas of spillage of potentially contaminating liquids and solids.</li> </ul>			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
Groundwater	Storage of fuels and lubricants and movement of vehicles	To prevent deterioration in groundwater quality	Spills from improper storage of fuels and lubricants and also from leaking vehicles	<ul style="list-style-type: none"> <li>a) Place drip trays under vehicles when parked.</li> <li>b) If in-field refuelling is done from a tanker, it should be done in a designated dirty area and a spill kit and clean-up team must be available on site;</li> <li>c) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site;</li> <li>d) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards</li> </ul>	ECO	Monthly	
Surface Water	Exposure of topsoil	To prevent pollution of surface waterbodies	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	<ul style="list-style-type: none"> <li>a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites</li> <li>b) Vegetation should only be removed where absolutely necessary;</li> <li>c) Hydrocarbons should be stored on hard park bunded facilities to ensure that all spillages are contained; and</li> </ul>	ECO	Monthly	
Traffic	Transportation of materials and labourers	Minimise congestion in access roads and intersections	Construction materials being transported to site will contribute to the addition of traffic on the road network	Road network able to support additional trucks.	ECO	Monthly	
			Employees and labourers transported to/ from site	Road network able to support additional commuter trips			
			Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).			
Heritage	Site clearance	To prevent destruction of artefacts should they be unearthed.	Site Clearance for construction activities might reveal or expose archaeological artefacts.	c) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken	ECO	Monthly	

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
				d) Education and training on heritage resources will be given to employees			
Socio-Economic	Construction activities	To create employment opportunities for the local communities	The residual impacts associated with the creation of employment and business opportunities and training during the construction phase is that the workers can improve their skills by gaining more experience.	<ul style="list-style-type: none"> <li>a) Adopt recruitment strategies that ensure local people are given employment preference;</li> <li>b) Effective implementation of training and skills development initiatives;</li> <li>c) The recruitment process has to be transparent and equitable;</li> <li>d) Maximise and monitor local recruitment;</li> <li>e) Consult local labour recruitment offices;</li> <li>f) Prevent nepotism/corruption in local recruitment structures;</li> <li>g) Promote employment of women and youth;</li> <li>h) Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and</li> <li>i) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force</li> </ul>	ECO	Monthly	
Waste Management	Construction activities	To practise the 3Rs (Recycle, Reuse and Reduce)	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials, general domestic waste and offcuts of building materials such as steel, wood, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution	<ul style="list-style-type: none"> <li>a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers;</li> <li>b) Have recyclable wastes removed by responsible recyclers; and</li> <li>c) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfill</li> </ul>	ECO	Monthly	
<b>Operational Phase</b>							
Air Quality	Vehicle movement	Monitor emissions concentrations in line with Air Quality Standards and Dust Regulations	Vehicle entrainment from unpaved roads	<ul style="list-style-type: none"> <li>a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads;</li> <li>b) Wet suppression on haul roads, with the addition of a chemical binder if necessary</li> </ul>	ECO	Monthly	
	Materials handling		Materials handling operations which are predicted to result in significant fugitive	<ul style="list-style-type: none"> <li>a) Reduced tipping</li> </ul>			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
			dust emissions from mining operations include the transfer of material by means of loading and offloading of trucks. The quantity of dust which will be generated will depend on various non-climatic parameters such as the nature (moisture content and silt content) and volume of the material handled.	b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles; c) Maintaining all vehicles in good condition at all times; and d) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS			
Ecology	Operation of borrow pits and management of access roads	Confine vegetation clearance and faunal disturbance to borrow pit boundary	Alien plant establishment	Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas	ECO	Monthly	
			Disturbance/Displacement of Faunal species	Minimise footprint area Work only in clearly demarcated areas			
			Disturbance of vegetation communities	Minimise footprint area Work only in clearly demarcated areas			
			Habitat fragmentation	Minimise footprint area Work only in clearly demarcated areas			
			Killing of faunal species	Minimise footprint area Work only in clearly demarcated areas			
Noise	Pit activities Hauling of waste rock to the waste dump Hauling of material to the plant Additional traffic Operation of an emergency generator	To minimise intrusive noise levels at sensitive receptors	Noise increase at the boundary of the borrow pit footprint and at the abutting residential	a) All noise sources exceeding 85.0 dBA to be identified and if practical to be acoustically screened off.	ECO	Monthly	
				Speed limit to be adhered to at all times			
				Noise readings to be done in the vicinity of and along the emergency boundaries to ensure that the prevailing ambient noise level is not exceeded.			
Soil, land use and land capability	Borrow pit		Surface infrastructure will both lead to surface impacts on soil resources.		ECO	Monthly	

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
		To protect soil from contamination; and  To preserve as much of the fertility of the topsoil as possible;	Surface infrastructure like buildings, haul roads, waste rock dumps and product stockpiles are by far the most disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilization of the topsoil	<b>Management of potential soil contamination during the operational phase</b>  The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:  a) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal; b) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; c) Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimize corrosion. Above-ground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater; d) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids. e) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors)			
	Spills of fuel and lubricants	Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have medium-high significance on the soil resource.					
	Vehicle movement	Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a permanent impact that will be localized within the site boundary with medium-low consequence and significance in the mitigated scenario.					
	Vegetation clearance		During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion. Soil surfaces with infrastructure such as concrete slabs and buildings will not be exposed to erosion any longer.				
Surface water	Mining activities	Prevent contamination of surface water bodies	Pollution of surrounding water courses as a result of activities during the operational phase (spills, overflows and contaminated runoff)	a) There are no mitigation measures for a loss of contained water to the catchment yield as long as the borrow pit is there however;	ECO	Monthly	



Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
				b) Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment - Sustainable water management needs to be implemented			
Traffic	Transportation of staff	Ensure worker safety and compliant with road safety signages	Haulage to/ from site; and staff to/from site	Road network able to support additional trucks.	ECO	Monthly	
	Dust from vehicle movement		Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).			
	Noise from vehicle movement		Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.			
<b>Decommissioning and Rehabilitation Phase</b>							
Air quality	Demolition of infrastructure	To remain within national standards at site perimeter and at sensitive receptors	Particulate mobilisation can be caused by the demolition of buildings and handling of the rubble, backfilling of the storm water dam and "dirty" water collection channels and ripping and shaping of compacted areas	<ul style="list-style-type: none"> <li>a) Wet suppression during landscaping and materials handling activities;</li> <li>b) Enforcement of low vehicle speeds on unpaved areas (&lt;40 km/h);</li> <li>c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust;</li> <li>d) Vegetation of bare surfaces with a locally indigenous grass species as soon as possible;</li> </ul>	ECO	Weekly	
Ecology	Shaping of landscape	To establish a self-sustaining diversity of local indigenous vegetation	Loss of species of conservation concern	All infrastructure that could have a negative impact on faunal species (powerlines etc) needs to be decommissioned and removed	ECO	Monthly	
	Revegetation of landscape		Impact on the growth and health of both fauna and flora	Implement rehabilitation strategy and rehabilitation interventions			
	Monitoring of plant species establishment		Establishment of vegetation	Implement rehabilitation monitoring plan and remedial actions			
			Habitat reconstruction	Implement rehabilitation monitoring plan and remedial actions			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
			Habitat stabilisation	Implement rehabilitation monitoring plan and remedial actions			
Noise	Backfill of disturbed areas	To avoid intrusive noise levels at sensitive receptors	Noise increase at the boundary of the borrow pit footprint and at the abutting residential	Rehabilitation activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem	ECO	Monthly	
	Planting of grass and vegetation at rehabilitated area			Rehabilitation activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem			
	Maintenance of disturbed area			Maintenance activities to be done during daytime working hours.			
	Vehicular and machinery movement		Pollution of water resources as result of hydrocarbon spills <ul style="list-style-type: none"> <li>a) Service all vehicles and machinery/Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area</li> <li>b) Vehicle maintenance and inspection daily</li> <li>c) Spill kits must always be available and ready on-site</li> </ul>				
Soil, land use and land capability	Traffic movement	Restore land to its pre-mining state	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	<b>a) Management and supervision of decommissioning teams</b>  The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.	ECO	Monthly	
	Earthworks		Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land capability but may increase soil compaction	<b>b) Infrastructure removal</b>  All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site			
	Handling and storage of materials		Other activities in this phase that will impact on soil are the handling and storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	<b>c) Site preparation</b>  Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
	Revegetation		<p>With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion</p>	<p>(sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles</p> <p><b>d) Seeding and re-vegetation</b></p> <p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated</p> <p><b>e) Prevention of soil contamination</b></p> <p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> <li>○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site;</li> <li>○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;</li> <li>○ Containing potentially contaminating fluids and other wastes; and</li> <li>○ Cleaning up areas of spillage of potentially contaminating liquids and solids.</li> </ul>			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring and Reports	Frequency
Surface water	Post closure	Prevent contamination of water bodies	Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored	ECO	Monthly	
Traffic Impact	Removal of rubble and other materials from site	To avoid adding to frustration of other road users or compromising road safety	Added traffic on the road network	Road network able to support additional trucks.	ECO	Monthly	
Heritage	Ripping and shaping of compacted areas	Report any suspicion of unmarked graves or artefacts to SAHRA and Provincial Heritage Resource Agency	Ripping and shaping all compacted areas to be free draining, followed by re-vegetation might expose human remains or archaeological artefacts	e) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken f) Education and training on heritage resources will be given to employees	ECO	Monthly	

## **4.15 Financial Provision**

### **4.15.1 Closure Objectives**

Closure objectives identified in this report include:

#### **a) Topography**

- To ensure that the final elevation will result in the continuation of the pre-mining surface drainage pattern.

#### **b) Soil, Land Capability and Land Use**

- To ensure that soil types are replaced in correct sequence, subsoil followed by topsoil, and at appropriate depths.
- To ensure post-mining land capability is at least like pre-mining which is grazing and some arable lands.
- To ensure that the land capability is self-sustaining.
- To ensure that pre-mining land uses can continue.

#### **c) Surface Water**

- To ensure that no dirty water from the site enters the surrounding surface water systems.
- To maintain flow in downstream rivers to prevent deterioration of downstream ecological status.

#### **d) Groundwater**

- To ensure that groundwater users that are impacted have alternative sustainable water sources of the similar quality and quantity.

#### **e) Flora and Fauna**

- To ensure that vegetation growth and cover on the rehabilitated areas is sustainable.
- To ensure that alien invasive growth is eradicated until the closure certificate is granted.
- To encourage surrounding animals to return into the rehabilitated areas to maintain the surrounding biodiversity.

#### **f) Wetlands**

- To minimise the disturbance on wetlands.

#### **4.15.2 Confirm Specifically That the Environmental Objectives in Relation to Closure Have Been Consulted with Landowner and Interested and Affected Parties.**

Closure objectives were presented in the draft EIA/EMP phase meeting. All registered I&APs and landowners were invited to attend. Furthermore, the draft EIA/EMPr was made available to I&APs and landowners for a 30-day review period.

#### **4.15.3 Calculate and State the Quantum of the Financial Provision Required to Manage and Rehabilitate the Environment in Accordance with The Applicable Guideline.**

The closure costs of the aspects linked with the project have been determined using the Mineral Resources (DMR) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions Provided by a Mine (2005). The closure costs are based solely on the premature closure of Mining Area only, as this would be the only area that would have been impacted upon within one year of operation.

The approach to calculating the closure quantum as specified in the DMR Guideline is summarised as follows and is reported in Table 2-2 of the guideline:

- a) Step 1: Determine the Mineral Mined which.
- b) Step 2A: Determine Primary Risk Class.
- c) Step 3: Determine Environmental Sensitivity has been determined by reference to Table B.4 of the DMR Guideline
- d) Step 4.1: Determine level of information
- e) Step 4.2: Determine the closure components and associated rates –the rates have been escalated with the Consumer Price Index since the inception of the guidelines.
- f) Step 4.3: Determine the unit rates for closure components. The rates used in the assessment are based on the original 2005 rates included in the guideline, with these rates inflated by the Consumer Price Index (CPI).
- g) Step 4.4: Determination of weighting factors:
  - o Weighting Factor 1: The nature of the terrain where the operation is located.
  - o Weighting Factor 2: The proximity of the operation to an urban centre.
- h) Step 4.5: Identify areas of disturbance
- i) Step 4.6: Identify closure costs from Specialists.
- j) Step 4.7: Proposed closure costs for the Project as indicated in Table 24.

Table 24: Quantum Calculation

	CLOSURE COMPONENT	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
<b>1</b>	<b>Infrastructural Areas</b>					
<b>1.1</b>	<b>Dismantling of processing plant and related structures</b>					
1.1.1.	Includes overland conveyors	No	0	m3	R14,71	R0,00
	<b>Sub-total for Dismantling of processing plant and related structures</b>					<b>R0,00</b>
<b>1.2</b>	<b>Demolition of steel buildings</b>					
1.2.1	Demolition of steel buildings	Yes	15	m3	R204,96	R3 074,40
	<b>Sub-total for Demolition of steel buildings</b>					<b>R3 074,40</b>
<b>1.3</b>	<b>Demolition of other buildings and structures</b>					
1.3.1	<u>Security building and change house</u>					
	Housing and Administration Facilities	Yes	100	m2	R408,93	R40 893,00
1.3.2	<u>Workshop</u>					
	Shed-type steel structure	Yes	50	m2	R408,93	R20 446,50
	Concrete base	Yes	50	m2	R408,93	R20 446,50
1.3.3	<u>Offices</u>					
	3 mobile containers to be used	No	0	m2	R408,93	R0,00
1.3.4	<u>Guard room</u>					
	Single storey wendy house	No	0	m2	R408,93	R0,00
1.3.5	<u>Carport</u>					

	CLOSURE COMPONENT	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
	Parking area	Yes	50	m2	R408,93	R20 446,50
1.3.6	<u>Fencing</u>					
	Remove security fencing	No	0	m	R126,45	R0,00
	Erect stock fencing	Yes	200	m	R126,45	R25 290,00
	<b>Sub-total for Demolition of other buildings and structures</b>					<b>R127 522,50</b>
<b>1.4</b>	<b>Rehabilitation of roads and paved surfaces</b>					
1.4.1	Hard stand	Yes	300	m2	R36,38	R10 914,00
1.4.2	Main access road	Yes	600	m2	R36,38	R21 828,00
	<b>Sub-total for Rehabilitation of roads and paved surfaces</b>					<b>R32 742,00</b>
	<b>Sub-total for Infrastructural Areas</b>					<b>R163 338,90</b>
<b>2</b>	<b>Mining Areas</b>					
<b>2.1</b>	<b>Open pit rehabilitation including final voids and ramps</b>					
2.1.1	Opencast rehabilitation	Yes	0,1	ha	R214 888,54	R21 488,85
	<b>Sub-total for Open pit rehabilitation including final voids and ramps</b>					<b>R21 488,85</b>
<b>2.2</b>	<b>Rehabilitation of stockpiles and processing residues</b>					
2.2.1	Overburden and Spoils Rehabilitation	Yes	0,1	ha	R143 259,03	R14 325,90
	<b>Sub-total for Rehabilitation of stockpiles and processing residues</b>					<b>R14 325,90</b>
<b>2.3</b>	<b>Rehabilitation of water impoundments</b>					
2.3.1	Rehabilitation of processing waste deposits and evaporation ponds	Yes	0,1	ha	R518 235,21	R51 823,52
	<b>Sub-total for Rehabilitation of clean water impoundments</b>					<b>R51 823,52</b>



	CLOSURE COMPONENT	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
<b>2.4</b>	<b>Rehabilitation of subsided areas</b>					
2.4.1	Shaping and levelling of stockpile and other infrastructural footprint areas	Yes	0,1	ha	R119 957,86	R11 995,79
2.4.2	Vegetation of disturbed areas	Yes	0,1	ha	R8 258,56	R825,86
	<b>Sub-total for Rehabilitation of subsided areas</b>					<b>R12 821,64</b>
	<b>Sub-total for Mining Areas</b>					<b>R100 459,92</b>
<b>3</b>	<b>General Surface Rehabilitation</b>					
<b>3.1</b>	<b>General Surface Rehabilitation</b>					
3.1.1	Rip to alleviate compaction of stockpile and infrastructural footprint areas	Yes	0,1	ha	R113 485,31	R11 348,53
	<b>Sub-total for General Surface Rehabilitation</b>					<b>R11 348,53</b>
<b>3.2</b>	<b>Other surface disturbances</b>					
3.2.1	Plant Area	Yes	0	ha	R113 485,31	R0,00
	<b>Sub-total for Other surface disturbances</b>					<b>R0,00</b>
	<b>Sub-total for General Surface Rehabilitation</b>					<b>R11 348,53</b>
	<b>Sub-Total 1 (for infrastructure and related aspects)</b>					<b>R275 147,35</b>
<b>4</b>	<b>P&amp;Gs, Contingencies and Additional Allowances</b>					
4.1	Preliminaries and general (Weighting Factor 2)	Yes		12%	R33 017,68	R33 017,68
4.2	Additional Studies	Yes	1	sum	R60 000,00	R60 000,00
4.3	Contingencies	Yes		10%	R27 514,74	R27 514,74
	<b>Sub-Total 2 (for additional allowances)</b>					<b>R120 532,42</b>

	CLOSURE COMPONENT	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
<b>5</b>	<b>Pre-site Relinquishment Monitoring and Aftercare</b>					
5.1	Water Management	Yes	2	ha	R43 150,31	R86 300,62
5.2	Care and maintenance of rehabilitated areas	Yes	0,5	ha	R15 102,61	R7 551,31
	<b>Sub-Total 3 (for Post-Closure aspects)</b>					<b>R214 384,34</b>
	<b>Grand Total Excl. VAT. (for Sub-Total 1+2+3)</b>					<b>R610 064,11</b>

**1.1 *Confirm that the Financial Provision Will Be Provided as Determined.***

Financial Provision, to the amount of **R610 064,11** be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Mining Permit Operations.

## **2 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON, INCLUDING**

### ***2.1 Monitoring of Impact Management Actions***

Refer to Section 4.14

### ***2.2 Monitoring and reporting frequency***

Refer to Section 4.14.

### ***2.3 Responsible persons***

Refer to Section 4.14

## ***2.4 Indicate The Frequency Of The Submission Of The Performance Assessment Report.***

The Environmental Performance Report will be submitted to the DMR after every 2 years

## **3 ENVIRONMENTAL AWARENESS PLAN**

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

#### **3.1.1 Training Needs**

A training needs analysis is to be performed through all levels of the organization including those within the administration. Each of the categories / levels of the organization have different responsibilities and roles, accordingly, different knowledge requirements are applicable. A training needs analysis is to be performed through all levels of the organization including those within the administration. Each of the categories / levels of the organization have different responsibilities and roles, accordingly, different knowledge requirements are applicable.

#### **3.1.2 General Awareness Training**

The Human Resources Development (HRD) Manager, together with the SHE Manager, will be responsible for the development of, or facilitating the development of, the required general SHE induction and awareness training. A general environmental awareness training module will be developed and integrated into the general induction programme. The general awareness training must include the Environmental Policy, a description of the environmental impacts and aspects and the importance of conformance to requirements, general responsibilities of Black South Energy personnel and contractors with regard to the environmental requirements and a review of the emergency procedures and corrective actions; and

A Training Practitioner or the Environmental Officer (EO) will conduct the general awareness training. The training presenter will keep a record of the details of all persons attending general awareness training. Such attendance registers shall indicate the names of attendants and their organisations, the date and the type of training received.

## **3.2 Manner In Which Risks Will Be Dealt With In Order To Avoid Pollution Or The Degradation Of The Environment.**

Training will address the specific measures and actions as listed in the EIA and EMP. In this way each staff member will be provided the knowledge required for their job to firstly prevent impact and secondly identify if an impact is likely to occur and then to report the possibility of risk or impact immediately so as to ensure immediate response.

The following is a list of the most likely potential environmental emergencies, followed by basic summary of procedures (contractor will develop detailed SOPs, which will incorporate detailed requirements under the MPRDA Regulations, for emergency events:

- a) Fires
- b) Chemical/hydrocarbon spill or leak
- c) Explosions

In the case of environmental emergencies, the remedial measures and actions as listed in the Emergency Response Plan should be followed, in addition the relevant authorities should be contacted

### **3.2.1 Fire**

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers should be placed around the site at accessible locations and needs to be frequently inspected and maintained in working condition. The following procedures apply in the event of a fire:

- a) An alarm should be activated to alert all employees and contractors.
- b) Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate-based fire extinguisher for chemical and electrical fires.
- c) In the event of a small fire, the fire extinguishers placed around the site should be used to contain and extinguish the fire.
- d) In the event of a large fire, the fire department will be notified.
- e) All staff will receive training in response to a fire emergency on site, including evacuation procedures.
- f) If possible, all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains.

- g) In case of a chemical or petroleum fire, run-off from the area should be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier.
- h) Contaminated run-off must be diverted into an oil sump or cleaned up.

## 4 IMPLEMENTATION PLAN

It is recommended that the EMP be implemented and monitored through regular audits conducted by an independent environmental practitioner. It is suggested that the audits be conducted annually, starting from the commencement of the mining operations up to rehabilitation phase. The audit reports must be submitted to the competent authority.

### 4.1 *Responsibility for EMPr Implementation*

Department of Public Works and Roads remains ultimately accountable for the site and remains liable for any environmental damage caused by activities undertaken on the site. It is from this point of view that Department of Public Works and Roads sets out a range of requirements in terms of the management of the environmental aspects for the site, to which Contractors must adhere as a prerequisite to their appointment.

It is the responsibility of Department of Public Works and Roads to ensure that the principles of integrated environmental management, in terms of the requirements of Chapter 5 of NEMA, are implemented and maintained on the site and that environmentally sustainable practices are undertaken on the site. Department of Public Works and Roads has to ensure that an approved EMPr and the conditions of the Environmental Authorisation (EA) be supplied to the Contractor for the activities undertaken on the site and also monitor the Contractor's compliance to the requirements set out in the EMPr and EA and take disciplinary action for non-compliance.

## 5 UNDERTAKING

The EAP herewith confirms

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant; and

- the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;
- made by interested and affected. parties are correctly reflected herein.

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Signature of the environmental assessment practitioner:

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Name of company:

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Date:



# **APPENDIX 1: EAP's CV**

## **APPENDIX 2: LOCALITY MAP**

# **APPENDIX 3: PUBLIC PARTICIPATION PROCESS**

# **APPENDIX 3A: SITE NOTICE**

# **APPENDIX 3B: NEWSPAPER ADVERT**

## **APPENDIX 3C: BID**

# **APPENDIX 3D: CORRESPONDENCE WITH I&APS AND CIRCULATION OF DRAFT BAR**

To be included in the final report

# **APPENDIX 3E: CORRESPONDENCE WITH LAND AFFAIRS**

To be included in the final report



## **APPENDIX 3F: COMMENTS AND REPORT**

To be included in the final report

# **APPENDIX 3G: CONSENT LETTER FROM THE TRIBAL AUTHORITY**

# **APPENDIX 3H: LIST OF INTERESTED AND AFFECTED PARTIES**

## **APPENDIX 4: SPECIALIST STUDIES**

## **APPENDIX 4A: HIA REPORT**

# **APPENDIX                      4B:                      VEGETATION ASSESSMENT**

# **APPENDIX 4C: WETLAND ASSESSMENT REPORT**

## **APPENDIX 5: SENSITIVITY MAP**