DRAFT BASIC ASSESSMENT REPORT FOR A MINING PERMIT ON PORTION OF PORTION 33 OF FARM SPITSKOP 276 IS

FOR PUBLIC REVIEW

DMR REF: MP 30/5/1/1/3/12500MP

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Conducted on behalf of:

Black South Energy

Compiled by:

_____

Charles Chigurah

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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR PUBLIC REVIEW

DMR REF: MP 30/5/1/1/3/12500MP

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: Black South Energy (Pty) Ltd

TEL NO: 081 019 1781

FAX NO: 086 552 1405

POSTAL ADDRESS: Private Bay X9013, Ermelo. 2350

PHYSICAL ADDRESS: 23 Voorterkker Street, Ermelo. 2350

FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/1/3/12500MP

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on 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 ASSSSMENT AND BASIC ASSESSMENT REPORT

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 Details of the

1.1.1 Details of the EAP

Name of The Practitioner	:	Charles Chigurah
Tel No.	:	073 565 8847
Fax No.	:	
E-mail address	:	charles@gccsustainableconsultingengineers.co.za

1.1.2 Expertise of the EAP

1.1.2.1 The qualifications of the EAP (with evidence)

Charles Chigurah holds an honours 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

1.2 Location of the overall Activity

Table 1: Location details

Farm Name:	Portion of Portion 33 of Farm Spitskop 276 IS
Application area (Ha):	5ha
Magisterial district:	Ermelo
Distance and direction from nearest town:	9 km northwest of Ermelo
21 digit Surveyor General Code for each farm portion:	T0IS0000000027600033

1.3 Locality map

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

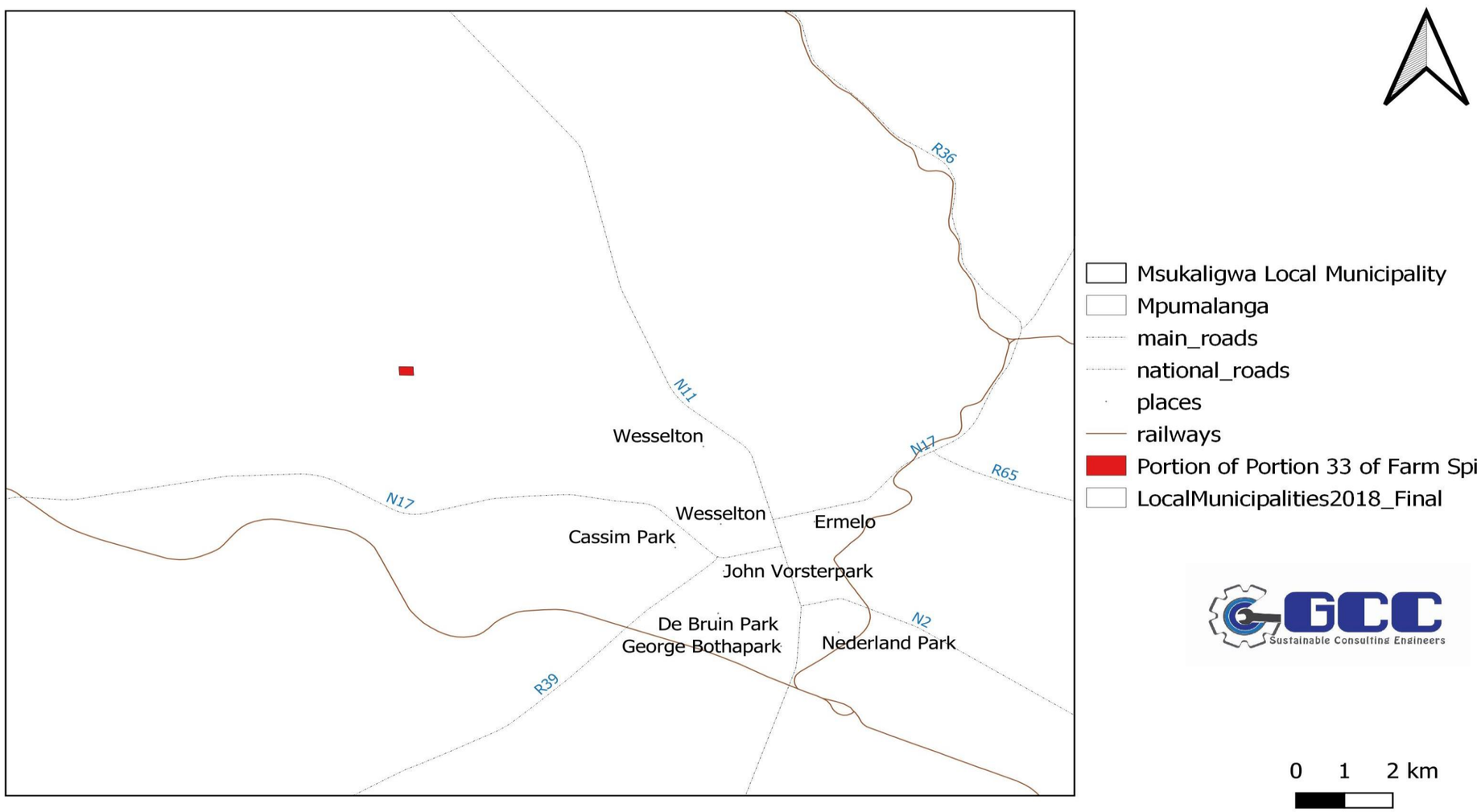


Figure 1: Locality map of the proposed project area

1.4 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 **Error! Reference source not found.** for a Site Plan of the Area.

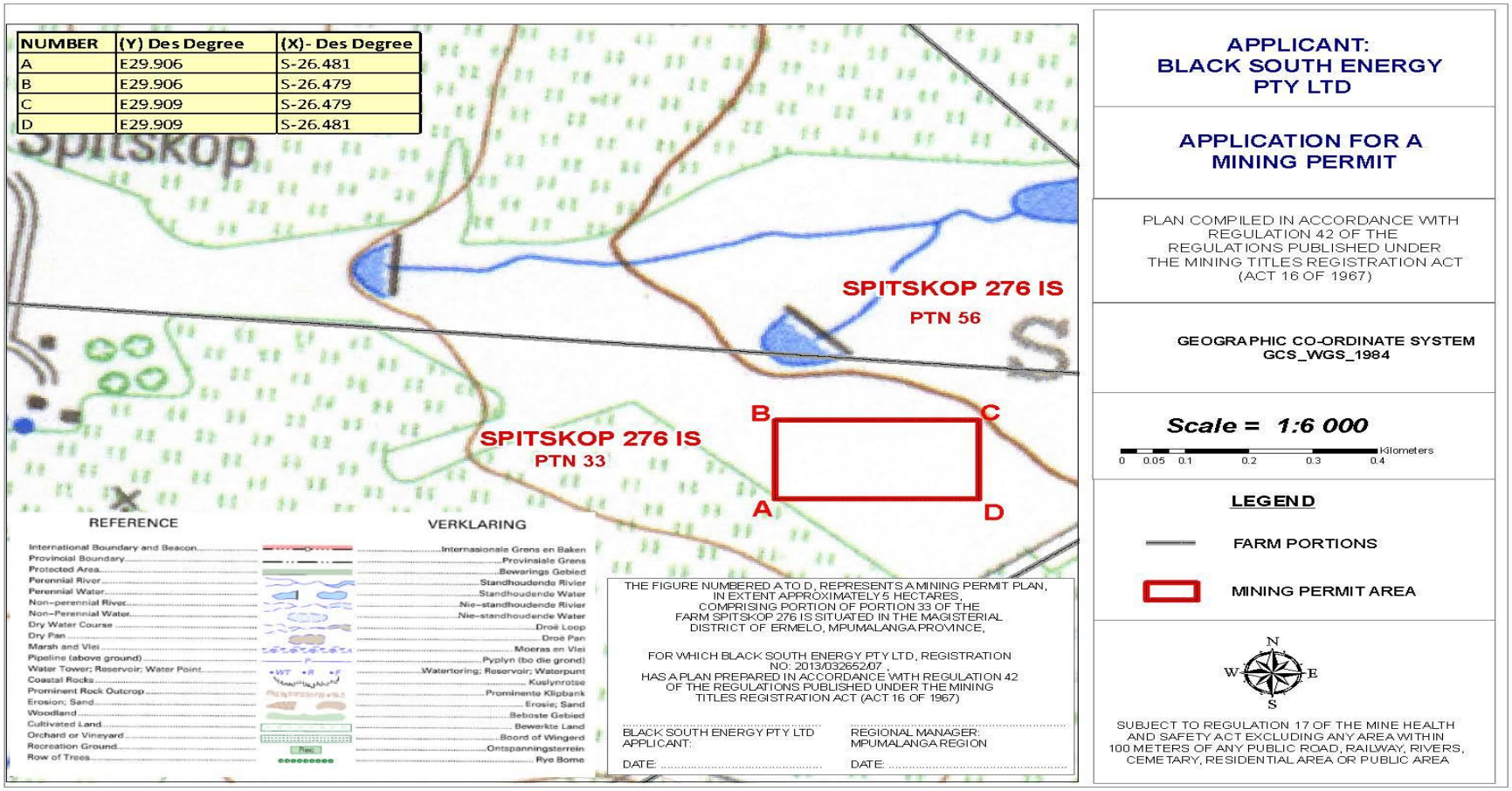


Figure 2: Site Plan of the Area

1.4.1 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

(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

NAME OF ACTIVITY (e.g. For prospecting drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc..etc E.g. for mining, excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control berms, roads, pipelines, powerlines, conveyors etc..etc	**Aerial extent of the activity Ha or m²**	**LISTED ACTIVITY** (Mark with an X where applicable or affected	**APPLICABLE LISTING NOTICE** (GNR 982, GNR 983, GNR 984 or GNR 985)
Mining	6 ha	X	GNR 327 of 7 April 2017 Activity 21
Clearance of an area of 1 hectare 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 (ii) Maintenance purposes undertaken in accordance with the maintenance plan	6 ha	X	GNR 327 of 7 April 2017 Activity 27
Access and Haul Roads	500m	X	GNR 327 of 7 April 2017 Activity 24
Stockpiles (topsoil, overburden, subsoil/softs and ROM	3 ha	X	GNR 327 of 7 April 2017 Activity 27
Weighbridge, workshop and stores (with septic/chemical ablution facilities)	500m²		Not applicable
Contractor's Yard with septic/chemical ablution facilities;	500m²		Not applicable
Diesel facilities and a hardpark;	200 m²		Not applicable
Site Office	100 m²		Not applicable
Surface water management measures (stormwater diversion berms and trenches; pollution control dams, etc)	1000 m²	X	GNR 327 of 7 April 2017 Activity 19

1.5 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)

1.5.1 Mining Method

1.5.1.1 Stripping and Stockpiling of Topsoil

The project will entail excavation of an open cast during mining of the coal seam. The proposed mining method commences with a box cut. Opencast mining is also known as an open-pit mining, open-cut mining, and strip mining, which basically refers to a method of extracting rock or minerals from the earth by removing the material from an open-pit. This activity will result in the transformation of the proposed site to mining use. The proposed site will be cleared off vegetation, followed by the removal of topsoil and the blasted overburden material. Mining will be at an average stripping ratio of 3: 1. Topsoil and overburden from the initial mining block will be temporarily stockpiled.

1.5.1.2 Excavation, Loading and Transport

The mining method applied will be a conventional open pit mining method where the scheduling unit (production block) is drilled, charged, blasted and loaded by excavators and hauled with dump trucks to the respective destinations. The drill and blast methodology for the project should minimise the impact on surrounding infrastructure and communities and achieve an appropriate fragmentation to minimise the re-handling of large boulders at the tip area. The drill and blast activity will be done by contractors. The base of the pit will be designed to accommodate a minimum mining width of 20m to ensure efficient manoeuvrability of the loading equipment in conjunction with the trucks.

1.5.1.3 Waste Dump and Overburden

The waste dump will be designed to ensure that all the waste within the ultimate pit limit can be accommodated throughout the life of the operation. The dumps will have a lift height of approximately 5m, a 35° face angle and a step-back of 5m between benches

1.5.1.4 Backfilling the Opencast Voids

A rollover mining technique will be practised, in such a case the topsoil and overburden from the initial cut of the opencast mine are stockpiled at the position of the final cut. As the opencast mine progresses, the overburden and topsoil from each successive cut will be backfilled into the void from the previous cut, the surface will then have shaped to be free from draining, topsoil will be analysed and treated

appropriately, and the surface will be fertilised and revegetated with locally indigenous species of grass, shrubs and trees

Other Activities:

Water Supply

In terms of sourcing the water, a local borehole will be used in the absence of a local water supply. A temporary water storage tanker will be utilised for potable water supply, which includes water for drinking purposes and for dust suppression.

Temporary Office Area

A temporary site office will be erected at the site.

Ablution facilities

Ablution facilities at the site will involve the installation of portable toilets by a registered service provider. Sufficient toilet facilities will be provided at the site. The toilets will be properly covered and ventilated and should contain hand washing facilities. The toilets will be cleaned and emptied regularly with waste being disposed of at the nearest treatment facility.

Storage of Dangerous Goods

Diesel will be brought on site using a bowser and the equipment will be filled on site. As such, no diesel or any other hazardous or dangerous goods will be stored on site.

Accommodation

No accommodation for staff and workers will be provided on site and all persons will be accommodated in nearby towns. Workers will be transported to and from the mining site on a daily basis. Night security staff will be employed once equipment has been established on site.

Waste Management:

General Waste

General waste generated from the proposed project area will be collected in drums and disposed of at a registered domestic waste disposal site.

Hazardous Waste

Hazardous waste generated will be collected in a hazardous waste bin. The bin will be clearly marked as such. The removal of the hazardous waste will be undertaken by a registered waste disposal company, for disposal at a registered licensed waste disposal site. The drums will be placed on protected ground and covered.

1.6 Policy and Legislative Context

Table 3: Applicable Legislation and Guidelines for the proposed Project

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT ***(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)***	**REFERENCE WHERE APPLIED**
The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996).	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 community. This report is drafted to ensure compliance to this piece of legislation.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT ***(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)***	**REFERENCE WHERE APPLIED**
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.	The National Environmental Management Act (Act 107 of 1998 as amended on the 8th 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. 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. NEMA and associated regulations are directly relevant to this authorisation Application

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(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)*	REFERENCE WHERE APPLIED
Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)	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- 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).
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.
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

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT ***(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)***	**REFERENCE WHERE APPLIED**
	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 stockpiles and deposits must be based on an assessment of the potential impacts and risks.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT ***(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)***	**REFERENCE WHERE APPLIED**
National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004).	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.
National Environmental Management: Biodiversity Act (No. 10 of 2004).	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 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,

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(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)*	REFERENCE WHERE APPLIED
	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". 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.
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

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(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)*	REFERENCE WHERE APPLIED
	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.
National Heritage Resources Act (Act 25 of 1999).	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.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(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)*	REFERENCE WHERE APPLIED
	The document will be approved by The South African Heritage Resources Agency (SAHRA) as part of the impact assessment process.
Promotion of Access to Information Act, 2000 (Act 2 of 2000 as amended)	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.

1.7 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).

Coal as an energy source faces several challenges, not least among them the fact that, as a contributor to Greenhouse Gas (GHG) emissions, coal is responsible for environmental degradation. At an international level, governments have developed and rectified legislation to cut down the use of coal in electricity generation. As a result, environmentally friendly technologies are subsidized with the hope that soon they will replace coal in the process of generating electricity. The South African government has ratified the Paris Agreement, which entered into force on 4 November 2016, signaling that government is committed to addressing the challenge of climate change. Government through the Department of Energy (DoE) intends reducing the share of coal generated power in the country's electricity mix from 82% in 2016 to 31% in 2050 as outlined in the Integrated Resource Plan (IRP) 2016. However, coal and nuclear power will continue to play an important and immediate role in the economy as the IRP 2016 adds an additional 6.3GW of electricity to existing generation consumption levels which will have come from coal-fired power plants (Chamber of Mines, 2018).

1.7.1 National and Regional Perspective

Need and Desirability #1: Cheap input costs are necessary to ensure efficient production resulting in economic growth and development. Electricity is a major input in the production process and improves society's welfare if it is accessible and affordable. Affordable, reliable and easily accessible energy is at the core of economic growth and development. For that reason, the drive to develop new electricity technologies should be based on these three pillars, which can be fundamentally summed up as the 'least cost options'.

Currently, coal power is among the cheapest baseload options, a fact that is acknowledged by the IRP 2016. Not only does coal present the cheapest baseload option, it does so even at the inclusion of CO2 curbing technologies such as Carbon Capture Storage (CCS), fluidised bed combustion (FBC) and integrated gasification combined cycle (IGCC).

The growth in peak electricity demand in South Africa is increasing. Coal at present provides 82% of the power generated by state-owned power utility Eskom (Chamber of Mines, 2018).

Need and Desirability #2: Coal remains strategically critical to the South African economy with 253.1 million tonnes per annum (Mtpa) produced in 2016 (Chamber of Mines, 2018), of which 181.4Mt were sold internally with a value of R61.5 billion while 68.9Mt, worth R50.5 billion, were exported. South Africa is the world's 6th largest coal exporter at 77 Mtpa.

1.8 Motivation for the overall preferred site, activities, and technology alternative

Preferred Site

The proposed site was selected based on extensive research and on information from previous prospecting activities in the area, as well the mining operations currently in place near the proposed site. There are known coal ore deposits in the area and mineral exploration has been approved in areas close to the proposed project area. As such, the proposed site is the only selected site, given the knowledge and mineral deposits on neighbouring farms.

1.9 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.

5.8.1 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. This data suggests that Coal is found in the identified area, and as such, no site alternatives have been considered for the proposed activities.

(b) The type of activity to be undertaken

The proposed and preferred option to mine Coal is thus far, the most preferred activity owing to the presence of this mineral within the proposed site. The mining opportunity will by far economically and socially empower and uplift the area. The land is presently utilised for agricultural purpose, including grazing activities.

Furthermore, opencast mining method is the preferred option in comparison to underground mining. This is due to the shallow nature of Coal deposit that can easily be mined by means of opencast mining.

(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. Mining under a mining permit is temporary in nature no permanent structures will be constructed, negotiations and agreements will be made with the farm owner to use any existing infrastructures.

(d) The technology to be used in the activity

The preferred mining method (open cast mining using an excavator, front end loader and haul trucks) is a proven mining method for this type of material and for the small scale of mining. This mining method is also considered to have a low environmental impact, if managed correctly. As such, no other mining method will be assessed.

(e) The operational aspects of the activity

The operations of the proposed mining involve the open cast mining, material stockpiles and excavations. No feasible alternative operational aspect methods currently exist.

(f) The option of not implementing the activity

Should the mining permit application be rejected, there will be a significant loss to valuable information regarding the mineral status present on these property. In addition to this, should economical reserves be present, and the applicant does not have the opportunity to mine, the opportunity to utilize these reserves for future phases will be lost and the limited agricultural activities currently undertaken will continue.

1.10 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 will be submitted for comment to the competent authority, commenting authorities, landowners, surrounding property owners and other identified stakeholders for review (see Table 4 for a list of identified stakeholders). Comments received will be recorded and included in the Final Basic Assessment Report. The following public participation process will be 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 Mining Permit 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.

5.8.2 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)

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

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

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

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

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
	X				
	X				
Birdlife SA					
Mrs Lourens					
Dr Hanneline Smith Robinson					
Mr Daniel Marverick					

1.11 The Environmental attributes associated with the alternatives

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

1.11.1 Regional Geology

Figure 3 reflects the geology and minerals found in the Msukaligwa area. The largest part of the municipal area is underlain by favourable or intermediate geotechnical conditions that do not pose significant impediments to development or human activity. The municipality is underlain predominantly by arenite and dolerite that forms part of the Karoo Supergroup. Other underlying rock types include quartz monzonite, granite and basalt. Localised issues may occur which should be taken into account in the case of individual developments after the appropriate investigations, e.g. shallow undermining, or clay in the vicinity of the many wetlands.

The central and western part of the municipality is underlain by the Ermelo coal field, providing the basis for the mining economy in the area. This resource is however nearing the end of its expected potential, giving rise to a need for economic diversification and rehabilitation.

Local Geology.

The project area is composed of karoo dolerite suite as indicated in Figure 4.

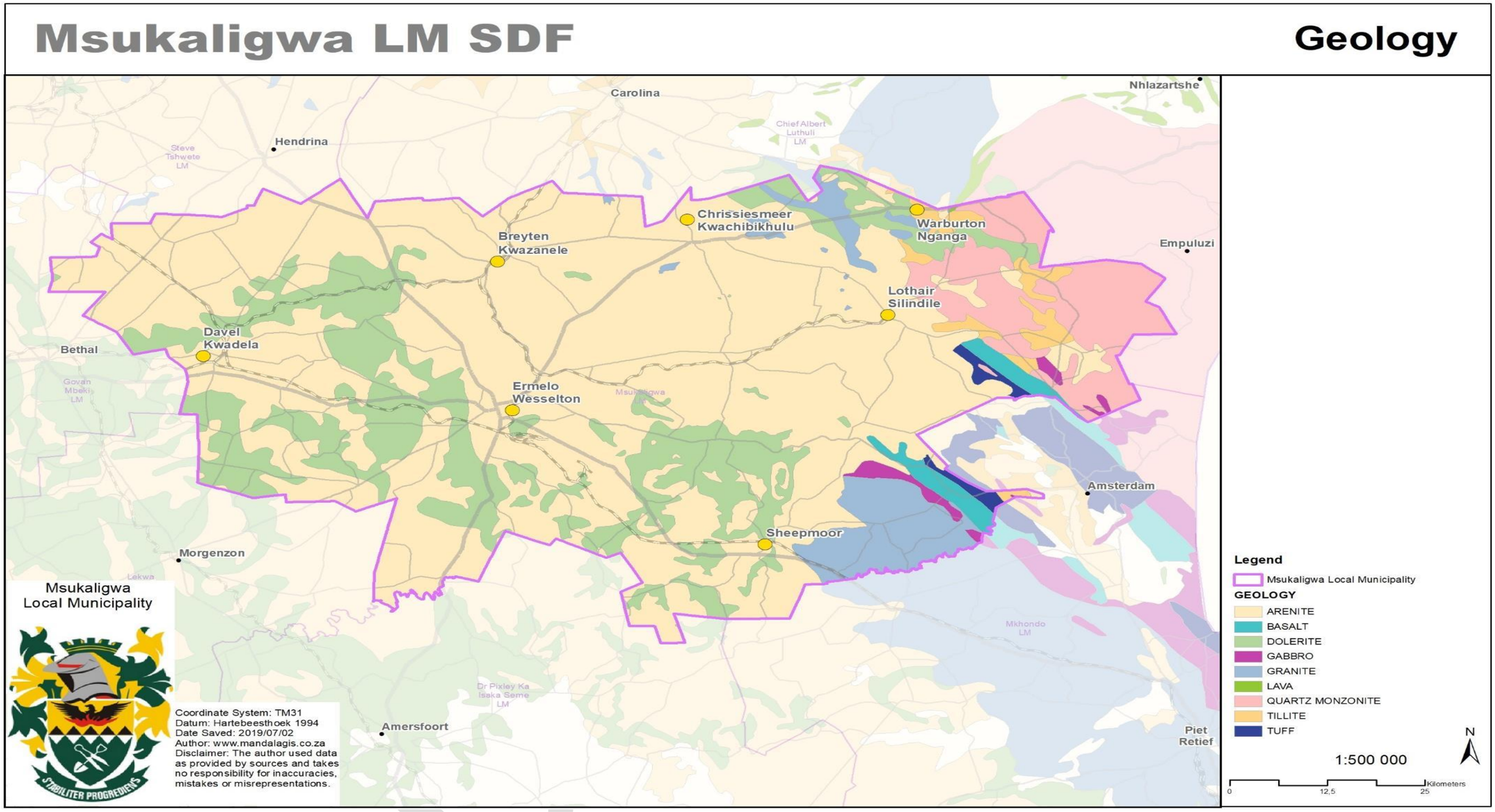


Figure 3: Regional Geological Map

Geological Map

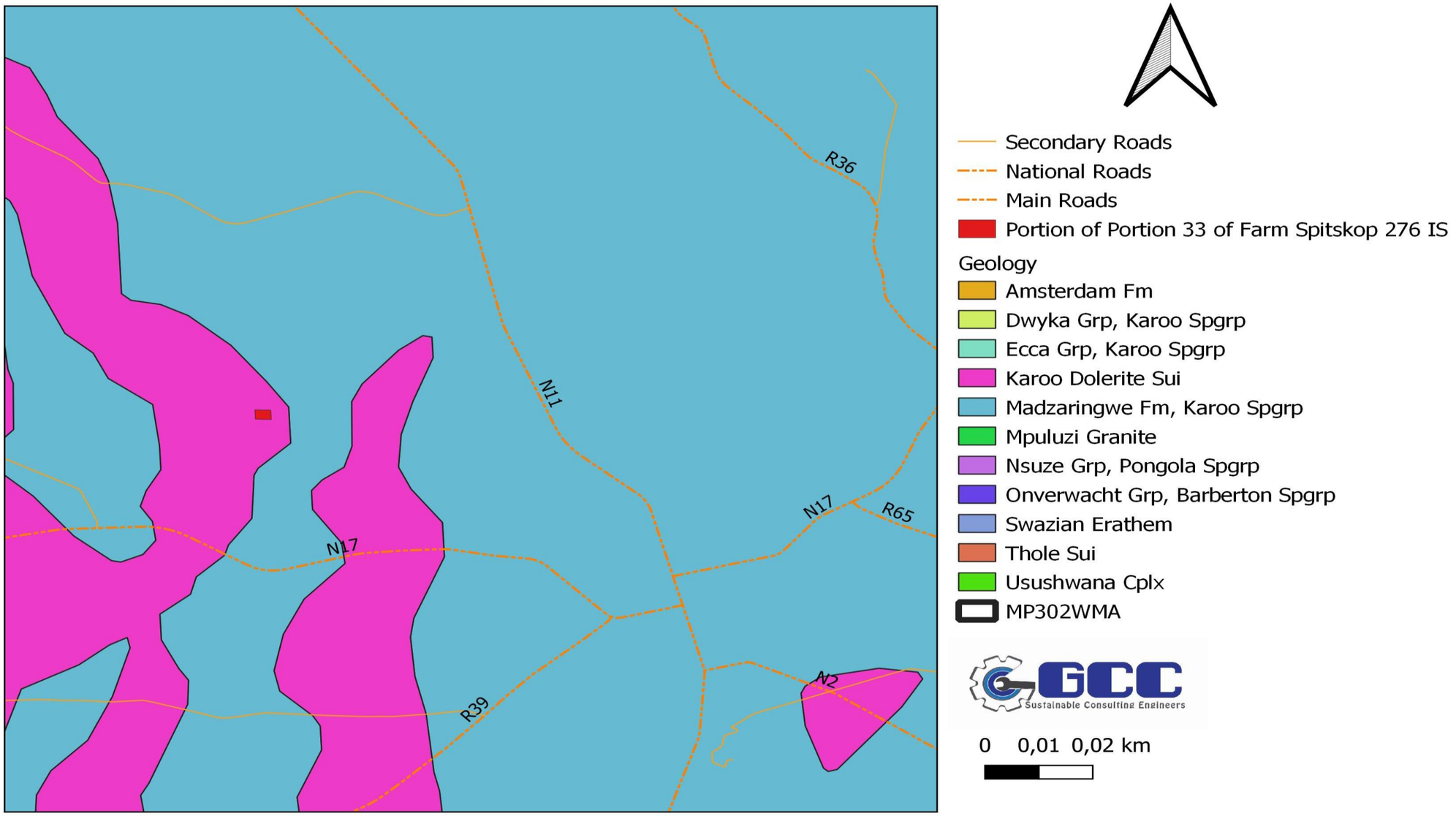


Figure 4: Local Geology Map

1.11.2 Topography

The area has a gently undulating highland topography, interspersed with valleys cut by water courses. It also features numerous flat pans and vlei areas which will be described in more detail in the hydrology section. The south eastern corner of the municipal area around Sheepmoor is slightly lower lying than the rest of the area, decending in a south easterly direction. The impact of the area's hydrology on topographical features is the most significant topographical aspect of the area, especially in the north east of the area. There are no additional factors impacting on development patterns and service delivery in the area, e.g. no major mountain ranges dividing the area or extreme slopes rendering parts of the area uninhabitable.

Maximum slope on site ranges from 0.4 m to 6.5m with maximum slope between 5% and 6.1% with an elevation of 1714m as indicated in Figure 5.

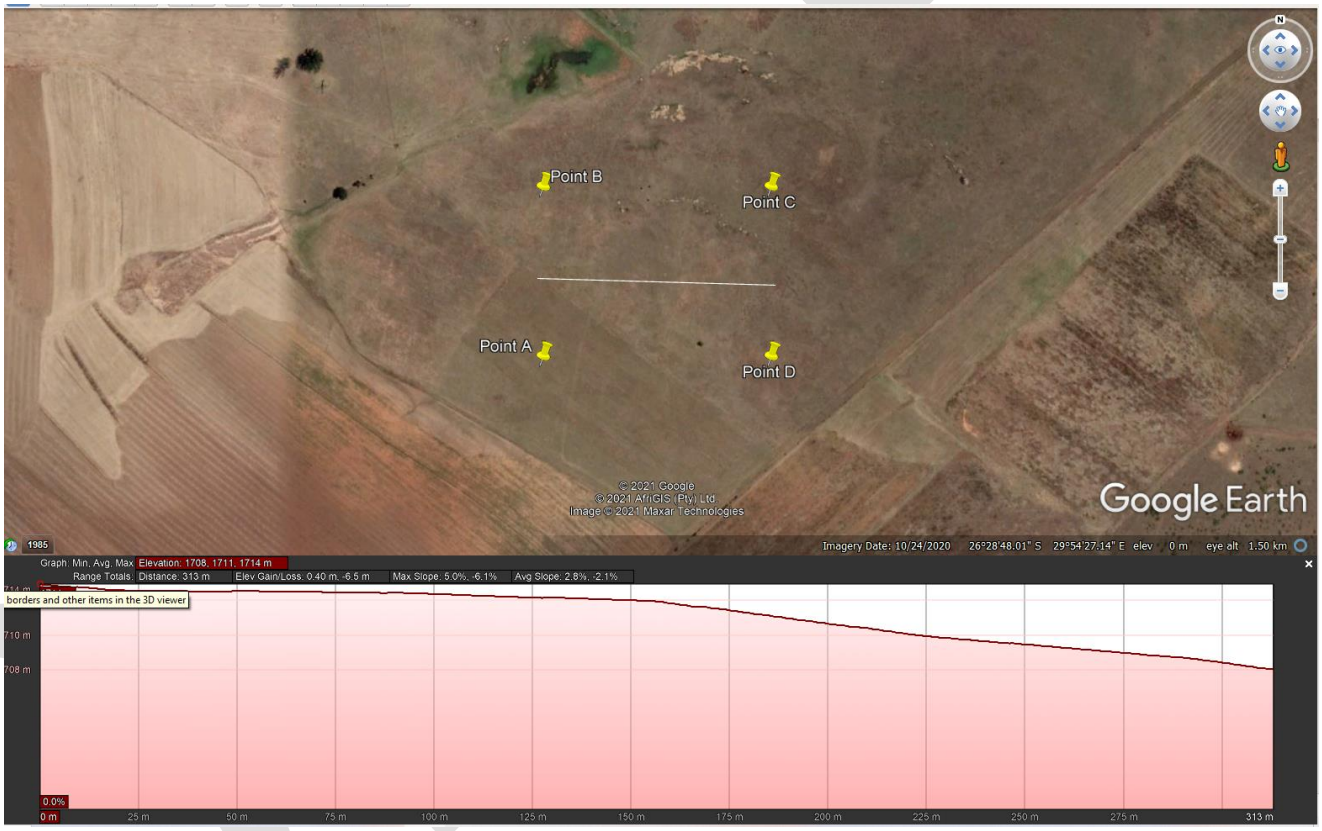


Figure 5: Site Elevation

1.11.3 Climate

As an area where a large part of the economy is reliant on agriculture and forestry, as well as the source area of some of the main strategic waterways of the country, the potential impact of climate change could have serious repercussions.

Current climate and forecasted changes by 2050 are summarised below:

Table 5: Climate and Climate Change

Current Climate		**Projected Climate Change 2050**				
Temperature	**Average Rainfall**	**Scenario:**	**Projected change in Temperature**	**Average Rainfall**	**Extreme Rainfall Days**	**Very Hot Days**
Min: 8.24°C Avg: 14.50°C Max: 20.76°C	Avg: 1033.99mm	RCP 4.5	**+ 2.04-2.77**	**- 47.67mm to 68.46mm**	**- 1.84 days — 0.80 days**	**+ 0.08 days to 8.26 days**
		RCP 8.5	**+ 2.53-3.04**	**- 64.16mm to 144.47mm**	**- 1.74 days — 1.90 days**	**+ 0.08 days to 13.26 days**
Climate Hazards						
Drought	Decrease over eastern half, increase across centre and greater increase towards western half					
Very Hot Days	Number of very hot days (above 35°C) – between 6 and 8.2, with greater tendency in central and eastern parts					
Flood Hazard	High flood hazard in western part, medium hazard for most of remainder of municipal area. Exceptionally low flood hazard in lakes district					
Fire Hazard	Likely around settlements, with biggest risk area around Ermelo / Wesselton					
Source: CSIR Greenbook 2018 https://riskprofiles.greenbook.co.za/						

On average, the area can expect increased temperatures, lower average rainfall and an increase in number of very hot days by 2015. Main climate risks are droughts, increased number of very hot days, flood hazards and fire hazards as indicated above. Changes in temperatures will have an impact on the type of crops and livestock, as well as overall productivity of agriculture and forestry. Flooding and fires also poses risks to settlements and infrastructure, in addition to rural uses such as agriculture and forestry. Increased droughts may affect availability of water not only in Msukaligwa but also in wider catchment areas with headwaters in Msukaligwa.

1.11.4 Regional Hydrology

The area's hydrology is one of its distinguishing features. A concentration of pans and freshwater lakes is located in the Chrissiesmeer protected area, which is not only ecologically significant but also a potential tourist attraction. According to the MLM EMF, standing water in the form of dams, lakes and pans comprises about 20% of the municipal area. The pans are fed by rainwater and groundwater but have no direct surface link to the drainage network. Numerous other water courses and wetlands are distributed throughout the municipal area. The entire municipal area is affected by the network of smaller watercourses and water bodies in terms of environmental sensitivity. Potential pollutants such as mining, and agriculture need to be managed to safeguard the quality and ecological health of water courses, wetlands and lakes. The sources of numerous significant rivers are found in the municipal area. These include:

- The Vaal River, flowing centrally in the area in a southern and then southwestern direction.
- The Usuthu River, rising in the northeast of the municipality, flowing eastwards.
- The Inkomati River, flow northwards,
- The Olifants River and Klein-Olifants River rising in north-west of the municipality, flowing northwards.

Parts of the Vaal and Inkomati / Usuthu Water Management Areas (WMAs) cover the western and eastern parts of the municipal area respectively. Rivers in the north flow into the Olifants WMA.

Local Hydrology

There is no river traversing the site. The only open water body in close proximity is an inland farm which is approximately 600m from the site boundaries in Figure 7 and Figure 8. The site is located in the Upper Vaal WMA as indicated in Figure 9.

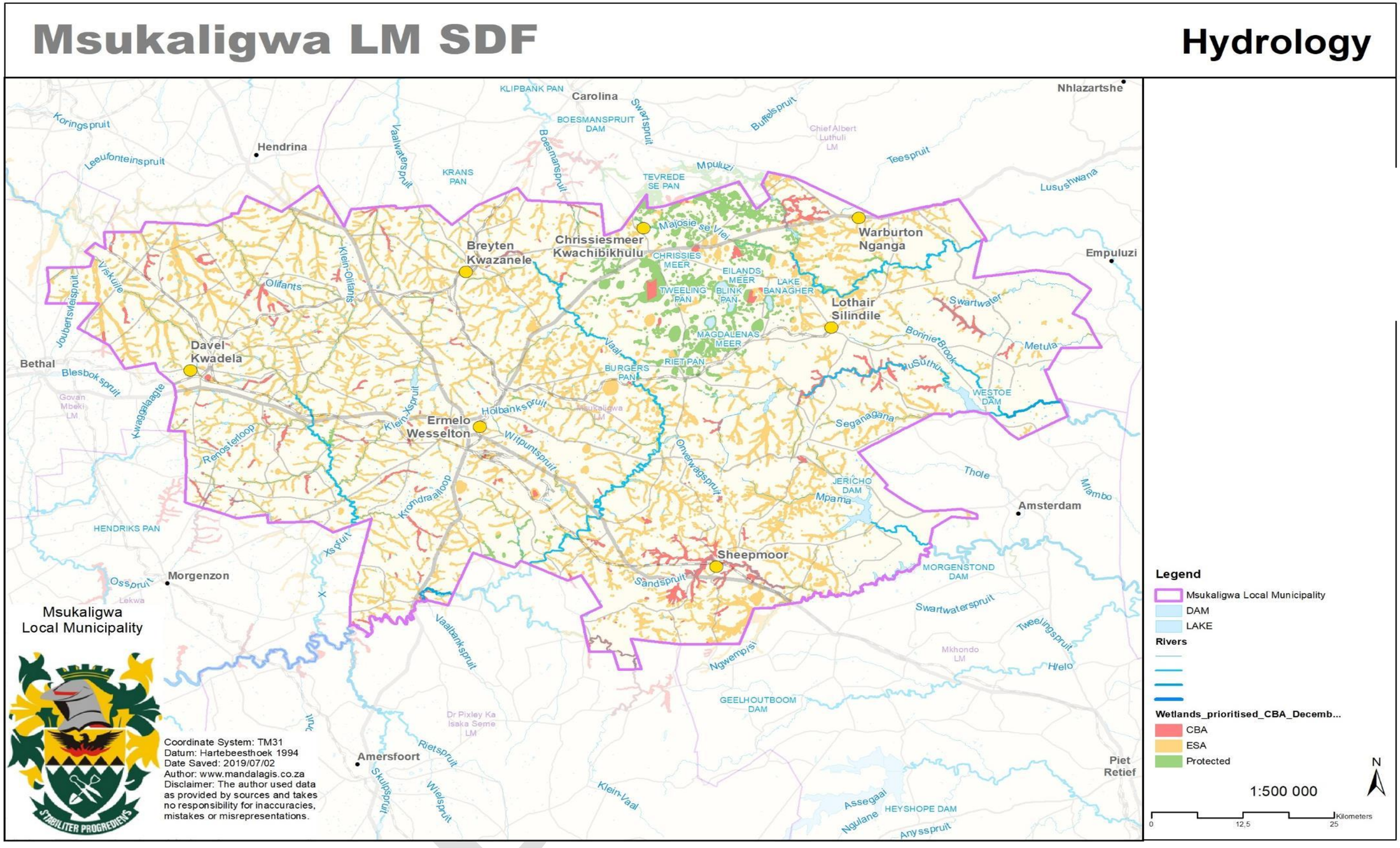
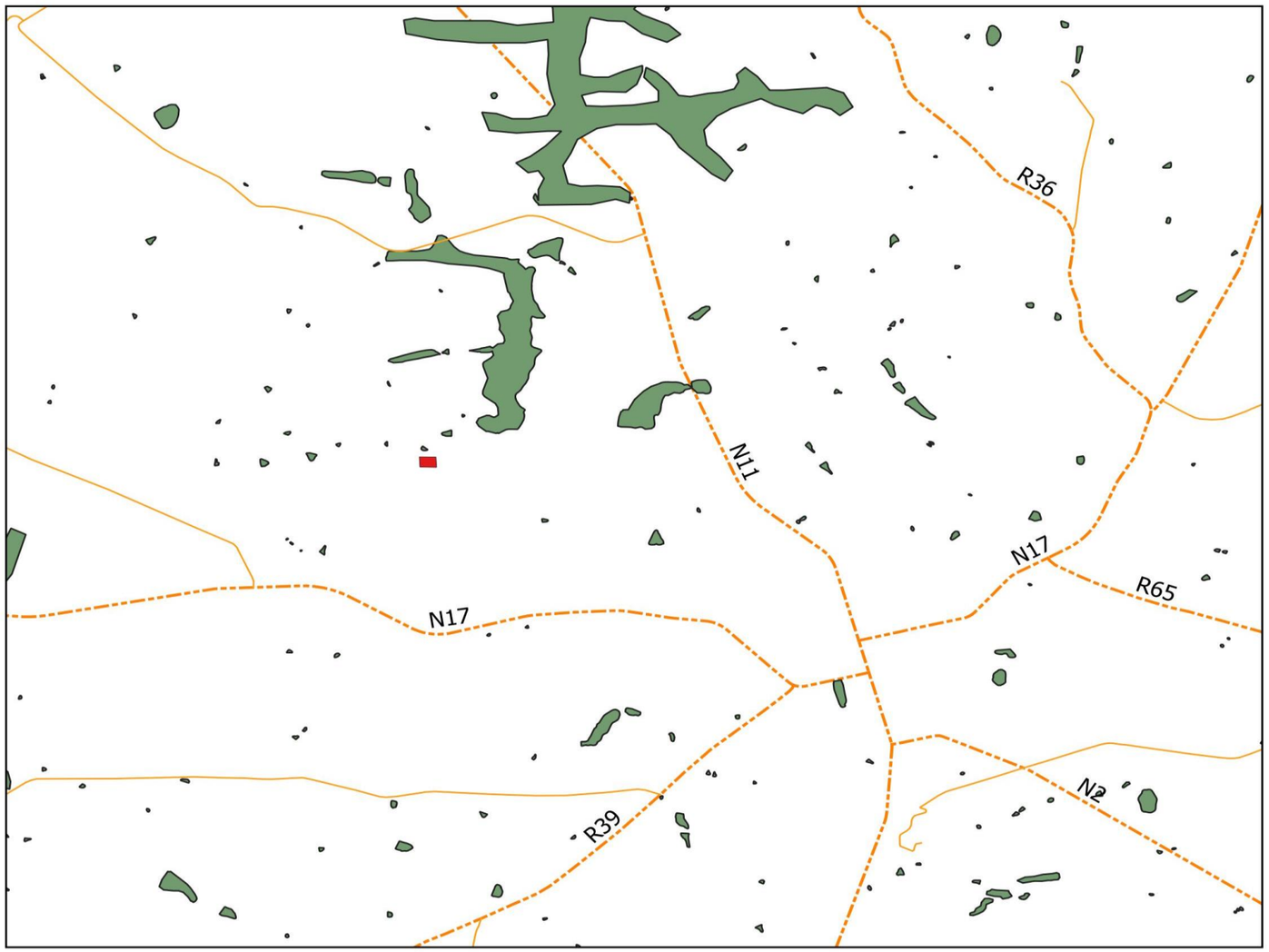
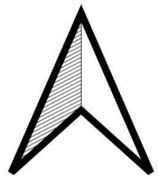


Figure 6: Regional hydrology.

Hydrological Map





Secondary Roads
MP302Rivers
MP302Wetlands
National Roads
Main Roads
Portion of Portion 33 of Farm Spitskop 276 IS
MP302WMA

GCC
Sustainable Consulting Engineers

Figure 7: Local hydrology

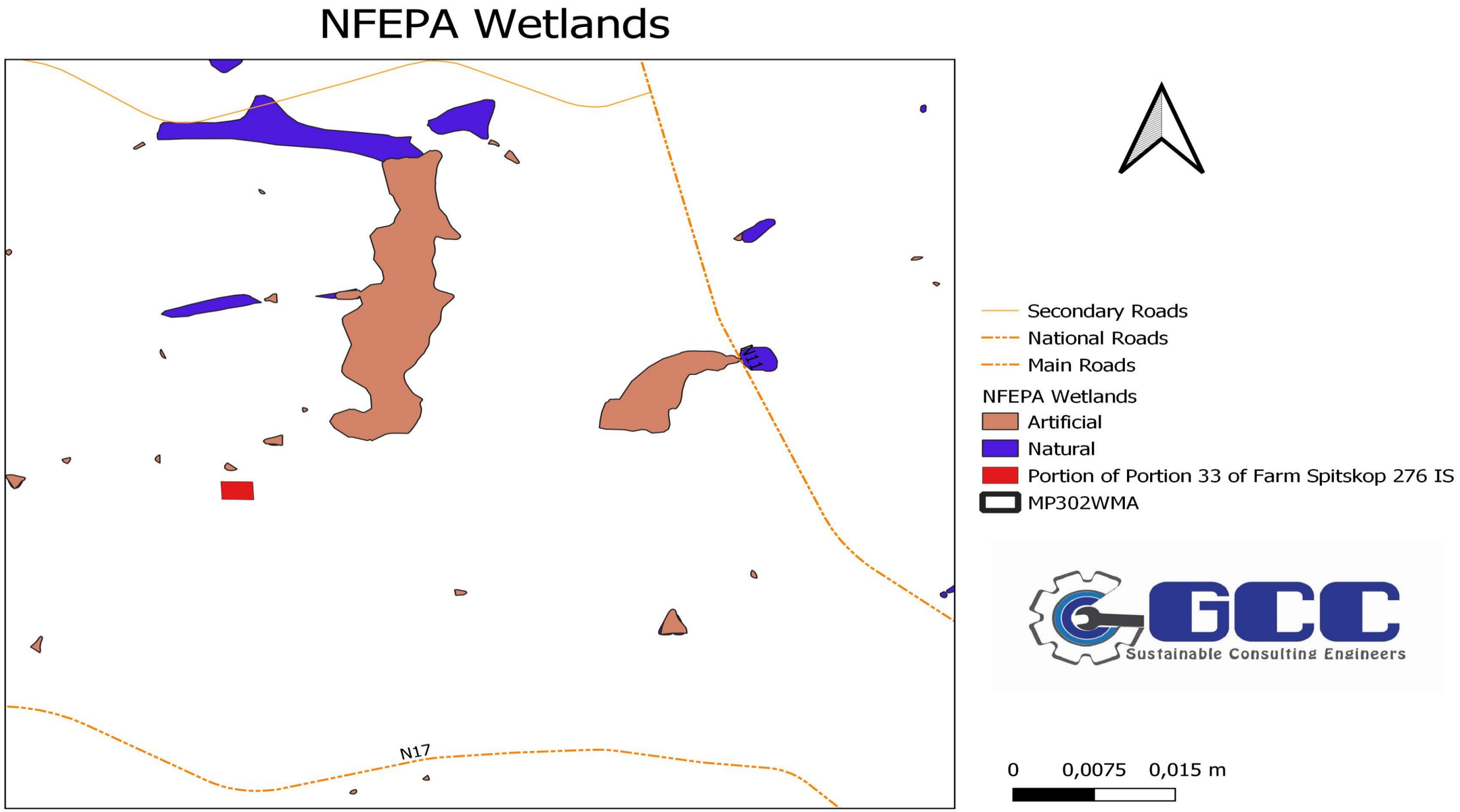


Figure 8: Wetland and river classification based on NFEPA

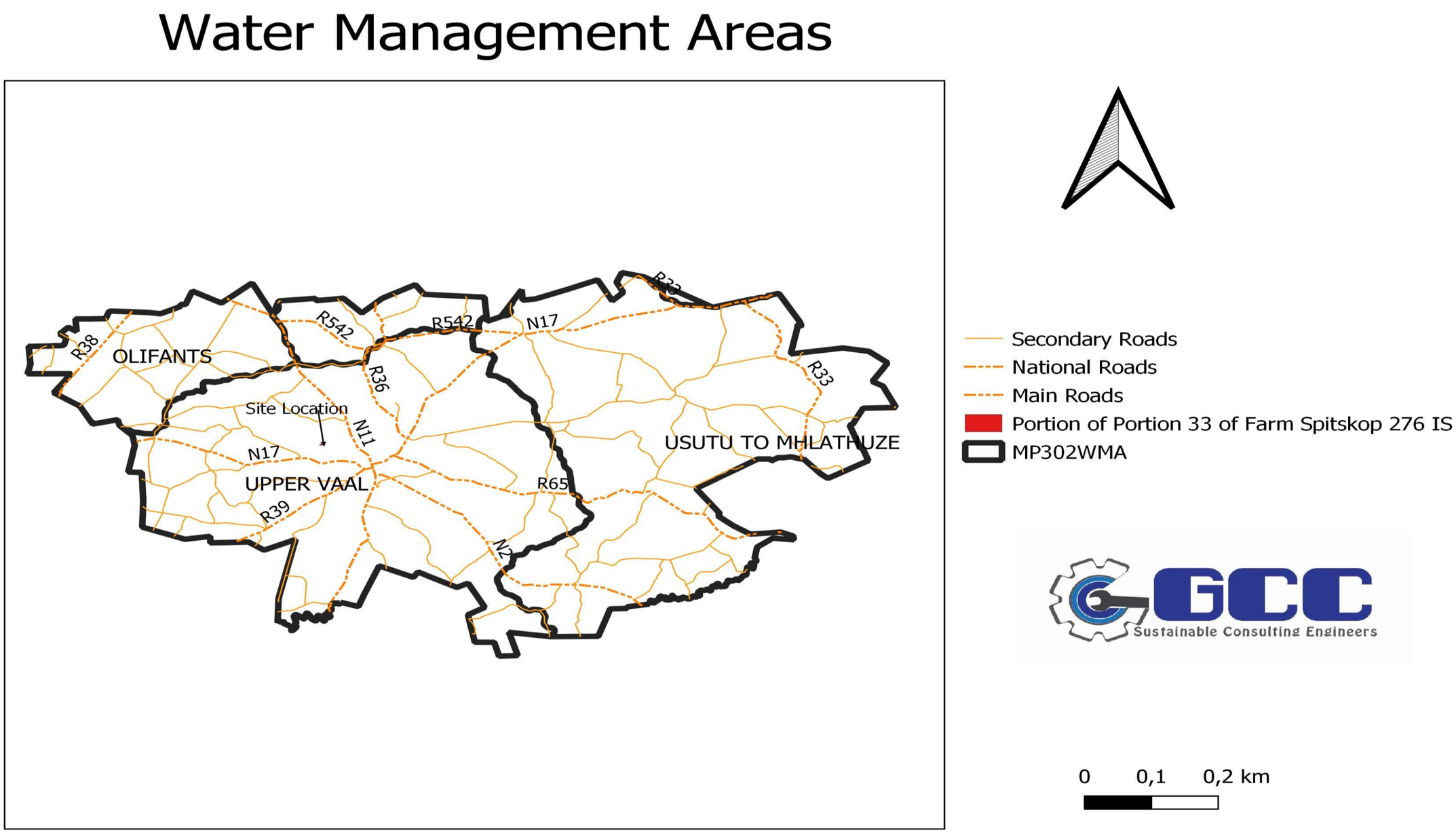


Figure 9: Water management area for the site

1.11.5 Biodiversity

The site is located within the Eastern Highveld Grassland as indicated Figure 10. The Highveld Grassland has suffered extensive degradation. Because it is one of the best areas for farming in South Africa, large tracts of land have already been converted to agriculture, mainly for corn production. Urban expansion, fire, and overgrazing have led to increased fragmentation, as has coal mining and afforestation for stands of exotic trees, especially by species of Eucalyptus (Low and Rebelo, 1998; Cowling et al. 1997). Over several hundred years, particularly around towns, planted wattle (Acacia mearnsii) has become invasive, and is prone to rapid expansion upriver watersheds. In the future, expanded surface activity associated with mining below the grassland may become a greater concern as companies develop new technology to make deep mining of coal more profitable (Mallett 1999).

The Highveld plays an important role in natural water purification, as the peat formed here has been shown to filter out 90 percent of the harmful chemicals in herbicides. Peat is also useful in absorbing various other pollutants, as a source of fuel, in horticulture, and for medicinal purposes. In South Africa, where clean water resources are already particularly valuable, this natural filter is being extracted from the Highveld at an unprecedented rate. Approximately 60 percent of locally extracted peat is used to grow mushrooms, while the remaining 40 percent comprises "environmentally friendly" potting soil and compost. Peat has an extremely slow regeneration rate, increasing between 0.7 mm to 1.2 mm per year depending on environmental conditions (Dada 1999). Given its slow formation process, it is unlikely this resource will recover from the damage caused by its rapid removal. Hence, the Highveld's role as a natural filtration element for scarce water resources could be in danger. The preservation of this resource is imperative and could be fulfilled by moderating or halting the use of peat for gardening purposes.

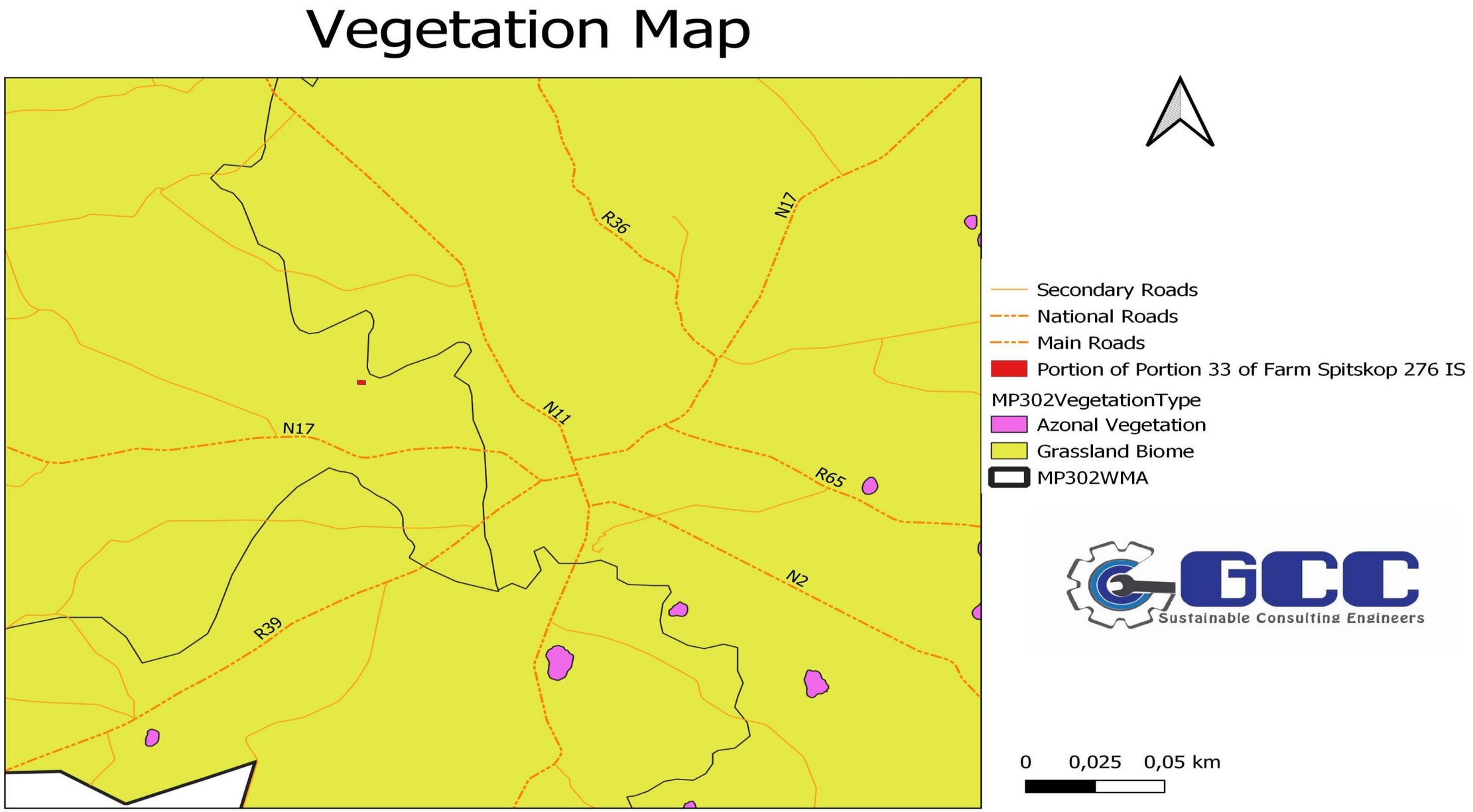


Figure 10: Local vegetation on the study area.

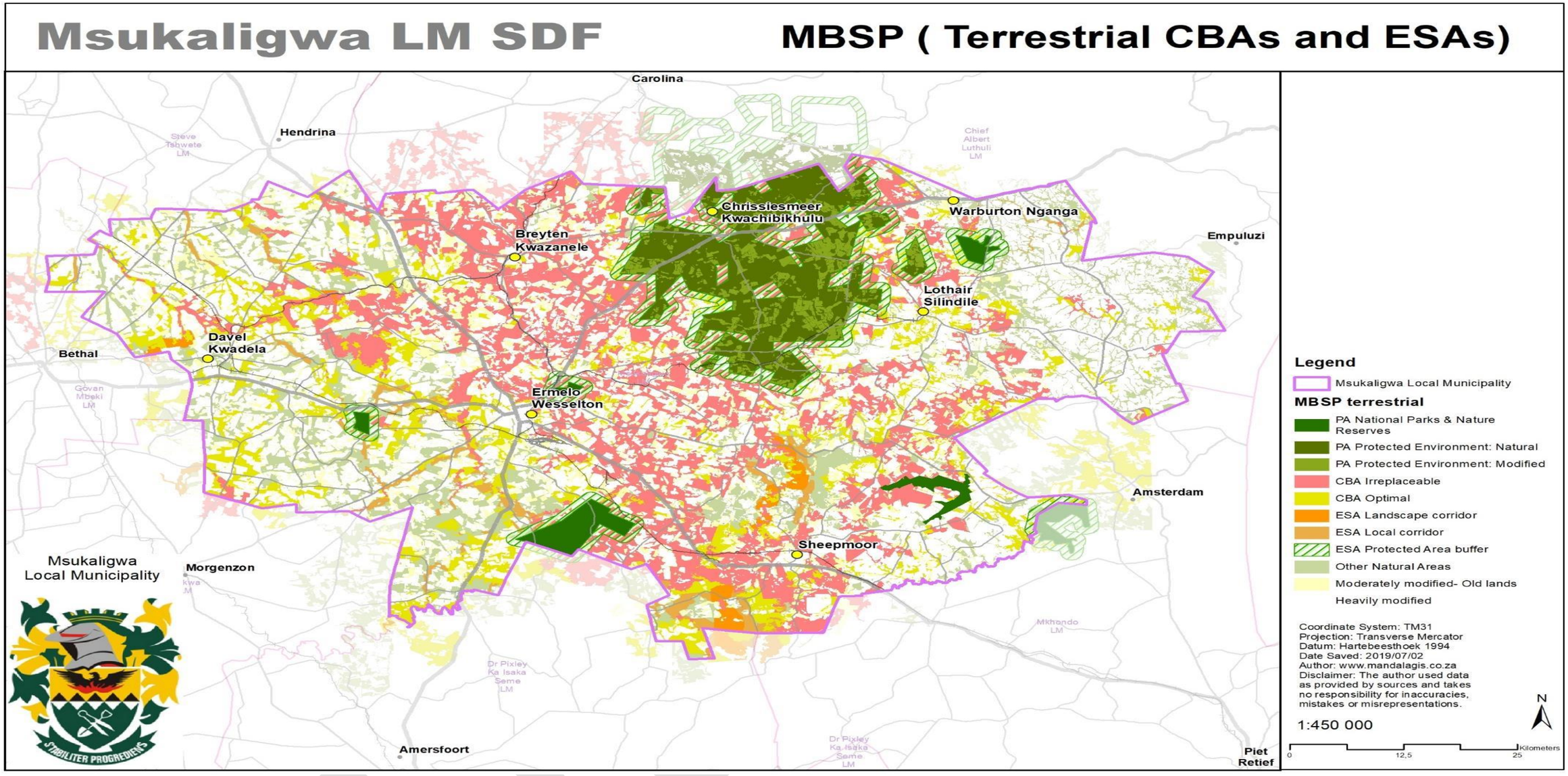


Figure 11: MBSP (Protected Areas / Terrestrial Sensitive Areas)

Sensitive and Protective Areas

The eastern part of Msukaligwa is very important from a hydrological point of view, and also for the protection of sensitive freshwater ecosystems. The extent of this sensitive area and it components are shown on Figure 12 below. This area comprises the protected area in the vicinity of Chrissiesmeer which contains the main lakes, but also the numerous rivers, watercourses and wetlands that occur outside the protected area. In addition, the area forms part of nationally significant strategic water source areas. While the largest concentration of sensitivity occurs in the eastern part, the western part of Mskaligwa also contains wetlands, wetland clusters and important sub-catchments. Of concern is that large parts of the sensitive freshwater areas overlap with human activity such as mining, agriculture, and forestry, creating concerns for damage to ecosystems and critical water sources. Towards the east, where strategic water source areas occur, forestry is the predominant land use. Terrestrial sensitivity is shown on Figure 13**.** The central part of Msukaligwa, where the majority of mines a located, has the highest concentration of irreplaceable critical biodiversity areas.

In terms of formal protection, Figure 14 shows the extent of protected areas vs areas that are important to be protected.14 Areas marked in blue that is not currently protected should be regarded as the highest priority for formalising an official protection status. Whilst mining is an important component of the local and national economy, it also has a potentially negative impact on the natural environment and natural resources. Figure 15 indicates the areas that are of most concern in terms of potential impact by mining. It should be noted, as also mentioned above, that in Msukaligwa mining does occur in some of the most sensitive areas

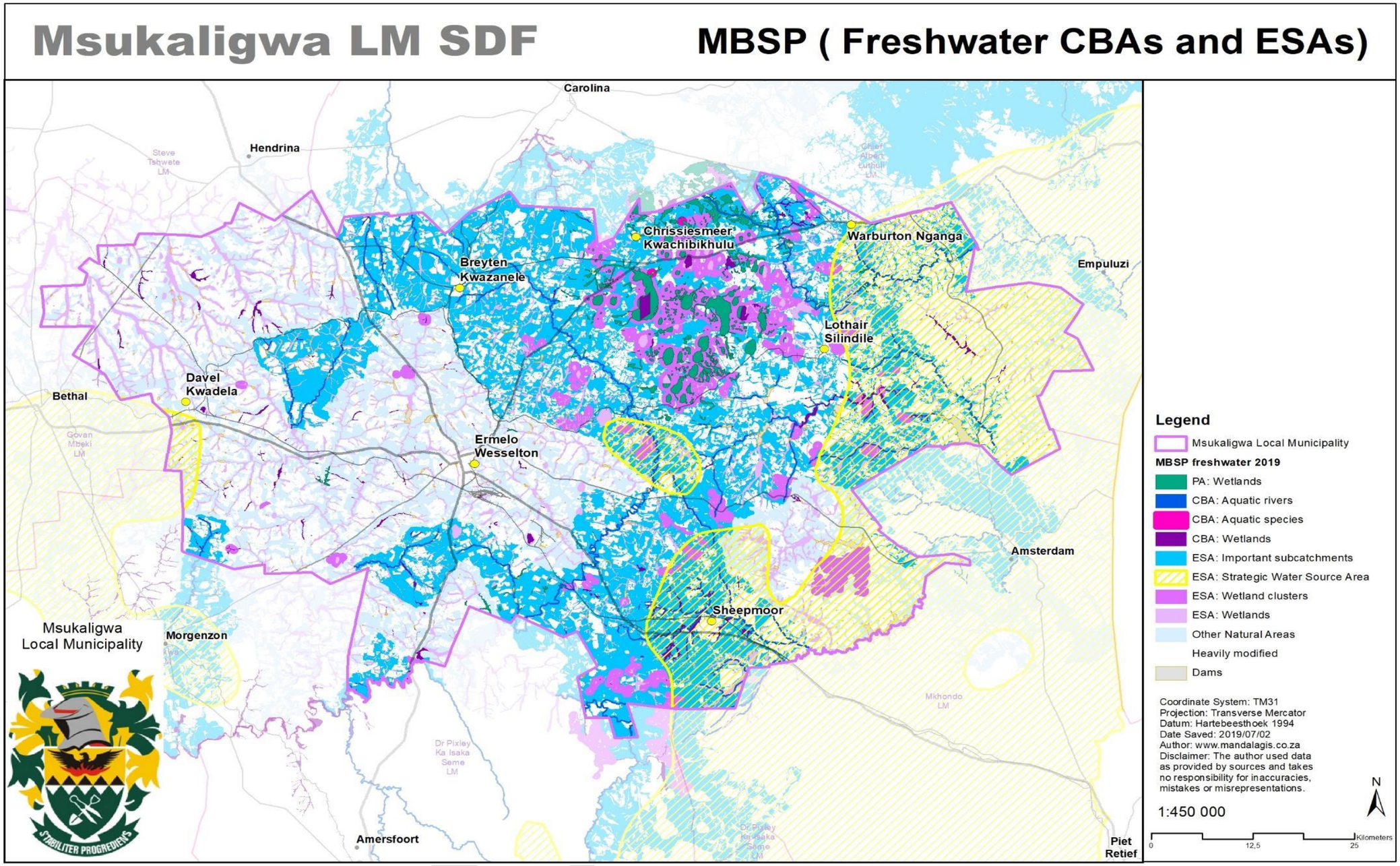


Figure 12: MBSP (Freshwater Sensitive Areas).

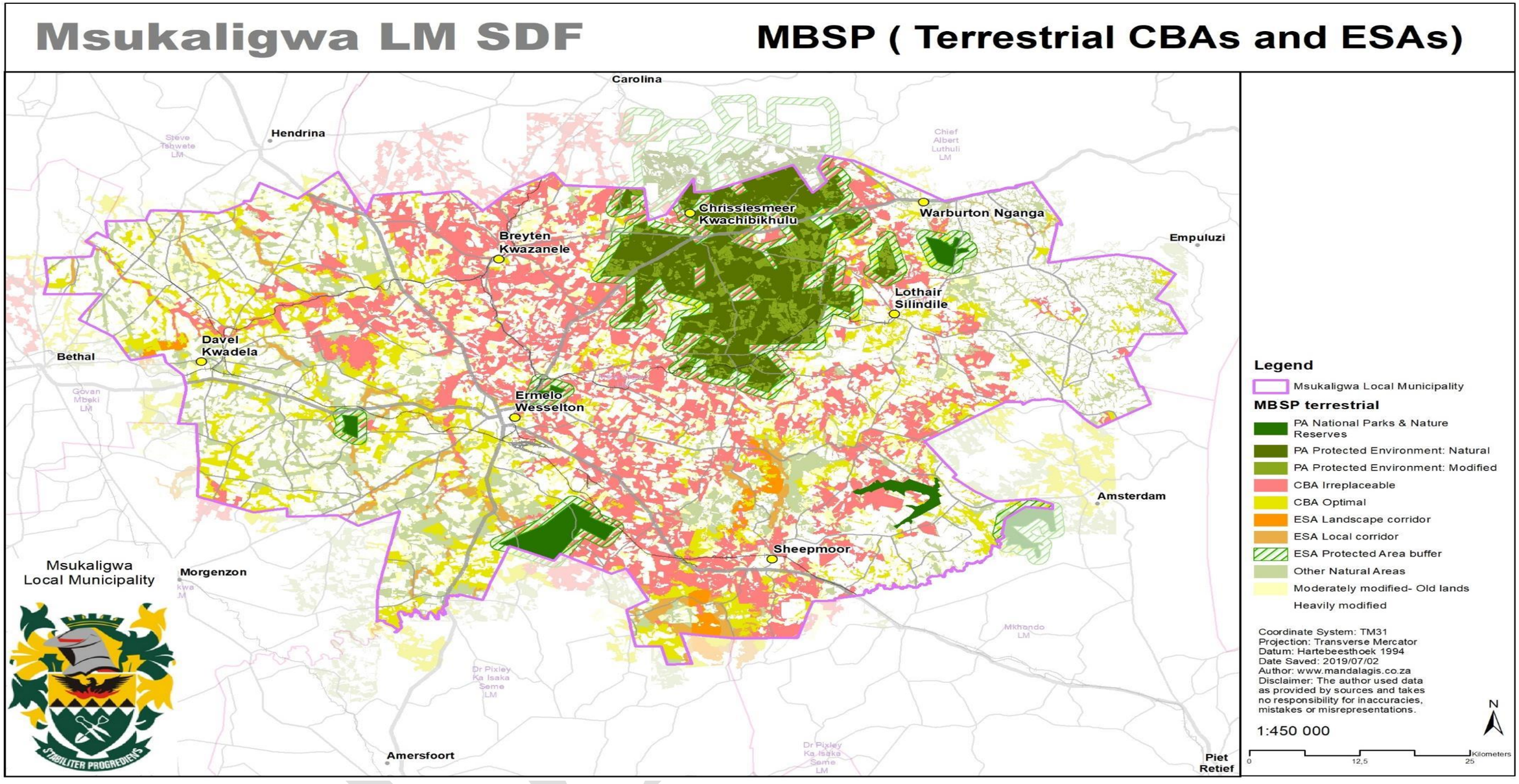


Figure 13: MBSP (Protected Areas / Terrestrial Sensitive Areas)

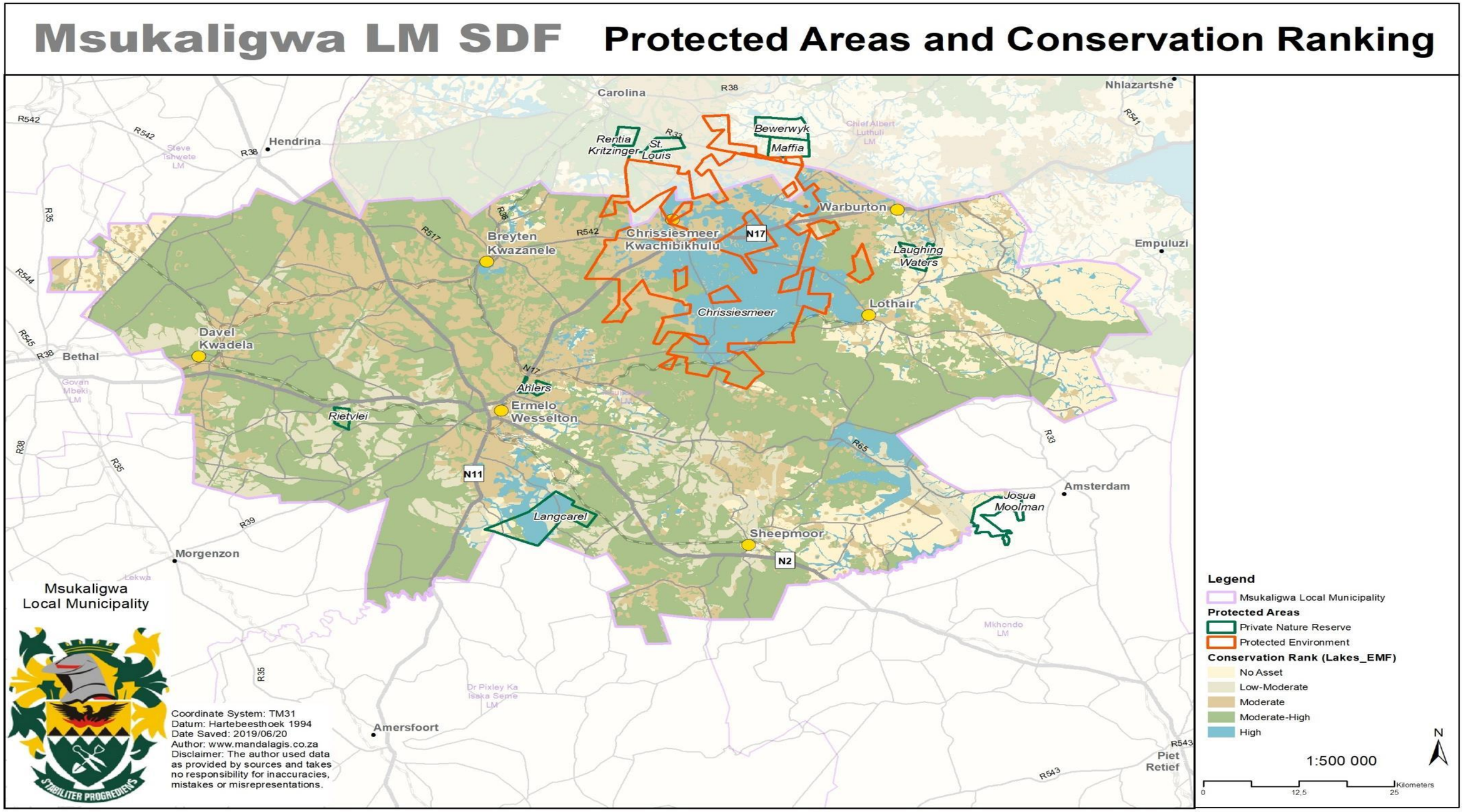


Figure 14: Conservation Ranking

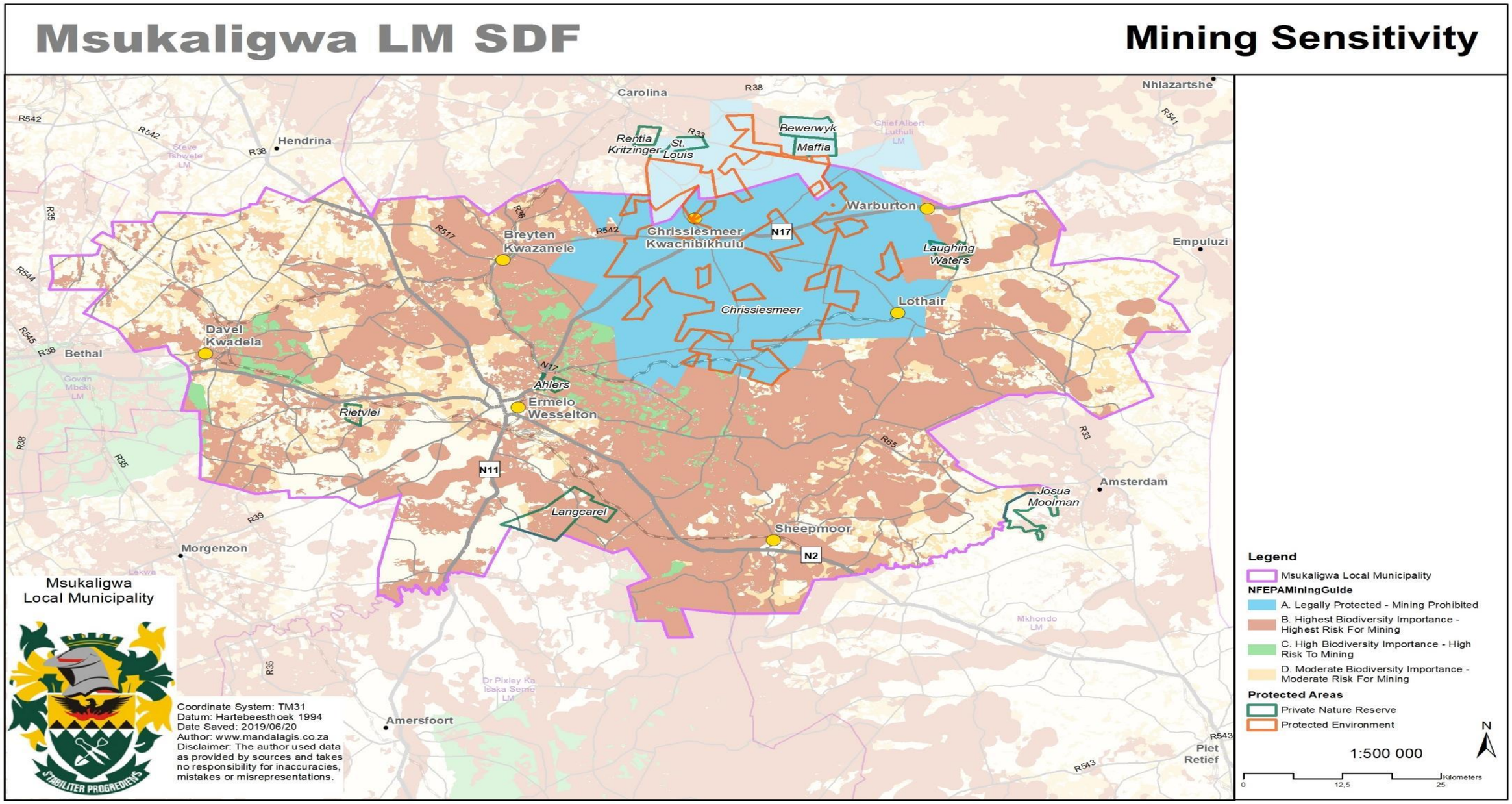


Figure 15: Mining sensitivity

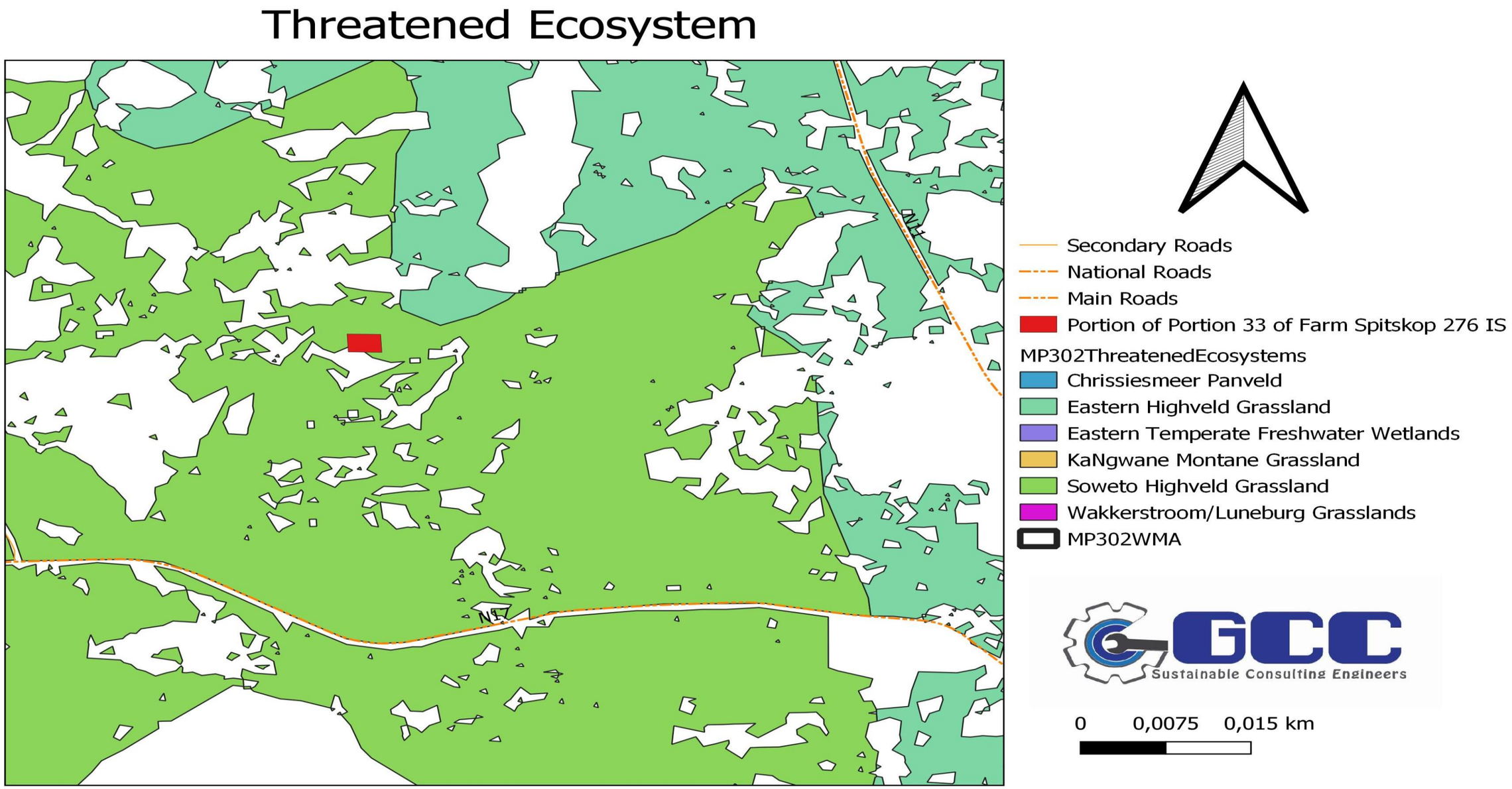


Figure 16: Threatened ecosystems.

(a) Description of the current land uses

The proposed site is an agricultural area and is characterized by farming.

1.12 Socio-Economic Assessment

1.12.1 Demographic Information

Msukaligwa has a relatively small population, with a fairly high growth rate of 2.2%. The total population increased from 149 377 in 2011 to 164 608 in 2016. In 2016, just more than 14% of people in the Gert Sibande District resided in Msukaligwa. In 2016, 51 089 households resided in Msukaligwa, representing 15.3% of the total District number of households. Average household size decreased from 3.6 to 3.2 from 2011 to 2016. Spatially the population is concentrated in the towns and settlements of Msukaligwa. Close to 60% of the total population in Msukaligwa lives in the main node of Ermelo / Wesselton, followed by 10% in Breyten / KwaZanele. Around 16% of the population lives across the rural wards. A trend of urban migration can be observed between 2016 and 2050, with the population living in Ermelo Wesselton increasing to 67% of the total population in 2050.

Table 6: Demographic indicators

	2011 StatsSA	2016 StatSA	2030 Projection	2050 Projection
Total Population	149 377 (40 932households)	164 608 (51 089 households)	196 342	238 555

1.12.2 Population Structure and Composition.

Msukaligwa has a fairly young population, with the youth population (15-34 years) forming 41.2% of the total population. The general trend is a decrease in the number of children between 5 and 14 years since 2001, with an increase in the 25-43 age group. This may indicate a period of decreased birth rates / decreased population growth. Just over half the population (51.1%) was female in 2016.

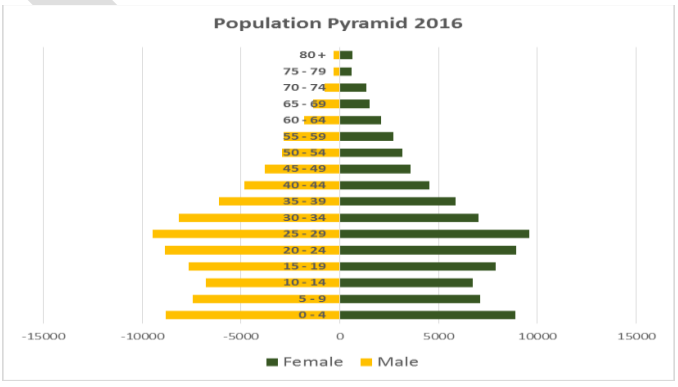


Figure 17: Population pyramid

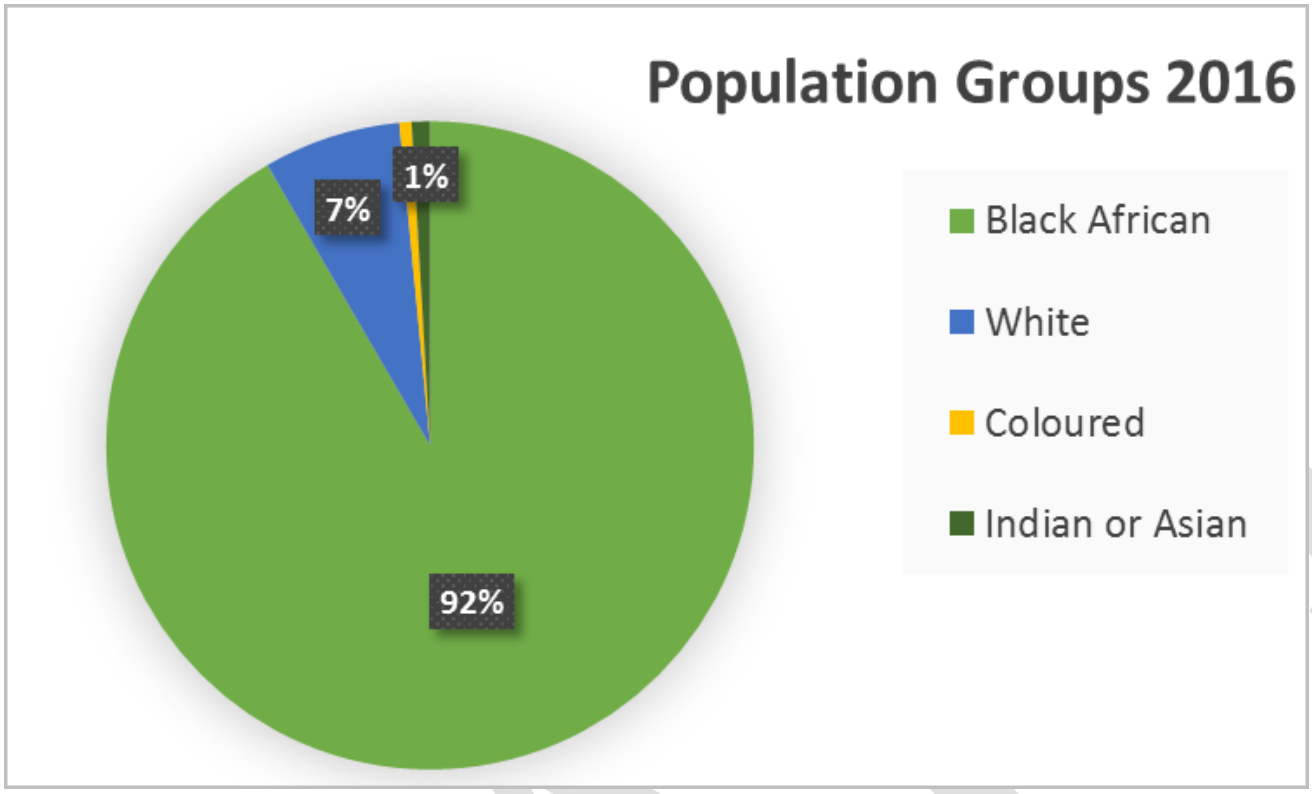


Figure 18: Population groups.

1.12.3 Local Economy & Employment

The economic growth rate for Msukaligwa was at 3.0% per annum on average over the period 1996 to 2017 and forecasted average annual GDP growth for 2017-2022 relatively low at 1.3%. The contribution of Msukaligwa to the Mpumalanga economy was around 4.3%, making it the fifth largest local economy in the province. It is the second largest economy in the District, contributing around 15.5%.

In 2017, the dominating sectors in the local economy was mining, community services, trade (including industries such as tourism) and finance. Msukaligwa has a comparative advantage in economic sectors such as agriculture, transport and mining. Finance and Agriculture achieved the highest (albeit slim) growth in contribution from 2014 to 2017. The contribution of utilities, mining and trade declined slightly. According to the DEDT, tourism expenditure in the area was 4.3% of the local GDP, indicating the tourism potential in the area; this equalled tourism spending of R627 million in 2017.

Table 7: Economic Sector Contribution

Economic Sector	2014	2017	Change
Agriculture	5,3%	6,0%	**0,7%**
Community Services	18,4%	**18,5%**	0,1%
Construction	2,7%	2,7%	0,0%
Finance	13,3%	**14,2%**	**0,9%**
Manufacturing	5,1%	5,1%	0,0%
Mining	20,8%	**20,3%**	**-0,5%**
Trade	18,5%	**18,2%**	**-0,3%**
Transport	11,3%	11,3%	0,0%
Utilities	4,5%	3,8%	**-0,7%**

The composition of the Msukaligwa economy is illustrated to the right.

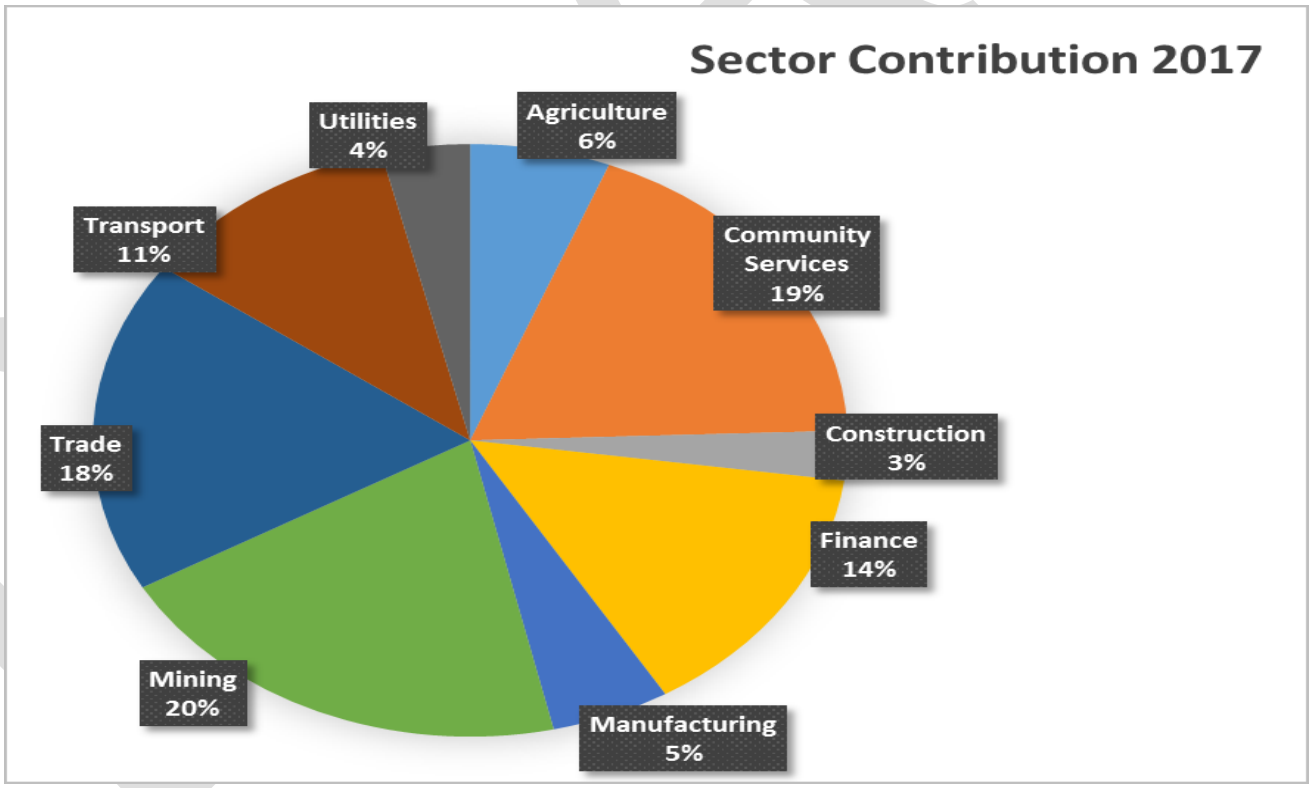


Figure 19: Economic Sector Contribution.

1.12.4 Access to Community Services

1.12.4.1 Access to Water

The towns and rural settlements in Msukaligwa are served by formal water reticulation networks. Just over 93% of households have adequate water supply, with a low backlog of 6.7% remaining. This is an improvement from a backlog of 9.4% in 2001 and 8.3% in 2011. It is also noted in the IDP that the backlog affects mainly rural communities, where water provision is achieved via boreholes. Such communities do have access to water, but not at RDP standards. Challenges in providing boreholes for water include large distances and resistance from private landowners.

Table 8: Water Provision

Number of Households: 2016 (StatsSA)	Serviced Households 2016 (StatsSA)	New development since 2016	Progress End June 2018	Backlog End June 2018	% Backlog End June 2018
51 089	46 846	802	47648	3441	6.7%

1.13 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 9, Table 10 and Table 11 below.

Table 9: 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	Management and Mitigation Measures	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 the mining site.	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.	1	1	1	2	6	**L**
	Friction between residents/landowners and construction personnel.	2	2	2	2	12	**L**	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. A community liaison officer will be mandated with informing the local residents of the commencement of mining activities. 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.	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. The proposed development footprint areas shall be within the 5ha. No informal fires in the vicinity of mining area shall be permitted. Edge effects of all 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 mining activities, erosion, poaching and faunal species trapping.	2	2	2	2	12	**L**		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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
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. Alien Invasive Plant Species Management plan to be implemented. Prohibit the collection of any plant material for firewood or medicinal purposes.	1	1	1	1	3	**L**
Heritage and Palaeontological Resources	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**
Surface water	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**

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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
Groundwater	Localised spillages of oils, fuels, lubricants, and other chemicals from machinery leaching to groundwater contamination.	3	3	3	3	27	**ML**	All mining 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**
Air Quality	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) 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	1	1	1	1	3	**L**
	Possible increase in dust generation, PM10 and PM2.5 as a result of excavations, operation of heavy machinery, and material movement.	2	2	2	2	12	**L**		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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
							L	include limiting the extent of open areas, reducing the frequency of disturbance, and spraying with water.						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, rehabilitation of the work areas shall be undertaken concurrent with mining to ensure that areas stripped of vegetation are kept to a minimum.	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
	Scaring 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 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. Mining staff working in areas where the ambient noise levels exceed 85 dB should wear ear protection equipment. Where possible, operation of several equipment and machinery simultaneously must be avoided. 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. Equipment must be operated within specifications and capacity (e.g. no overloading of machines). Regular maintenance of equipment must be undertaken, particularly regarding lubrication. Equipment shall be switched off when not in operation. Appropriate directional and	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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
								intensity settings must be maintained on all hooters and sirens. Black South Energy must ensure that the employees conduct themselves in an appropriate manner while on site.						
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	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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
								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 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 motorist 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 10: 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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
MINING ACTIVITIES														
Fauna and Flora	Loss of animal species because of collisions with vehicles or hunting and trapping by personnel.	2	3	2	2	14	**L**	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. Ensure that mining is done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material.	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**	Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs. 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 mining and the campsite will be collected in proper receptacles and removed to a registered disposal facility.	2	1	1	2	8	**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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
Air Quality	Dust generated by moving vehicles and 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**
Visual	The mining operations will be visible from the nearby residents and properties.	2	3	2	3	21	**L**	Materials transported on public roads must be covered.	1	2	1	2	8	**L**
Noise	Increase in ambient noise levels as a result of the mining activities.	3	3	2	2	16	**L**	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. 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. 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.	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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
Soil, Land Use and Land Capability	Soil contamination as a result of miningactivities 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**	Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. 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.	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**	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.	2	2	1	1	5	**L**
Heritage and Archaeological Resources/ Palaeontology impacts	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**
Surface water	Mining operations may result in the generation of surface water runoff contaminated with coal. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the surrounding clean water	2	3	4	3	27	**ML**	No mining operations will be undertaken within 100 metres from the nearby steams. Storm water 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**

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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
	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.													
Groundwater	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. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs. 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**
	Material used for backfilling may leach pollutants that will result in the pollution of the surrounding groundwater regime. This may even spread beyond the backfilling site via plume migration.	3	3	3	3	27	**ML**		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 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 11: Impact Assessment for Decommissioning Phase and Closure

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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
Soils and Vegetation	Soil and vegetation disturbance from drill pad preparation.	2	1	2	2	10	**L**	Ensure that contamination of the rehabilitate area by carbonaceous material and hydrocarbon liquids are prevented. Ensure that the rehabilitation work is done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. All pits will be rehabilitated to pre-mining conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs. 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**
	The use of vehicles/machinery during the rehabilitation of the mining site may result 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**		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 mining site.	-	-	-	-	-	-		-	-	-	-	-	-

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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
	The removal of the campsite equipment and the rehabilitation of the mining site and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	-	-	-	-	-	-		-	-	-	-	-	-
Surface water	During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, open pits will be backfilled, levelled, top soiled and the area re-seeded. 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.	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**	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.	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	Management and Mitigation Measures	Severity	Spatial	Duration	Probability	Significance	Significance Rating
								Maintaining equipment and machinery in good working order. Switching off equipment when not in use.						

1.14 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 9, Table 10 and Table 11. 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 13. 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:

Significance = Consequence x Probability

Where

Consequence = Severity + Spatial Scale + Duration

And

Probability = Likelihood of an impact occurring

Table 12: Criteria for Assessing Significance of Impacts

Criteria	**Description**
Severity (S)	The severity of an impact on the receiving environment: • No Impact- (Weight value- 0) • Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1) • Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2) • High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3) • Low- Low potential that impact might be reversed (weight value- 4) • Impact cannot be reversed (weight value- 5)
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
	• Onsite – within specific site boundary (weight value – 1) • Project area specific – within the mining area boundary (weight value – 2) • Local area - within 5 km of the mine boundary (weight value – 3) • Regional –Municipal boundary (weight value- 4)
Duration (D)	Time span associated with impact: • Immediate – 1 Year or less (weight value – 1) • Short term – 1-5 Years (weight value –2) • Medium term – Longer than 5 Years (weight value – 3) • Long term- life of the activity/ operation (weight value-4) • Permanent (weight value- 5)
Probability (P)	The likelihood of an impact occurring: • Unlikely – chance of the potential impact occurring (weight value – 1) • Possible –chance of the potential impact occurring (weight value – 2) • Likely - chance of the potential impact occurring (weight value – 3) • High probability - chance of the potential impact occurring (weight value- 4) • Definite - chance of the potential impact occurring (weight value- 5)
Impact Significance/Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium, or Low). **Severity + Spatial + Duration + Frequency of Impact = High/Medium/Low Impact**

Table 13: 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 14: Significance Threshold Limits

Significance Points	Environmental Significance	Description
76- 150	High (H)	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.
40- 75	Medium High (MH)	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.
26- 39	Medium Low (ML)	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.
1- 25	Low (L)	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.

1.15 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 15: Positive and Negative impact of the proposed activity

Alternative		**Advantages**	**Disadvantages**
Activity alternatives (mining method alternatives)	Prefered Alternative (Opencast mining methods)	The shallow nature of the Coal deposit can easily be mined by means of opencast mining. Economically and socially empowerment of the local communities	Opencast 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)
	Alternative 1 (Underground mining method)	In comparison to the preferred alternative, if underground mining would have been feasible, there could be less surface-related environmental impacts that would have resulted from mining.	Underground mining has greater safety risk to the miners as compared to the open cast mining method. Owing to the shallow nature of the proposed mineral, it is not feasible to undertake underground mining.

Alternative		Advantages	Disadvantages
No-go versus Open cast mining	Open cast Mining	Mining activity was prefered on the proposed site based on the availability Coal reserves within the area. The open cast mining is prefered such that the shallow nature of the mineral deposit can easily be mined by means of opencast mining. If the mining right is granted local communities will be positively impacted through employment opportunities that will arise and the proposed area's economy will grow through trading activities associated with mining activities like transport, increase in health facilities as well as an increased turnover in hospitality and tourism sectors. Most importantly, the proposed mining project will create skills development and community building opportunities to the local community, therefore, eradicating poverty in such a case stimulating Local Economic Development.	**Visual impacts** The development of the mine will have a visual impact on the proposed area due to the dust generation and construction activities resulting from the mining activities. **Dust** The excavation activities and the use of the access dusty road will result in the emission of dust into the surrounding atmosphere. This will not only impact on the surrounding communities but also the plants surrounding the area as the dust is deposited on the leaves. This interferes with the photosynthesis process of the plants. Furthermore, animals that feed on the plants will be impacted upon as this will affect their forage. **Noise** Noise pollution will be generated from the mining activities, namely through the movement of trucks and vehicles, machinery operations, trenching activities. Depending on the size, noise levels of the trucks and excavators may cause the noise to be localised in the specific site.

Alternative		Advantages	Disadvantages
		Not only that, the business opportunities will be encouraged through infrastructural development as roads will be constructed, this will assist in increasing the demand of goods and services in the affected area/s in the long term. The project will contribute directly and indirectly to the Country's GDP. Moreover, the development will encourage income generation in the area as well as the development of BEE opportunities during construction, operation and eventual closure and rehabilitation	**Soil contamination** Soil pollution due to the leakages of oil and other industrial liquids from the trucks and machinery. This is a potential risk of soil contamination, which will change the soil chemistry and soil nutrients of the affected soil. Ultimately this could also potentially affect the vegetation growth in the contaminated areas. **Impact on heritage resources** The mining activity could result in danger of negatively impacting on unidentified heritage resources during site assessment, however, the possibility of the impact is very minimal as education and training on heritage resources will be given to mine employees. **Fauna disruption** Due to the impacts of noise, dust, movement and operation of trucks and vehicles, the potential loitering of the employees and the trenching itself will disrupt the surrounding animals. This disruption can further lead to injury or death in cases where animals fall into the trenches.

Alternative		Advantages	Disadvantages
			Stripping (Removal of vegetation) While all means will be applied to minimise disturbance, removal of vegetation cannot be avoided altogether. Deforestation will occur to clear the land for the opencast mining, this will leave the ground bare and prone to erosion. **Soil erosion** Erosion of the soil will occur through runoff and wind. **Habitat destruction** The habitat that supports the animals within the project site will be disturbed and destructed by the movement and operations during the mining activities. This could possibly cause the relocation of some of the animals and result in habitat fragmentation. **Waste generation** Waste rock, litter and other solid waste will be generated and deposited in and around the site. This could potentially attract nuisance and affect the natural scenery of the site. Waste rock

Alternative		Advantages	Disadvantages
			will be used to backfill the trenches. This will be undertaken in a concurrent rehabilitation manner. **Surface and groundwater impacts** The hazardous chemical spills may lead to surface water contamination and groundwater due to the leakages.
	No-go Alternative	The implementation of the no-go option would result in the continuation of the current land uses (farming). Therefore, no additional impacts on the bio-physical environment will occur, besides those that are currently occurring, and / or which may potentially occur if the areas are not managed appropriately.	It is also very important to note that the implementation of the no-go option may not necessarily prevent the mining of these resources on the property, as other companies may apply to mine the resources, unless the DMR sterilizes the reserves.
Technology Prefered (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 Prefered (No Operation Alternative was identified)	The operation includes the open cast mining, material stockpiles, storage, excavations.	The mine and its related activities will generate employment opportunities.	Relocation and loss of cattle grazing area.

1.15.1 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) Groundwater

Pit dewatering and groundwater contamination from hydrocarbon spillages and decant during post-closure will have a significant impact if not managed. The following mitigation measures if implemented, will result in a low impact:

- Store the dewatered water in PCDs and ensure that the dams will have enough storage volume
- Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users
- Monitoring of groundwater water levels and groundwater inflow rates
- Monitoring groundwater levels, decant rates and qualities

d) Surface Water

There is no river that will be affected within the study area where the mine and infrastructure will be located. However, the possibility of surface water contamination will result due to:

- Clearing the surface and site preparations, for the mine 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.
- Storm water management measures such as diversion berms, trenches and PCDs should be monitored and maintained fairly regularly.
- Prevent and contain hydrocarbon spillages that may wash off into nearby watercourses

e) Soil, land use and land capability

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 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

f) Noise

The vibration and over-air pressure levels during blasting will result in an increase in the prevailing noise level when blasting take place. The same physical attributes such as distance, topography and wind direction will play a role on how the receptors will perceive the over-air pressure and ground vibration levels which last for up to 3-seconds per blast. 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 opencast mine and receptors where practical.

g) 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.

1.15.2 Motivation where no alternative sites were considered

The site is located in an area where the geology is known for having Coal reserves. Minerals can only be mined where there are identified and verified, therefore it was not practical to select any other sites. If the proposed operation were not to proceed, the land may or may not be utilized for agricultural, or grazing activities in the future. It is worth noting that as much as the no go option may result in the protection of the environment in situ; the consequences of not proceeding with the proposed mining activities will include the forfeiture of a mining opportunity and therefore the loss of support towards the local municipality. 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.

1.15.3 Statement motivating the alternative development location within the overall site

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

The site is located in an area where the geology is known for having Coal reserves. Minerals can only be mined where there are identified and verified, therefore it was not practical to select any other sites. If the proposed operation were not to proceed, the land may or may not be utilized for agricultural, or grazing activities in the future.

It is worth noting that as much as the no go option may result in the protection of the environment in situ; the consequences of not proceeding with the proposed operation will include the forfeiture of a mining opportunity and therefore the loss of support towards the local municipality. 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.

1.16 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.

1.17 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 16: Air Quality Impact Assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction			
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).	a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-ASide may also be used; c) Enforce low vehicle speeds on unpaved areas (< 40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; e) Vegetate the berm and other surfaces that were laid bare as a result of construction with locally indigenous grass species where practicable, as soon as possible; and f) Requiring contractors to maintain construction vehicles in good condition	Medium
Vehicle movement on haul roads	Same as above	Haul road mitigation measures include: a) Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions. b) 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.	Low
Operational			
Drilling and Blasting	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden	a) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; b) Carbon offsets will be considered if required;	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		c) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink functionality within the mining right area. d) Avoid blasting under windy conditions as far as practicable	
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	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, loading and transfer from one conveyor to another and bulldozing. 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.	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) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS	Medium
Decommissioning and Rehabilitation			
Demolition of infrastructure	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	a) Wet suppression during landscaping and materials handling activities; b) Enforcement of low vehicle speeds on unpaved areas (< 40 km/h); c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and f) Requiring contractors to maintain construction vehicles in good condition	Medium

Table 17: Noise impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
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
Operational Phase			
Pit activities	Noise increase at the boundary of the mine 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 mine have not changed.	Medium
Hauling of waste rock to the waste dump			
Additional traffic		Speed limit of mining areas to be adhered to at all times.	Low
Operation of an emergency generator		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.	Medium
Decommissioning Phase			
Planting of grass and vegetation at rehabilitated area	Noise increase at the boundary of the mine 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.	Low
Maintenance of disturbed area		Maintenance activities to be done during daytime working hours.	Low

Table 18: Traffic impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
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
	Employees and labourers transported to/ from site	Road network able to support additional commuter trips	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
Operational Phase			
Transportation of staff	Haulage to/ from site; and mine staff 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
Decommissioning and Rehabilitation Phase			
Removal of rubble and other materials from site	Added traffic on the road network	Road network able to support additional trucks.	Medium-Low

Table 19: Groundwater impact assessment.

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Drilling	Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside preferred pathways, which will: a) Identify geological and hydrogeological control across the proposed mining right area; b) Provide facilities to undertake aquifer testing and water sample collection; and c) Serve as future monitoring points in an initial groundwater monitoring network.	Monthly monitoring of the boreholes with regard to water levels and water quality	Low
Storage of fuels and lubricants and movement of vehicles	Spills from improper storage of fuels and lubricants and also from leaking vehicles	a) Monthly monitoring of the boreholes with regard to water levels and water quality b) Place drip trays under vehicles when parked. c) 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; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards	Low
Operational Phase			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Mine water contamination	Deposition waste rock on Waste Rock Dumps (WRD) can result in the contamination of groundwater as a result of seepage	a) Implement compacted clay or synthetic liner underneath the WRDs to minimizes seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment c) Monthly and quarterly monitoring of the surface water and groundwater respectively	Medium-Low
Mine dewatering	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety.	a) Water quality sampling should be done to determine the quality of the water before it is pumped into the environment; b) Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users; c) Monitoring of groundwater water levels and groundwater inflow rates; and	Medium-Low
Decommissioning and Rehabilitation			
Decanting and groundwater contamination	After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on groundwater quality will continue in perpetuity, even after mine closure. Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable impacts. If the pH is acidic, dissolved metals and sulphates will remain is solution	a) Identify decant areas and raise topography to increase time to decant; b) Plan open cast mining so that the perimeters follow the surface contours along the lowest side of the pit and not cut directly across streams; c) Monitoring groundwater levels, decant rates and qualities; d) Revegetated WRD as quickly as possible to minimize recharge rates; e) Divert all clean runoff away from, the pit through a series of berms;	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		f) Re-evaluate impact of decant after end of life, once monitoring information is available; and g) Treat seepage and decanted water using passive or active means to meet the recommended standards.	

Table 20: Soil, land use and land capability impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
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) Minimise the footprint of the Mining Project.** The existing pre-construction mine layout and design are aiming to minimize the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible. 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) Management and supervision of construction teams** 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.	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 open cast pit 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		Low
Handling and storage of building material	This will have the potential to result in soil pollution when not managed properly.		Low
Vegetation clearance	Soil erosion is also anticipated due to vegetation clearance.		Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		c) Location of stockpiles 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. **d) Topsoil stripping** 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. 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. **e) Stockpiling of topsoil** To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched. The clay content of the topsoil on the largest area of the Mining project area is not sufficient for stockpiles to remain relatively stable without benching. The areas on the Arcadia soil form do have sufficient clay content.	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		f) Prevention of stockpile contamination 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 **g) Terrain stability to minimise erosion potential** Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: • Using appropriate methods of excavating that are in accordance with regulatory requirements and industry best practices procedures; • 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 • Using drainage control measures and culverts to manage the natural flow of surface runoff Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: • Using appropriate methods of excavating that are in accordance with regulatory requirements and industry best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff **h) Management of access and services roads** 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. 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. **Prevention of soil contamination** During the construction phase, chemical soil pollution should be minimised as follows: • 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; • 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; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		• Cleaning up areas of spillage of potentially contaminating liquids and solids.	
Operational Phase			
Open pits and mine infrastructure	Open pits and surface infrastructure will both lead to surface impacts on soil resources. 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	**Management of potential soil contamination during the operational phase** 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) Processing areas should be contained, and systems designed to effectively manage and dispose of contained storm water, effluent and solids; d) Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise 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; e) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids	Medium-low
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.		Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		f) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors g) Effluent and processing drainage systems avoid leakage to ground.	
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. Soil surfaces with infrastructure such as concrete slabs and buildings will not be exposed to erosion any longer. This is a permanent impact that will be localized within the site boundary with medium-high consequence and significance.	Same as above	Medium-low
Decommissioning and Rehabilitation			
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	**a) Management and supervision of decommissioning teams** 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.	Medium-low
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		Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
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) Infrastructure removal** All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site **c) Site preparation** Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (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. **d) Seeding and re-vegetation** 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 **e) Prevention of soil contamination** During the decommissioning phase, chemical soil pollution should be minimised as follows: Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a	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		

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		drip tray with plastic sheeting and filled with absorbent material; o Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; o Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; o Containing potentially contaminating fluids and other wastes; and o Cleaning up areas of spillage of potentially contaminating liquids and solids.	

Table 21: Surface water impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction			
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	a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites b) Vegetation should only be removed where absolutely necessary; c) Hydrocarbons should be stored on hardpark bunded facilities to ensure that all spillages are contained; and d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities	Low
Operational Phase			
Mining 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. - Sustainable mine water management needs to be implemented.	Medium - Low
Decommissioning and Rehabilitation Phase			
Mine decommissioning	Pollution of surrounding watercourses as a result of activities during the decommissioning phase	a)The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage; b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.	
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 22: Socio-economic impact assessment

Activity	Impact Description	Mitigation Measures
Construction Impacts		
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.	a) Establish targets for employment and training; b) Train workforce for longer term employment; c) Adopt recruitment strategies that ensure local people are given employment preference; d) Effective implementation of training and skills development initiatives; e) The recruitment process has to be transparent and equitable; f) Maximise and monitor local recruitment; g) Consult local labour recruitment offices; h) Prevent nepotism/corruption in local recruitment structures; i) Promote employment of women and youth; j) 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 k) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force
	Multiplier impacts on the local economy	a) Development of a register of local SMMEs; b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) Preference should be given to capable subcontractors who based within the local municipal area; d) Align skills development to build capacity of SMMEs; e) Monitoring of sub-contractors procurement; f) Development of a register of local SMME; and
	a) Improved economic development; b) Increased capacity to develop and maintain livelihood strategies	a) Ensure that there is stakeholder buy-in; b) Aligning LED projects with those of other development role-players; c) Liaison with beneficiaries to ensure needs are met;

Activity	Impact Description	Mitigation Measures
		d) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; e) Expanding its skills development and capacity building programmes for non-employees f) Monitoring system to regulate Historically Disadvantaged South African procurement g) Where feasible, training should be NQF Accredited; and h) A record of training courses completed per individual should be kept
	Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Community education to sensitize community members to potential traffic and blasting safety risks
	Strain on the existing infrastructure which is already inadequate	a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Mining Project; and d) Liaison with district and local municipalities well in advance to ensure needs are met e) Ensure that municipalities take into account expected population influx f) Promotion of mining methods to allow for surface development g) Influx management h) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders

Activity	Impact Description	Mitigation Measures
Operational Impacts		
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	a) Limit, as far as reasonably possible, social ills caused by influx of workers and jobseekers; b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project; c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that the Mine has no control over activities related to workers' behaviour, however it is recommended that HIV/AIDS campaigns are conducted within the affected area; d) Discourage influx of jobseekers by prioritising employment of unemployed members of local communities; e) Clear identification of workers –prevention of loitering; f) Liaison with police or establish/ support community policing forum;
	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	a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors
	Loss of grazing land	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; b) Should Mine acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes – potentially as part of a lease agreement; c) 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

Activity	Impact Description	Mitigation Measures
	Altered sense of place and breakdown of existing social networks	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; b) Black South Energy should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked
Operational activities	a) Developed local economy; b) Increased capacity to develop and maintain livelihood strategies	Maximise benefits from local employment, skills and economic development
	Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of fly-rock on Community education to sensitize community members to potential traffic and blasting safety risks.
Decommissioning and Rehabilitation Phase		
Mine closure	The impact may be reversible over time as workers and jobseekers leave the area, consequences such crime and other social pathologies will be permanent	a) Develop a Mine Closure Plan; b) Proactively and effectively implement mine closure plan; c) Collaborate with adjacent mining companies to develop and implement sustainable community; d) Develop alternative and sustainable livelihoods; e) Alternatives to save jobs/avoid downscaling should be investigated beforehand; f) Proactively assess and manage the social and economic impacts on individuals, regions and economies where retrenchment and/or closure of the mine are certain; and g) Partner with the relevant government departments, to jointly manage Closure process

Table 23: Waste management impacts

Activity	Impact Description	Mitigation Measures
	Construction Phase	
Construction activities	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	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
	Operational Phase	
Mining activities	Contamination of groundwater from WRD seepage	GCC advises that monitoring boreholes be established near the waste rock dumps
	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GN R.632 and R.633	a) Manage waste in accordance with Regulations GN R.634. b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and d) Take such corrective action as may be required.
	Decommissioning and Rehabilitation	
Mine closure	Wastes expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution, an impact rated as	a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding then prevailing standards/guidelines; b) Sort the remaining 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; c) Have recyclable wastes removed by responsible recyclers; and d) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfills

Table 24: Blasting and vibration impacts.

Activity	Impact Description	Mitigation Measures
	Operational Phase	
Opening up of the pit	**Airblast** Airblast is usually the main cause of blasting related complaints. Airblast is an atmospheric pressure wave consisting of high-frequency sound that is audible and low-frequency sound or concussion that is sub-audible and cannot be heard. Either or both of the sound waves can cause damage if the sound pressure is high enough (Konya). Airblast results from explosive gasses being vented to the atmosphere that results in an air pressure pulse. This occurs as a consequence of stemming ejections or hole blowouts, direct rock displacement through face ruptures or surface cratering, the use of high Velocity of Detonation (VOD) accessories that are left unconfined and / or uncovered (e.g. detonating cord on surface), by ground vibration or by various combinations of the above.	a) Exercise ongoing care and control during all stages of the drilling and blasting operation. Check, check and check again. b) Prior to charging up the blast, the holes drilled should be inspected and all 'problem' holes identified for corrective action. Examples of 'problem' holes could include holes that are under burdened, holes that are short drilled, holes surrounded by badly cracked ground and off pattern holes that could potentially lead to problems. c) Production QC checks must be implemented as part of the Standard Operating Procedures. This is particularly important if bulk explosives are being used. During charging up of the holes the bulk explosive product should be sampled on an ongoing basis to ensure acceptable quality. The explosive's supplier should have standard operating procedures in place to address this issue. These procedures should be shared with the end user. d) After charging up is complete and prior to stemming the holes closed, the holes should be taped to determine the explosive column rise to ensure that the required stemming length is obtained. Any errors must be corrected before the hole is stemmed closed. e) The tie up should be carried out according to the blast plan to ensure that the timing and sequencing of the blast proceeds as planned. f) Avoid prolonged sleeping of blasts particularly in wet ground conditions. It is preferable to charge and blast in the shortest possible time frame. g) If fumes occur after a blast, then the area must be kept clear until these have dissipated. h) The stipulated re-entry times must be enforced.

1.18 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):-

No specialist studies have been undertaken during the mining permit application.

Table 25: Summary of Specialist

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.

Attach copies of Specialist Reports as appendices

1.19 Environmental Impact Statement

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

Summary of construction impacts indicated in Table 26

Table 26: 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
Construction Phase												
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	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
generation, visual intrusion of pit & heavy machinery												
Terrestrial Biodiversity 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	Low
Surface water 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
Socio-economic Employment creation	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Waste management Poor waste management could cause soil contamination by	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
hydrocarbons, chemicals, cement												
Blasting and Vibration Fumes produced in the detonation process	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium

1.19.1 Summary of Operational Impacts

Potential impacts resulting for the operational phase are indicated in Table 27

Table 27: 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
Groundwater Groundwater inflow into the pit and reduction of groundwater levels due to dewatering of pits	1	3	2	3	18	Medium-High	1	3	1	1	5	Low
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	Low
Heritage Excavations may expose archaeological artefacts	1	3	2	3	18	Medium-High	1	3	1	1	5	Low
Visual Appearing of WRD and blasting which cause the altering the topography and visual character, dust generation, visual intrusion of pit & heavy machinery	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
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 HIV/AIDS and unwanted pregnancies.	3	3	3	3	27	High	1	3	1	2	10	Low-Medium
Waste management Mining residues have low potential for mobilisation of contaminants	2	3	3	3	24	Medium-High	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
Blasting and Vibration Fumes and fly rock produced in the detonation process	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium

1.19.2 Summary of Decommissioning and Rehabilitation Phase

Impacts emanating from decommissioning and rehabilitation phase are indicated in

Table **28**.

Table 28: 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
Decommissioning and Rehabilitation Phase												
Air Quality Considerations and impacts similar to construction phase, possibly greater due to larger area and eddy	2	3	1	3	18	Medium-High	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
Noise Noise unlikely to cause exceedances of guideline levels, but some receptors will experience intrusive noise	3	3	3	3	27	High	3	3	1	1	7	Low-Medium
Traffic Impact 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
Groundwater Decanting and groundwater contamination	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
Soil, land use and land capability Soil impacts on WRD footprints will be permanent. Elsewhere, mixing of topsoil with subsoil during rehabilitation	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
would have an adverse impact												
Heritage 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 during the construction and operational phases. If any	0	0	0	0	0	None	0	0	0	0	0	None
Visual Reclaiming stockpiles & WRD, removal of infrastructure	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Terrestrial Biodiversity	1	3	3	3	21	Medium-High	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
Habitat stabilisation and reconstruction												
Surface water Increase in surface water quantity	2	3	2	3	21	Medium-High	1	3	1	1	5	Low
Aquatic Ecology Sedimentation as a result bare area of soil and pollution of water courses resulting from hydrocarbon spills	3	3	3	3	27	High	3	3	1	1	7	Low-Medium
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

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Waste management Mobilisation of particulates and other contaminants from mining residue deposits	2	3	3	3	24	Medium-High	1	3	1	1	5	Low

1.19.3 Cumulative Impacts

1.19.3.1 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

1.19.3.2 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.

1.20 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 20: Preliminary sensitivity map

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

Refer to Table 15

1.21 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) Reduce mine decant at the rehabilitated pits
b) To reuse contaminated water from mining site and prevent discharge of contaminated onto natural environment

c) To continually monitor ground water levels and water quality to ensure that adverse impacts are managed.
d) Re-shape rehabilitated slopes to ensure free draining
e) Monitor dust dispersion as per the Dust Regulations
f) Monitor noise during all phases of the mine
g) To establish a buffer zone between ecologically sensitive areas and the mine boundaries
h) To prevent soil compaction, contamination, and soil erosion
i) To prevent sedimentation and surface water contamination
j) To continually carry out noise surveys to assess the impacts of noise on the surrounding communities

1.22 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

1.23 Description of any assumptions, uncertainties, and gaps in knowledge

(Which relate to the assessment and mitigation measures proposed)

- No Heritage Impact Assessment was undertaken therefore details on the SAHRA permit requirement are not available;
- 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 soldiered 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.

1.24 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, GCC'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.

1.25 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.

1.26 Period for which the environmental authorisation is required

The mining 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.

1.27 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.

1.28 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

2 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

2.1 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

2.2 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;

2.3 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).

2.4 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.

2.5 Composite Map

(Provide a map 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 20

2.6 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:

- Ensure that mitigation and management measure are effective.
- Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
- Reduce duration of any potential negative impacts.

Environmental management outcomes and related management statements are:

a) Protect the biophysical environment as far as possible.

- Minimise impacts to the biophysical environment.
- Ensure relevant legislation are applied on site including but not limited to alien invasive management and protection of ecologically sensitive species and environments.
- 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.

- Ensure clean and dirty water separation systems are established on site from the onset and are in line with GN704 principals.
- Use water responsibly and recycle water as much as possible.
- 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) Mine 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.
- Conduct annual EMP audits and complete the necessary amendment process where this is deemed necessary.

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.

2.6.1 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 farming and 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 and ore processing 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
- Monitoring groundwater quality and surface runoff for at least 5 years after closure, longer if warranted by the results. Target water quality objectives must be based on pre-closure groundwater and surface runoff quality from the Smarty mine and infrastructure site; and
- Providing the required measures to limit at source the generation of contaminants which could adversely affect local groundwater quality.

2.6.2 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 possible plumes originating from the mining areas do not impact significantly on the surface water features or surrounding user's boreholes.
- 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.

2.7 The Process for Managing Any Environmental Damage, Pollution, Pumping and Treatment of Extraneous Water or Ecological Degradation As A Result Of Undertaking A Listed Activity.

Surface Water

a) Clean and dirty water separation and dirty water containment features must be established on site, in line with GN704 requirements and engineered designs, prior to any other activity taking place on site:

- The dirty water catchment must be demarcated and managed as small as possible.
- Where diverted storm water flow enters a wetland or drainage line, flow dissipaters and / or silt traps must be installed if high flow, erosion and / or sedimentation is observed.
- Internal trenches will be excavated to drain dirty water from the active footprint to lined containment dams. Excavated soils will be placed upslope of the trenches to prevent contamination of the soil with dirty water runoff.
- All storm water diversion features will be designed to divert a 1:50 year 24hr storm event.

2.8 Volumes and rate of water use required for the operation

The rates and volumes of water to be used are not available at this stage.

2.8.1 Has a water use licence has been applied for?

A water use license has not been applied for.

2.9 Impacts to be mitigated in their respective phases

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

Table 29: Environmental Management Programme for the proposed project

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Construction Phase					
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.	a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-A-Side may also be used; c) Enforce low vehicle speeds on unpaved areas (< 40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust;	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 LOM.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			e) Vegetate the berm and other surfaces that were laid bare because of construction with a locally indigenous grass species where practicable, as soon as possible; and f) Requiring contractors to maintain construction vehicles in good condition		
	Vehicle movement	Emissions from the resuspension of loose material on the road surface. Vehicle-entrained dust emissions from the unpaved haul roads within the proposed Mining Project mining area potentially represent the most significant source of fugitive dust for the mine	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		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			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	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		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		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 machinery which may create a noise problem.	Environmental Conservation Act, Noise Regulations	From day 1, through life of project until rehabilitation vegetation established
		Construction of mine infrastructure	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem		
	Vehicle movement and refuelling	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	Earthworks	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 planned open cast pit 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	**a) Minimise the footprint of the Mining Project** The existing pre-construction mine layout and design is aiming to minimise the area to be occupied by mine infrastructure to as small as practically possible. 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) Management and supervision of construction teams**	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 mine. Rehabilitate areas completely as soon as activity in those areas ceases.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		infrastructure is constructed	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. **c) Location of stockpiles** 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		
	Handling and storage of building material	This will have the potential to result in soil pollution when not managed properly.			
	Vegetation clearance	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			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		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.	their final closure location, or as close as practicable to it **d) Topsoil stripping** 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. 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. **e) Stockpiling of topsoil**		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched. The clay content of the topsoil on the largest area of the Mining project area is not sufficient for stockpiles to remain relatively stable without benching. **f) Prevention of stockpile contamination** 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		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			avoided at all cost and if it occurs, should be cleaned up immediately **g) Terrain stability to minimise erosion potential** Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			those disturbed surfaces; and **h) Management of access and services roads** 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.		
Groundwater	Drilling	Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside	Monthly monitoring of the boreholes with regard to water levels and water quality	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	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		preferred pathways, which will: a) Identify geological and hydrogeological control across the proposed mining area; b) Provide facilities to undertake aquifer testing and water sample collection; and c) Serve as future monitoring points in an initial groundwater monitoring network.		quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	(including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
	Storage of fuels and lubricants and movement of vehicles	Spills from improper storage of fuels and lubricants and also from leaking vehicles	a) Monthly monitoring of the boreholes with regard to water levels and water quality	Same as above	Same as above

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			b) Place drip trays under vehicles when parked. c) 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; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards		
Surface Water	Exposure of topsoil	Sedimentation of watercourses due to exposing and loosening of	a) Use wet suppression, chemical stabilization and wind speed	Dangerous goods stored and managed as per SANS 10228:2006 and	Hydrocarbons will only be stored on site

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	reduction methods that should be used to control open dust sources at the construction sites b) Vegetation should only be removed where absolutely necessary; c) Hydrocarbons should be stored on hardpark bunded facilities to ensure that all spillages are contained; and d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities	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.	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 mine.
	Vegetation removal	Altered drainage paths and loss of catchment yield due to the removal of vegetation and	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		construction of diversion berms	to acceptable standards and then to discharge to the catchment.		
Traffic	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.	Mine safety in terms of MHSA and relevant regulations	From day 1 until mine 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 b) Education and training on heritage resources will be given to mine employees	Heritage resources act	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Socio-Economic	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.	a) Establish targets for the employment and training; b) Train workforce for longer term employment; c) The recruitment process has to be transparent and equitable; d) Maximise and monitor local recruitment; e) Consult local labour recruitment offices; f) Prevent nepotism/corruption in local recruitment structures; g) Promote employment of women and youth; 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 i) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force	Mine Charter and Good relations with communities	From construction until mine closure
		Multiplier impacts on the local economy	a) Development of a register of local SMMEs;		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) Preference should be given to capable subcontractors who based within the local municipal area; d) Align skills development to build capacity of SMMEs; e) Monitoring of sub-contractors' procurement; f) Development of a register of local SMME.		
		a) Improved economic development; b) Increased capacity to develop and maintain	a) Ensure that there is stakeholder buy-in; b) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		livelihood strategies	NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; c) Expanding its skills development and capacity building programmes for non-employees d) Monitoring system to regulate Historically Disadvantaged South African procurement		
		Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Community education to sensitize community members to potential traffic and blasting safety risks		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		Altered sense of place and breakdown of existing social networks	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; b) The Mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked; c) Inform communities of planned construction activities that would affect vehicle/pedestrian traffic; d) Ensure that access to key services are uninterrupted by providing alternative access routes in cases where construction activities restricts or disrupt movement		
Waste Management	Construction activities	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials,	a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non- recyclable materials. Recyclable materials should	Waste management standards and Regulations	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		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	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		
Operational Phase					
Air Quality	Drilling and blasting	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden (US EPA, 1995). Clearly, other	a) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; b) Carbon offsets will be considered if required; c) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink	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 LOM.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		variables such as the depth of the holes, diameter of the holes, and moisture content of the material being drilled would also be relevant and it might be supposed that an emission factor equation should take account of these variables. However, in the absence of other data (and given the relatively minor contribution of this source to overall emissions from mining operations), it is reasonable to accept the 0.59 kg/hole factor for TSP	functionality within the mining right area. d) Avoid blasting under windy conditions as far as practicable		
	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		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			of a chemical binder if necessary		
	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, loading and transfer from one conveyor to another and bulldozing. 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.	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) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			implemented to monitor compliance with the NAAQS		
Ecology		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	Preservation of biodiversity in terms of NEM:BA	From day 1, through life of project until rehabilitation 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 mine	a) All noise sources exceeding 85.0dBA to be identified and if		From day 1, through life of project until

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Hauling of waste rock to the waste dump	footprint and at the abutting residential	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 mine have not changed.	Environmental Conservation Act, Noise Regulations	rehabilitation vegetation established
	Additional traffic		Speed limit of mining areas to be adhered to at all times		
	Operation of an emergency generator		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	Open pits and mine infrastructure	Open pits and surface infrastructure will both lead to surface impacts on soil resources. Surface infrastructure like buildings,, waste rock	**Management of potential soil contamination during the operational phase** The following management measures will either prevent or	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
		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	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) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids. d) Air pollution control systems avoid release of fines to the ground (such	conditions stipulated in licenses/rights/permits	maintain these for life of mine. Rehabilitate areas completely as soon as activity in those areas ceases.
	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.			
	Vehicle movement	Soil compaction will be a measurable deterioration			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		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.	as dust from dust collectors.		
	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. This is a permanent impact that will be localized within the site boundary with medium-high consequence and			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		significance. With proper mitigation measures it is anticipated that the significance of this impact will be reduced to low			
Groundwater	Mine dewatering	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety.	a) Store the dewatered water in PCDs and ensure that the dams will have enough storage volume; b) Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users; c) Monitoring of groundwater water levels and groundwater inflow rates.	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 mine.
	Mine water runoff	Any contamination that will seep from the WRDs is	a) Implement compacted clay or synthetic liner underneath		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		expected to move eastern direction toward the north-north-east down-gradient of the waste dump. The toe of the plume estimated to extend 700 m away from waste dump, 20 years after contamination commences	the WRDs to minimizes seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment; c) Monthly and quarterly monitoring of the surface water and groundwater respectively		
Surface water	Mining activities	Pollution of surrounding watercourses 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 mine is there however, 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 mine water	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	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			management needs to be implemented	standards for hydrocarbons.	in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
Traffic	Transportation of staff	Haulage to/ from site; and mine staff to/from site	Road network able to support additional trucks.	Mine safety in terms of MHSA and relevant regulations	From day 1 until mine 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 box-cut	Opening of the box-cut might expose or reveal archaeological artefacts	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken	Heritage resources act	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			b) Education and training on heritage resources will be given to mine employees		
Socio-Economic		The impact may be reversible over time as workers and job-seekers leave the area, consequences such as HIV/AIDS and unwanted pregnancies will be permanent	a) Limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project; c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that Mine has no control over activities related to workers' behaviour, however It is recommended that HIV/AIDS campaigns are conducted within the affected area; d) Discourage influx of jobseekers by prioritising employment of unemployed members of local communities; e) Clear identification of workers –prevention of loitering;	Mine Charter and Good relations with communities	From construction until mine closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			f) Liaison with police or establish/ support community policing forum; g) Promote projects providing housing, especially low-cost housing, to link with the proposed h) Community education; and i) Implement measures to address potential conflict between locals and non-locals		
		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	a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain, and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			generate nuisance factors		
		Strain on the existing infrastructure which is already inadequate.	a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Mining Project; and d) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders		
		Loss of grazing land	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		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			landowner with the intention to acquire only the required servitude area; 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		
		Altered sense of place and breakdown of existing social networks	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; b) The mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked		
		a) Developed local economy; b) Increased capacity to develop and maintain	Maximise benefits from local employment, skills and economic development		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		livelihood strategies			
		Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure;		
Waste management	Mining operations	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GN R.632 and R.633	a) Manage waste in accordance with Regulations GN R.634 – 636, b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and	Waste management standards and Regulations	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			d) Take such corrective action as may be required.		
Decommissioning Phase					
Air quality	Demolition of infrastructure	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	a) Wet suppression during landscaping and materials handling activities; b) Enforcement of low vehicle speeds on unpaved areas (< 40 km/h); c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with a locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and	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 LOM.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			f) Requiring contractors to maintain construction vehicles in good condition		
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		
		Habitat stabilisation	Implement rehabilitation monitoring plan and remedy actions		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Noise	Rehabilitate of disturbed areas	Noise increase at the boundary of the mine 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		Building 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 c) Spill kits must always be available and ready on-site		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
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	**a) Management and supervision of decommissioning teams** 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. **b) Infrastructure removal** All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. **c) Site preparation**	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 mine. 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 storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (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. **d) Seeding and re-vegetation** 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		
	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			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			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. **e) Prevention of soil contamination** During the decommissioning phase, chemical soil pollution should be minimised as follows: 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; ○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; ○ Avoiding waste disposal at the site wherever		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			possible, by segregating, trucking out, and recycling waste; ○ Containing potentially contaminating fluids and other wastes; and ○ Cleaning up areas of spillage of potentially contaminating liquids and solids.		
Groundwater	Decanting	After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on groundwater quality will continue in perpetuity, even after mine closure. Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable	a) Identify decant areas and raise topography to increase time to decant; b) Plan open cast mining so that the perimeters follow the surface contours along the lowest side of the pit and not cut directly across streams; c) Monitoring groundwater levels, decant rates and qualities; d) Revegetated WRD as quickly as possible to minimize recharge rates; e) Divert all clean runoff away from, the pit through a series of berms;	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

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		impacts. If the pH is acidic, dissolved metals and sulphates will remain is solution	f) Re-evaluate impact of decant after end of life, once monitoring information is available; and g) Treat seepage and decanted water using passive or active means to meet the recommended standards.		brought to site for the life of mine.
Surface water	Mine rehabilitation	Pollution of surrounding watercourses as a result of activities during the decommissioning phase	a) The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage; b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.	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

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	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		brought to site for the life of mine.
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 mine closure
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 mine employees	Heritage resources act	From construction until closure
Socio-Economic	Mine closure	The impact may be reversible over time as workers and job-seekers leave the area, consequences such crime	a) Support economic diversification through development of alternative markets; b) Develop a Mine Closure Plan;	Mine Charter and Good relations with communities	From construction until mine closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		and other social pathologies will be permanent	c) Proactively and effectively implement mine closure plan; d) Collaborate with adjacent mining companies to develop and implement sustainable community; e) Develop alternative and sustainable livelihoods; f) Alternatives to save jobs/avoid downscaling should be investigated beforehand; g) Proactively assess and manage the social and economic impacts on individuals, regions and economies where retrenchment and/or closure of the mine are certain; and h) Partner with the relevant government departments, to jointly manage Closure process		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Waste management	Mine closure	Waste expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly Streams pollution, an impact rated as	a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding then prevailing standards/guidelines; b) Sort the remaining 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; c) Have recyclable wastes removed by responsible recyclers; and d) Have non-recyclable wastes removed by reputable contractors for	Waste management standards and Regulations	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			disposal at appropriately licensed landfills		

2.11 Impact Management Outcomes

Refer to Heading 1.21

2.12 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).

2.12.1 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 to mark the mine and infrastructure footprint
b) Vegetation clearing within the footprint
c) Construction of stormwater facilities
d) Construction of mine infrastructure (workshops, office and buildings)
e) 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) Drilling and blasting
c) Open cast mining of the ore
d) Transportation of the mined ore to the processing plant
e) Transportation of processed product off-site
f) Equipment and vehicle maintenance at the mine workshop

Closure and Rehabilitation

Activities of closure and rehabilitation will involve:

a) Demolition of buildings and other infrastructure and disposal of the rubble;
b) Shaping of waste rock dump
c) Emptying and backfilling of PCD
d) Revegetating the backfilled areas
e) Post-closure monitoring of surface water, groundwater and vegetation

2.13 Summary of Environmental Impact Management and Monitoring Actions

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Construction Phase						
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.	a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-ASide may also be used; c) Enforce low vehicle speeds on unpaved areas (< 40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; e) Vegetate the berm and other surfaces that were laid bare as a result of construction with a locally indigenous grass species where practicable, as soon as possible; and f) Requiring contractors to maintain construction vehicles in good condition	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 mine	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. The disadvantage of paving/tarring, infrequent watering and chemical mitigation measures is their inability to prevent material spillage from being re-entrained		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Ecology	Site clearance for establishment or access roads, infrastructure and pit area		Clearing of vegetation	Avoid sensitive areas and implement buffer zones Limit the footprint area to the pit and infrastructure Avoid areas of remaining indigenous vegetation	ECO	Monthly Alien Management Plan
			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	Earthwork 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 Monthly Noise Survey Reports
			Construction of mine infrastructure	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem		
	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	Transport of materials and labor with trucks and buses as well as other light vehicles using the existing access roads. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution. 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 planned open cast pit. These activities are the most disruptive to natural soil	**a) Minimize the footprint of the Mining Project.** The existing pre-construction mine layout and design is aiming to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible. 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.	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			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) Management and supervision of construction teams** 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.		
	Handling and storage of building material		This will have the potential to result in soil pollution when not managed properly.		ECO	Monthly
	Vegetation clearance		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.	**c) Location of stockpiles** 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 **d) Topsoil stripping** 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. 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. **e) Prevention of stockpile contamination** 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	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately **f) Terrain stability to minimise erosion potential** Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • 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 • Using drainage control measures and culverts to manage the natural flow of surface runoff Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • 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. **g) Prevention of soil contamination** During the construction phase, chemical soil pollution should be minimised as follows: • 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; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids.		
Groundwater	Drilling	To prevent deterioration in ground water quality	Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside preferred pathways, which will: a) Identify geological and hydrogeological control across the proposed mining right area; b) Provide facilities to undertake aquifer testing and water sample collection; and c) Serve as future monitoring points in an initial groundwater monitoring network.	Monthly monitoring of the boreholes with regard to water levels and water quality	ECO	Monthly Monthly Water Quality Reports
	Storage of fuels and lubricants and movement of vehicles	Same as above	Spills from improper storage of fuels and lubricants and also from leaking vehicles	a) Monthly monitoring of the boreholes with regard to water levels and water quality b) Place drip trays under vehicles when parked. c) 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; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
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	a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites b) Vegetation should only be removed where absolutely necessary; c) Hydrocarbons should be stored on hard park bunded facilities to ensure that all spillages are contained; and d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities	ECO	Monthly Monthly Water Quality Reports
	Vegetation removal	Same as above	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	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 d) Education and training on heritage resources will be given to mine employees	ECO	Monthly
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	a) Establish targets for the employment and training; b) Train workforce for longer term employment; c) Adopt recruitment strategies that ensure local people are given employment preference;	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			can improve their skills by gaining more experience.	d) Effective implementation of training and skills development initiatives; e) The recruitment process has to be transparent and equitable; f) Maximise and monitor local recruitment; g) Consult local labour recruitment offices; h) Prevent nepotism/corruption in local recruitment structures; i) Promote employment of women and youth; j) 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 k) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force		
			Multiplier impacts on the local economy	a) Development of a register of local SMMEs; b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) Preference should be given to capable subcontractors who based within the local municipal area; d) Align skills development to build capacity of SMMEs; e) Monitoring of sub-contractors procurement; f) Development of a register of local SMME; a		
			a) Improved economic development; b) Increased capacity to develop and maintain livelihood strategies	a) Ensure that there is stakeholder buy-in; b) Aligning LED projects with those of other development role-players; c) Liaison with beneficiaries to ensure needs are met; d) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; e) Expanding its skills development and capacity building programmes for non-employees f) Monitoring system to regulate Historically Disadvantaged South African procurement g) Where feasible, training should be NQF Accredited; and h) A record of training courses completed per individual should be kept		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Community education to sensitize community members to potential traffic and blasting safety risks		
			Altered sense of place and breakdown of existing social networks	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; b) The Mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked; c) Inform communities of planned construction activities that would affect vehicle/pedestrian traffic; d) Ensure that access to key services are uninterrupted by providing alternative access routes in cases where construction activities restricts or disrupt movement		
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	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	ECO	Monthly
Operational Phase						
Air Quality	Drilling and blasting	Monitor emissions concentrations in line with Air Quality Standards and Dust Regulations	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden (US EPA, 1995). Clearly, other variables such as the	e) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; f) Carbon offsets will be considered if required; g) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink functionality within the mining right area.	ECO Occupational hygienist	Monthly Monthly Dust Monitoring Reports

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			depth of the holes, diameter of the holes, and moisture content of the material being drilled would also be relevant and it might be supposed that an emission factor equation should take account of these variables. However, in the absence of other data (and given the relatively minor contribution of this source to overall emissions from mining operations), it is reasonable to accept the 0.59 kg/hole factor for TSP	h) Avoid blasting under windy conditions as far as practicable		
	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		
	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. 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.	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) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS		
Ecology	Operation of mine and management of access roads	Confine vegetation clearance and faunal disturbance to mine 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		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			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	To minimise intrusive noise levels at al sensitive receptors	Noise increase at the boundary of the mine 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 mine have not changed.	ECO Occupational hygienist	Monthly Monthly Noise Surveys
	Hauling of waste rock to the waste dump					
	Hauling of material to the plant					
	Additional traffic			Speed limit of mining areas to be adhered to at all times		
	Operation of an emergency generator			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	Open pits and mine infrastructure	To protect soil from contamination; and To preserve as much of the fertility of the topsoil as possible;	Open pits and surface infrastructure will both lead to surface impacts on soil resources. 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	**Management of potential soil contamination during the operational phase** 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,	ECO	Monthly
	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			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			within the site boundary and have medium-high significance on the soil resource.	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		
	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.			
Groundwater	Mine dewatering	Prevent groundwater contamination and reduction of groundwater levels	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety.	Store the dewatered water in PCDs and ensure that the dams will have enough storage volume; Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users; Monitoring of groundwater water levels and groundwater inflow rates; and Update numerical model annually	ECO	Monthly Water Quality Assessment Reports Annual Water Liability Reports
	Mine water runoff		Any contamination that will seep from the WRDs is expected to move eastern direction toward the north-north-east down-gradient of the waste dump.	a) Implement compacted clay or synthetic liner underneath the WRDs to minimizes seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment; c) Monthly and quarterly monitoring of the surface water and groundwater respectively		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Surface water	Mining activities	Prevent contamination of surface water bodies	Pollution of surrounding watercourses 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 mine is there however, 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 mine water management needs to be implemented	ECO	Monthly Water Quality Assessment Reports Annual Water Liability Reports
Traffic	Transportation of staff	Ensure worker safety and compliant with road safety signages	Haulage to/ from site; and mine 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.		
Heritage Impact Assessment	Opening of box-cut	Report any suspicion of unmarked graves or artefacts to SAHRA and Provincial Heritage Resource Agency	Opening of the box-cut might expose or reveal archaeological artefacts	i) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken j) Education and training on heritage resources will be given to mine employees	ECO	Monthly
Socio-Economic			The increase in nuisance factors and associated changed sense of place will be negative, and direct because of Project activities, and indirect as a result of migrant jobseekers	a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors	ECO	Monthly
			Loss of grazing land	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; b) Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				Rehabilitation Plan that will be implemented as part of the decommissioning phase		
			Altered sense of place and breakdown of existing social networks	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;		
			Increase in injuries and possible loss of lives	a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Community education to sensitize community members to potential traffic and blasting safety risks		
Waste management	Mining operations	To prevent contamination of soil and water resources by acid, salts or metals and to practises 3Rs of waste management	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GN R.632 and R.633	a) Manage waste in accordance with Regulations GN R.634 – 636 b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and d) Take such corrective action as may be required.	ECO	Weekly
Decommissioning and Rehabilitation Phase						
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	a) Wet suppression during landscaping and materials handling activities; b) Enforcement of low vehicle speeds on unpaved areas (< 40 km/h); c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with a locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and	ECO	Weekly Dust Monitoring Reports

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				f) Requiring contractors to maintain construction vehicles in good condition		
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 Alien Invasive Species Management Plan
	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		
			Habitat stabilisation	Implement rehabilitation monitoring plan and remedy actions		
Noise	Backfill of disturbed areas	To avoid intrusive noise levels at sensitive receptors	Noise increase at the boundary of the mine 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.	ECO Occupational Hygienist	Monthly Monthly Noise Surveys
	Planting of grass and vegetation at rehabilitated area			Building 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 c) Spill kits must always be available and ready on-site		
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	**a) Management and supervision of decommissioning teams** 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	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.			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			These activities will not result in further impacts on land use and land capability but may increase soil compaction	demarcated for decommissioning. In addition, compliance to these instructions must be monitored. **b) Infrastructure removal** All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site **c) Site preparation** Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (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 **d) Seeding and re-vegetation** 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 **e) Prevention of soil contamination** During the decommissioning phase, chemical soil pollution should be minimised as follows: 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;		
	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			
	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			

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; ○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; ○ Containing potentially contaminating fluids and other wastes; and ○ Cleaning up areas of spillage of potentially contaminating liquids and solids.		
Groundwater	Decanting	Prevent contamination of water bodies	After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on groundwater quality will continue in perpetuity, even after mine closure. Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable impacts. If the pH is acidic, dissolved metals and sulphates will remain is solution	a) Identify decant areas and raise topography to increase time to decant; b) Monitoring groundwater levels, decant rates and qualities; c) Revegetated WRD as quickly as possible to minimize recharge rates; d) Divert all clean runoff away from, the pit through a series of berms; e) Re-evaluate impact of decant after end of life, once monitoring information is available; and f) Treat seepage and decanted water using passive or active means to meet the recommended standards.	ECO	Monthly Water Quality Assessment Reports Annual Water Liability Reports
Surface water	Mine rehabilitation	Prevent contamination of water bodies	Pollution of surrounding watercourses because of activities during the decommissioning phase	a) The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage; b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.	ECO	Monthly Water Quality Assessment Reports Annual Water Liability Reports
	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		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				result in an improvement in catchment yield after land profiling and cover having been restored		
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	k) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken l) Education and training on heritage resources will be given to mine employees	ECO	Monthly
Waste management	Mine closure	To prevent contamination of soil and water resources by acid, salts or metals and to practises 3Rs of waste management	Wastes expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, PCD dam silt and liners, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution, an impact rated as	a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding then prevailing standards/guidelines; b) Remove silt, synthetic liners and contaminated non-synthetic liner materials from PCD and dispose at appropriately licenced landfill. Liner materials and building rubble with contamination levels below prevailing standards/guidelines may be backfilled into the last portion of the opencast void; c) Sort the remaining 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; d) Have recyclable wastes removed by responsible recyclers; and e) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfills	ECO	Weekly

2.14 Financial Provision

2.14.1 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, albeit that topographical changes on site, such as the mine residue facility, will be altered permanently.

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 possible plumes originating from the mining areas do not impact significantly on the surface water features or surrounding users' boreholes.
- 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.

2.14.2 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.

2.14.3 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:
    - Weighting Factor 1: The nature of the terrain where the operation is located.
    - 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 30.

Table 30: Quantum Calculation

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

	CLOSURE COMPONET	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
1.3.6	Fencing					
	Remove security fencing	No	0	m	R126,45	R0,00
	Erect stock fencing	Yes	200	m	R126,45	R25 290,00
	Sub-total for Demolition of other buildings and structures					**R127 522,50**
1.4	**Rehabilitation of roads and paved surfaces**					
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
	Sub-total for Rehabilitation of roads and paved surfaces					**R32 742,00**
	Sub-total for Infrastructural Areas					**R163 338,90**
2	**Mining Areas**					
2.1	**Open pit rehabilitation including final voids and ramps**					
2.1.1	Opencast rehabilitation	Yes	0,1	ha	R214 888,54	R21 488,85
	Sub-total for Open pit rehabilitation including final voids and ramps					**R21 488,85**
2.2	**Rehabilitation of stockpiles and processing residues**					
2.2.1	Overburden and Spoils Rehabilitation	Yes	0,1	ha	R143 259,03	R14 325,90
	Sub-total for Rehabilitation of stockpiles and processing residues					**R14 325,90**
2.3	**Rehabilitation of water impoundments**					
2.3.1	Rehabilitation of processing waste deposits and evaporation ponds	Yes	0,1	ha	R518 235,21	R51 823,52
	Sub-total for Rehabilitation of clean water impoundments					**R51 823,52**

	CLOSURE COMPONET	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
2.4	**Rehabilitation of subsided areas**					
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
	Sub-total for Rehabilitation of subsided areas					**R12 821,64**
	Sub-total for Mining Areas					**R100 459,92**
3	**General Surface Rehabilitation**					
3.1	**General Surface Rehabilitation**					
3.1.1	Rip to alleviate compaction of stockpile and infrastructural footprint areas	Yes	0,1	ha	R113 485,31	R11 348,53
	Sub-total for General Surface Rehabilitation					**R11 348,53**
3.2	**Other surface disturbances**					
3.2.1	Plant Area	Yes	0	ha	R113 485,31	R0,00
	Sub-total for Other surface disturbances					**R0,00**
	Sub-total for General Surface Rehabilitation					**R11 348,53**
	Sub-Total 1 (for infrastructure and related aspects)					**R275 147,35**
4	**P&Gs, Contingencies and Additional Allowances**					
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
	Sub-Total 2 (for additional allowances)					**R120 532,42**

	CLOSURE COMPONET	CLOSURE COST				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
5	**Pre-site Relinquishment Monitoring and Aftercare**					
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
	Sub-Total 3 (for Post-Closure aspects)					**R214 384,34**
	Grand Total Excl. VAT. (for Sub-Total 1+2+3)					**R610 064,11**

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 2.13

2.2 *Monitoring and reporting frequency*

Refer to Section 2.13.

2.3 *Responsible persons*

Refer to Section 2.13

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 and mining worker sectors. 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, and mining worker sectors. 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 Energey 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 (mine 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 mine 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 mine 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) A Fire Association should be set up with the mine and surrounding landowners to facilitate communication during fire events and assist in fighting fires, where necessary. If such an association exists, then the mine will join such an association.

g) 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.
h) 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.
i) Contaminated run-off must be diverted into an oil sump or cleaned up.

3.2.2 Hydrocarbon/Chemical Spill

Hydrocarbons such as diesel, petrol, and oil, which are used as fuel for mine machinery will be kept on site; therefore, there is the possibility that spillage may occur. Further, any chemicals contained on site, such as those associated with explosives may also be detrimental to the environment if spills occur. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment. The following procedure applies to a hydrocarbon/chemical spill:

a) The incident must be reported to the Environmental coordinator immediately.
b) The Environmental Coordinator will assess the situation from the information provided and set up an investigation team. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
c) When investigating the incident, priority must be given to safety.
d) Once the situation has been assessed, the Environmental Coordinator must report back to the Mine Manager.
e) The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible, any remediation measures that can be taken.
f) In the event of a small spillage, the soil should be treated in situ, using Hazmat clean up kits and bioremediation.
g) Every precaution should be taken to prevent the spill from entering the surface water environment.
h) In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be made available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil should be removed and treated at a special soil rehabilitation facility.

i) Reasonable measures must be taken to stop the spread of spills and secure the area to limit access.
j) Dispatch necessary services.

3.2.3 Explosion

Other than explosion incidents related to mining, explosions can occur in the workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance. The procedure to be followed is:

a) Safe evacuation routes should be devised in the event of an uncontrolled explosion and all staff trained on relevant evacuation routes and assembly points.
b) Once safe to do so, first responders may provide first aid to injured parties.
c) All relevant emergency response units must be notified, and hospitals informed of incoming patients.
d) DMR to be notified of the incident.

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*

Black South Energy 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 Black South Energy 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 Black South Energy 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. Black South Energy 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. ☐

Signature of the environmental assessment practitioner:

Name of company:

Date:

APPENDIX 1: EAP's CV

APPENDIX 2: LOCALITY MAP

APPENDIX 3: SITE PLAN

APPENDIX 4: COMPOSITE MAP

APPENDIX 5: PUBLIC PARTICIPATION REPORT