BOTHAVILLE NE EXT A PROSPECTING RIGHT AMENDMENT

FINAL BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Submitted in support of an Amendment Application for an Issued Prospecting Right and Environmental Authorisation

Prepared on Behalf of
WHITE RIVERS EXPLORATION (PTY) LTD

DMR REFERENCE NUMBER
FS 30/5/1/1/3/2/1/10273 EM

26th APRIL 2019

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FINAL BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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REVISION AND AMENDMENTS		
Revision	**Date**	**Report**
1	20 March 2019	Draft Basic Assessment Report and Environmental Management Programme
2	26 April 2019	Final Basic Assessment Report and Environmental Management Programme

EXECUTIVE SUMMARY

White Rivers Exploration (Pty) Ltd holds an executed Prospecting Right and an Environmental Management Plan for a project known as Bothaville NE Ext A, which consider the non-invasive prospecting of the following commodities:

- Silver
- Gold
- Coal
- Diamond (Alluvial)
- Platinum Group Metals
- Rare Earths
- Sulphur
- Uranium

White Rivers Exploration (Pty) Ltd wishes to undertake amendments to their current prospecting operations by including invasive prospecting activities. The amendments will consider the addition of 8 (eight) drillholes (each to a depth of 700 metres) to the Prospecting Work Programme. In order to amend the current prospecting operations, it is necessary that a Section 102 template, accompanied by (i) an Environmental Authorisation amendment application and (ii) an updated Prospecting Work Programme, are completed and submitted to the regulatory authority, the Department of Mineral Resources, for decision-making. The amendment application process requires the submission of a Basic Assessment Report and Environmental Management Programme as well as the undertaking of a Public Participation Process. Shango Solutions (Pty) Ltd has been appointed by White Rivers Exploration (Pty) Ltd as the independent Environmental Assessment Practitioner to assist in complying with these requirements.

The Prospecting Right amendment application was lodged in terms of Section 102 of the Mineral Petroleum Resources Development Act and the Environmental Authorisation amendment application was lodged in terms of Section 31 of the Environmental Impact Assessment Regulations (as amended) to the Regional Manager of the Free State Department of Mineral Resource. Acknowledgment of receipt of the application for ministerial consent to amend the Prospecting Right was received on the 3rd May 2018 and the application to amend the issued Environmental Authorisation was acknowledged on the 3rd July 2018.

Purpose of this Document

This document has been compiled in support of an application for the amendment of an issued Prospecting Right and Environmental Authorisation and aims to assess any impacts associated with proposed prospecting activities as detailed in the amended Prospecting Work Programme. It is important that Interested and Affected Parties were provided with an opportunity to review and comment on the assessment report, thereby contributing to the Basic Assessment process and assisting in identifying any additional risks or impacts that may be experienced. As such, a public consultation was undertaken for this application. The draft report was made available to Interested and Affected Parties for review and comment for a period of at least 30 days before it was finalised. This report includes the results of the public consultation as input for consideration by the Competent Authority (the Department of Mineral Resources) in their decision-making.

Project Location

The area of interest occupies a total of 9 510.03 hectares and it is situated approximately 30 kilometres east of the town Bothaville, in the Free State Province of South Africa. The project area is located in the Bothaville Magisterial District and falls under the Nala and Moqhaka Local Municipalities, within the Lejweleputswa and Fezile Dabi District Municipalities respectively. Twenty-four farm portions extend over the application area.

Proposed Activities

Invasive and non-invasive prospecting activities will be undertaken as part of the amended Prospecting Work Programme. The Prospecting Work Programme is based on a phased approach over approximately five years. The activities completed to date include desktop studies and sourcing historical data over the project area. The data was captured and interpreted to generate preliminary 3D geological and structural models. A conceptual estimate of the grade and tonnage was performed. The outcome from the exploration activities identified that drilling is required to increase the confidence in the geological model and resource estimate and ultimately define a code-compliant resource.

The amendments will consider the addition of 8 (eight) drillholes to the existing Prospecting Working Programme. During Year 4, four holes will be drilled and depending on the outcome of this drilling phase, an additional four holes will be drilled in Year 5. Diamond core drilling will be undertaken utilising a drill rig, mounted on a vehicle. The drill rig will consist of a power driven rotary drill with a diamond studded bit. Each drill pad will disturb an area of up to 30 metres x 30 metres. The prospecting right is currently in Year 4 and the scheduled activities will continue as planned.

Upon completion of the drilling programme, the recovered core will be logged and sampled. The drillhole information will be captured into a database and integrated into the final geological model. Thereafter, a resource estimate will be performed utilising the finalised geological model and a concept study will be conducted to assess the feasibility of the prospect.

Prospecting Targets

The Welkom Goldfield hosted eleven mines in the triangle between Allanridge, Welkom and Virginia, 270 kilometres southwest of Johannesburg. Historically, these mines have collectively produced in excess of 9.6 Million kilograms Au (gold). The Central Rand Group of the Witwatersrand Supergroup is present at Bothaville with four potentially economic placer deposits. The mineralised reefs at Bothaville are the Basal Reef, Big Pebble Conglomerate, A Reef and the B Reef. In addition to gold, the primary exploration target, silver, uranium, sulphur, diamonds, rare earths and platinum group metals have been historically extracted as by-products of gold mining.

Environmental Specialist Studies

A comprehensive assessment was undertaken in support of the Bothaville NE Ext A Prospecting Right Amendment Application. Four specialist studies were undertaken, namely:

- Heritage Impact Assessment.
- Palaeontological Impact Assessment.
- Biodiversity (Fauna and Flora) Impact Assessment.
- Wetland Impact Assessment.

Based on the specialist assessments, it was determined that a number of sensitive features exist within the application area.

Summary of Key Findings

The project area falls within the Vaal Water Management Area, which contains the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo rivers. It comprises 12 tertiary catchment areas and the project area is situated in the C60J quaternary catchment. The climate is characterised by mild to hot summer temperatures and extremely cold winter temperatures with severe frost during the winter months. Summer rains occur and the mean annual precipitation is 530 millimetres.

Biodiversity and Wetland Impact Assessment

A Biodiversity and Wetland Impact Assessment was undertaken by The Biodiversity Company. The assessment was conducted at a desktop level and a field survey was undertaken in order to increase confidence in the information obtained from desktop studies. Based on the assessment, the project area is situated across three vegetation types, namely (i) Vaal Vet Sandy Grassland, (ii) Central Free State Grassland and (iii) Highveld Alluvial Vegetation. The prospecting footprint is specifically situated within Vaal Vet Sandy Grassland, which is classified as Endangered according to Mucina and Rutherford (2006). The proposed prospecting footprint is situated predominantly within disturbed habitats. Although they are disturbed, it is believed these areas may still support some faunal species and there is a moderate likelihood that Species of Conservation Concern may occur.

According to the Free State Terrestrial Critical Biodiversity Areas Plan, two of the proposed drillholes are situated in areas which are classified as Critical Biodiversity Areas whilst six are in areas classified as Ecological Sensitive Areas 2. This application area has been extensively altered from its natural condition, mostly due to agricultural transformation of the landscape. Based on the South African National Biodiversity Institute Protected Areas Map and the National Protected Areas Expansion Strategy, the project area does not overlap with, nor will it impact upon any formally protected areas. According to the Mining and Biodiversity Guidelines (2013), the prospecting footprint is not classed as being of significant biodiversity importance and does not represent a risk to mining. Furthermore, the prospecting footprint falls within two ecosystems, which are listed as Least Threatened and Endangered. Two wetland National Freshwater Ecosystem Priority Area types have been identified within the 500 metres buffer around the proposed drillhole sites, namely a portion of a depression (or pan) and a seep (or dam).

Heritage Impact Assessment and Palaeontological Impact Assessment

A Heritage Impact Assessment and a Palaeontological Impact Assessment were undertaken by NGT Holdings over the project area. The Heritage Impact Assessment was conducted on a desktop level and a field survey was undertaken with the aim of identifying archaeological and heritage resources within the proposed prospecting footprint and a 500 metres assessment boundary. No archaeological resources, burial grounds or graves were identified at the proposed drillholes sites, nor within the assessment boundary.

According to the palaeosensitivity map developed by the South African Heritage Resources Agency (SAHRA), the proposed drill sites are situated in an area classified as moderately sensitive. The rock units in the project area are not fossiliferous.

Environmental Impact Assessment

This assessment was undertaken in order to identify potential impacts associated with each phase of prospecting. Each of the identified risks and impacts were assessed following the prescribed methodology described in the body of this report. The assessment criteria include nature, extent, duration, magnitude/intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources. Based on the impact assessment conducted by the Environmental Assessment Practitioner, with specialists input, the environmental impacts associated with the proposed prospecting activities are expected to be localised and of medium to low significance. The significance of the impacts can be reduced to low if the mitigation measures are implemented efficiently.

The following negative impacts were identified in this final Basic Assessment Report:

- Safety and security risks to landowners and lawful occupiers.
- Interference with land-use.

- Sense of place.
- Loss/destruction of habitat.
- Damage to existing infrastructure.
- Perceptions and expectations.
- Clearance of vegetation.
- Soil instability/compaction/pollution.
- Erosion and sedimentation.
- Disturbance/damage of heritage features.
- Noise.
- Introduction of alien species.
- Fugitive emission (dust).
- Hydrocarbon spills/contamination.
- Surface and groundwater pollution.
- Generation and disposal of waste.

The positive implications of the Bothaville NE Ext A Prospecting Right are:

- Job creation during prospecting operations.
- Training of unskilled labourers prior to commencement of prospecting operations.
- Possible boost in short-term local business opportunities.
- Discovery of economically viable mineral resources.

Environmental Management Programme Mitigation Measures

The four specialists (Ecology, Wetland, Heritage and Palaeontology) have recommended mitigation measures and proposed suitable monitoring programmes. These mitigation measures and monitoring programmes have been included as commitments in the Environmental Management Programme. It is anticipated that the implementation of the mitigation measures stipulated in the Environmental Management Programme will result in effective mitigation of the negative impacts. Conversely, the implementation of the mitigation measures designed to maximise the positive aspects of the project will result in a significant positive influence as a result of the proposed prospecting operations.

Need and Desirability of the Project

Should prospecting prove successful and a resource be quantified, it would indicate a potential viable economic activity in the form of mining. Mining will contribute greatly to local economic stimulation through direct employment, future business opportunities, royalties and tax revenues.

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS 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).

PREPARED BY

Shango Solutions

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DMR File Reference Number: FS 30/5/1/1/3/2/1/10273 EM

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (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 instructions or guidance provided by the Competent Authority to the submission of applications.

It is therefore the instruction that the prescribed reports required in respect of application 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 requested 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 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 activity is situated and document how the proposed 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 the technology alternatives on these aspects to determine:

    i. The nature, significance, consequence, extent, duration, and probability of the impacts occurring to.
    ii. The degree to which these impacts-
        (aa) Can be reversed.

(ba) May cause irreplaceable loss of resources.

(ca) 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.

iii. Identify residual risks that need to be managed and monitored.

This report has been designed to meet the requirements for a Basic Assessment Report and Environmental Management Programme as stipulated in the 2014 Environmental Impact Assessment Regulations (as amended) promulgated under the National Environmental Management Act, 1998 (Act 107 of 1998). The adjudicating authority for this application is the Department of Mineral Resource and this report has been compiled in accordance with the applicable Department of Mineral Resources Guidelines and Basic Assessment Report and Environmental Management Programme template.

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DEFINITIONS

Abbreviation	Definition
Applicant	The person or party applying for Environmental Authorisation for a listed activity and who is responsible for ensuring the development complies with all relevant legislation whether or not they are the land owner.
BAR and EMPR	Basic Assessment Report and Environmental Management Programme. DMR document for joint BAR and EMP related for mineral applications.
BA	Basic Assessment.
BID	Background Information Document.
CA	Competent Authority.
DMR	The Department of Mineral Resources. CA in South Africa for mineral right applications.
DWS	The Department of Water and Sanitation – both national offices and their various regional offices, which are divided across the country on the basis of water catchment areas.
DWAF BPG	Department of Water Affairs and Forestry Best Practice Guidelines.
EA	Environmental Authorisation. This constitutes the approval or dismissal of a project as issued by the relevant Competent Authority.
EAP	Environmental Assessment Practitioner..
EAR	Environmental Audit Report
EIA Regulations	Environmental Impact Assessment Regulations.
EIR and EMP	Environmental Impact Report and Environmental Management Programme. DMR document for joint EIR and EMP related to mineral applications.
EMPR	Environmental management Programme.
Environment	The Environment is defined in terms of the National Environmental Management Act (Act 107 of 1998) as the surroundings within which humans exist and that are made up of: The land, water and atmosphere of the earth: Micro-organisms, plant and animal life, any part or combination of the first three items and the inter-relationships between them the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Fauna	All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
Fence	A physical barrier in the form of posts and barbed wire or any other concrete construction, ("palisade"-type fencing included), constructed with the purpose of keeping humans and animals within or out of defined boundaries.
Financial Provision Regulations	Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations No. 1147 (effective 20 November 2015).
Flora	All living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and usually capable of photosynthesis.
FRDCP	Final Rehabilitation, Decommissioning and Closure Plan.
GIS	Geographic Information Systems.
GN	Government Notice.
HSE	Health, Safety and Environment.
IBA	Important Bird Areas.
IDP	Integrated Development Plan.
IUCN	International Union for Conservation of Nature.
I&AP	Interested and Affected Parties.
MEC	Member of the Executive Council.
MHSC	Mine Health and Safety Council.
MPRDA	Minerals and Petroleum Development Act, No 28 of 2002.
NEMA	National Environmental Management Act.
NEMWA	National Environmental Management Waste Act.
NGO	Non-Governmental Organisations.

NWA	National Water Act.
NHRA	National Heritage Resources Act No 25 of 1999.
OSHA	Occupational Health and Safety Act 85 of 1993.
PPP	Public Participation Process.
PR	Prospecting Right in terms of the MPRDA.
PWP	Prospecting Work Programme.
SAHRA	South African Heritage and Resources Act, No25 of 1999.
SAMRAD	The web-based portal for mineral right applications and management – managed by the DMR.
SANS	South African National Standards.
SCC	Species of Conservation Concern.
WMA	Water Management Area.

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. INTRODUCTION

White Rivers Exploration (Pty) Ltd (hereafter referred to as White Rivers Exploration) holds an executed Prospecting Right (PR) and an Environmental Management Plan for a project known as Bothaville NE Ext A, which consider the non-invasive prospecting of the following commodities:

- Silver
- Gold
- Coal
- Diamond (Alluvial)
- Platinum Group Metals
- Rare Earths
- Sulphur
- Uranium

White Rivers Exploration wishes to make amendments to their current prospecting operations by including invasive prospecting activities. The amendments will consider the addition of 8 (eight) drillholes (each to a depth of 700 metres (m)) to the Prospecting Work Programme (PWP). In order to amend the current prospecting operations, it is necessary that a Section 102 template, accompanied by an Environmental Authorisation amendment application, are completed and submitted to the regulatory authority, the Department of Mineral Resources (DMR), for decision-making. The amendment application process requires the submission of a Basic Assessment Report (BAR) and Environmental Management Programme (EMPR) as well as the undertaking of a Public Participation Process (PPP). Shango Solutions (Pty) Ltd (Shango Solutions) has been appointed by White Rivers Exploration as the independent Environmental Assessment Practitioner (EAP) to assist in complying with these requirements.

The Prospecting Right amendment application was lodged in terms of Section 102 of the Mineral Petroleum Resources Development Act (MPRDA) and the Environmental Authorisation amendment application (Appendix A) was lodged in terms of Section 31 of the Environmental Impact Assessment Regulations (as amended) to the Free State DMR Regional Manager. Acknowledgment of receipt of the application for ministerial consent to amend the PR was received on the 3rd May 2018 and the application to amend the issued Environmental Authorisation was acknowledged on the 3rd July 2018.

It is anticipated that the following invasive and non-invasive activities will be/have been undertaken, based on information presented in the associated PWP (Appendix B).

Non-invasive prospecting activities

Desktop studies.

Data acquisition and synthesis.

Re-logging and re-sampling of historical drillholes.

Logging and sampling of new drillholes.

Geological modelling.

Resource estimation.

Concept study.

Invasive prospecting activities

Drilling of 8 diamond core drillholes.

1.1 Location of the Activity

The area of interest occupies a total of 9 510.03 hectares (ha) and it is situated approximately 30 kilometres (km) east of the town Bothaville, in the Free State Province of South Africa. The project area is situated in the Bothaville Magisterial District and falls under the Nala and Moqhaka Local Municipalities, within the Lejweleputswa and Fezile Dabi District Municipalities respectively. Twenty-four farm portions extend over the application area (Table 1and Figure 1).

Table 1: Locality details.

Farm name	1. Beestkraal-Noord 186 Portion 0 2. Brak–Spruit 222 Portion 0 3. Concord 392 Portion 0(RE) 4. Concord 392 Portion 1 5. Concord 392 Portion 2 6. Damplaats 220 Portion 0(RE) 7. Damplaats 220 Portion 1 8. Diepwater 50 Portion 0 9. Doornheuvel 242 Portion 0 10. Eureka 761 Portion 0(RE) 11. Eureka 761 Portion 1 12. Gelukskraal 56 Portion 0 13. Kaalplaats 51 Portion 0 14. Lyden 264 Portion 0 15. Mealie-Bult 20 Portion 0 16. Roode Rand 35 Portion 0(RE) 17. Roode Rand 35 Portion 1 18. Roode Rand 35 Portion 2 19. Spitshoek 868 Portion 0 20. Tarantaaldraai 156 Portion 0(RE) 21. Tarantaaldraai 156 Portion 1 22. Uitkijk 147 Portion 0 23. Weestevreden 269 Portion 0(RE) 24. Weestevreden 269 Portion 1
Project area (Ha)	The project area extends over twenty-four (24) farm portions with a total area of 9 510.03 ha
Magisterial district	Bothaville Magisterial District
Distance and direction	The Bothaville NE Ext A project area is situated approximately 30 km east of

from nearest town	Bothaville in the Free State Province of South Africa		
21 digit surveyor general code for each portion	**Farm Name**	**Farm Portion**	**Surveyor General Code**
	1. Beestkraal-Noord 186	0	F00500000000018600000
	2. Brak–Spruit 222	0	F00500000000022200000
	3. Concord 392	0(RE)	F00500000000039200000
	4. Concord 392	1	F00500000000039200001
	5. Concord 392	2	F00500000000039200002
	6. Damplaats 220	0(RE)	F00500000000022000000
	7. Damplaats 220	1	F00500000000022000001
	8. Diepwater 50	0	F00500000000005000000
	9. Doornheuvel 242	0	F00500000000024200000
	10. Eureka 761	0(RE)	F00500000000076100000
	11. Eureka 761	1	F00500000000076100001
	12. Gelukskraal 56	0	F00500000000005600000
	13. Kaalplaats 51	0	F00500000000005100000
	14. Lyden 264	0	F00500000000026400000
	15. Mealie-Bult 20	0	F00500000000002000000
	16. Roode Rand 35	0(RE)	F00500000000003500000
	17. Roode Rand 35	1	F00500000000003500001
	18. Roode Rand 35	2	F00500000000003500002

	19. Spitshoek 868	0	F00500000000086800000
	20. Tarantaaldraai 156	0(RE)	F00500000000015600000
	21. Tarantaaldraai 156	1	F00500000000015600001
	22. Uitkijk 147	0	F00500000000014700000
	23. Weestevreden 269	0(RE)	F00500000000026900000
	24. Weestevreden 269	1	F00500000000026900001

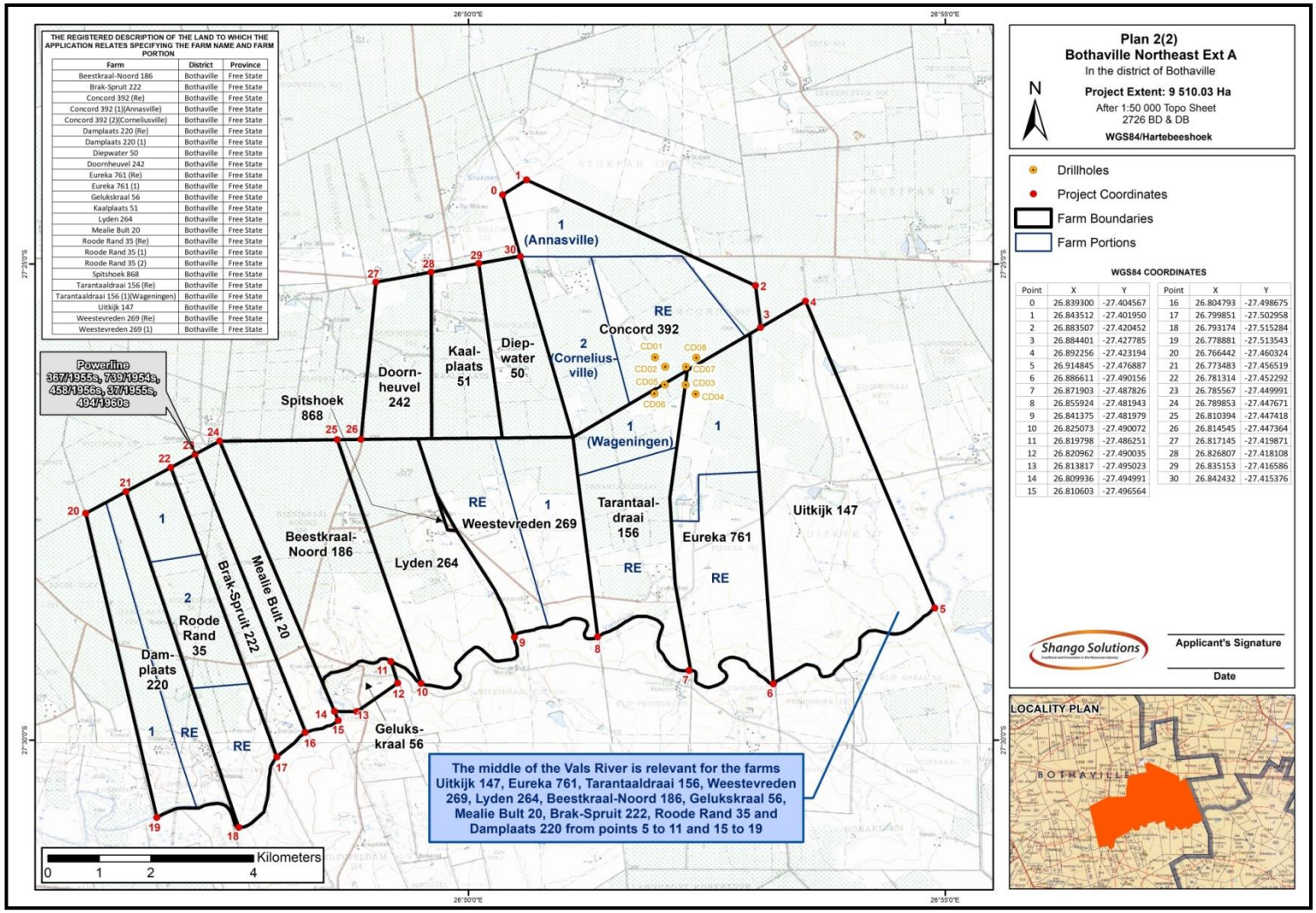

Figure 1: Locality map indicating the farm portions and drillhole locations (refer to Appendix D for an enlarged map).

1.2 Details of the Environmental Assessment Practitioner

Shango Solutions was appointed by White Rivers Exploration as the EAP. This report was compiled by Shango Solutions consultant, Ms Nyandala Ramaru, under the supervision of Ms Zizo Siwendu. The contact details of the consultants are as follows:

- Name of the EAP: Shango Solutions.
- Contact person: Nyandala Ramaru or Zizo Siwendu.
- Tel No.: 011 678 6504.
- Fax No.: 011 678 9731.
- E-mail address: nyandala@shango.co.za or zizo@shango.co.za.

1.3 Expertise of the EAP

1.3.1 Qualifications of the EAP

In terms of Regulation 13 of the National Environment Management Act (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations (Government Notice 326), an independent EAP must be appointed by the Applicant to manage the application. Shango Solutions have been appointed by the Applicant as the EAP and are compliant with the definition of an EAP as defined in the 2014 EIA Regulations and the NEMA (1998). This includes, inter alia, the requirement that Shango Solutions is:

1) Objective and independent.
2) Have expertise in conducting EIAs.
3) Comply with the NEMA, the Regulations and all other applicable legislation.
4) Take into account all relevant factors relating to the application.
5) Provide full disclosure to the Applicant and the relevant environmental authority.

Ms Ramaru holds a B.Sc. Honours degree in Geology. She has 2 years' experience in environmental auditing/permitting (including environmental audit and financial provision reports, environmental impact assessments, basic assessments and prospecting right applications) and public participation/stakeholder engagement for White Rivers Exploration (Pty) Ltd, Western Allen Ridge Gold Mines (Pty) Ltd and Evander Gold Mines (Pty) Ltd.

Ms Siwendu holds a B.Sc. Honours degree in Environmental Management. She has in excess of 9 years auditing and environmental management experience, specifically in the mining environment. She has compiled several environmental studies in support of mineral right applications such as for Sungu Sungu Gas (Pty) Ltd, Motuoane Energy (Pty) Ltd, African Exploration, Mining and Finance Corporation, Atoll Metal Recovery, White Rivers Exploration (Pty) Ltd, West Wits Mining (Pty) Ltd, Mafuri Construction and Mining (Pty) Ltd, Evander Gold Mines (Pty) Ltd and Tetra 4 (Pty) Ltd (previously known as Molopo South African Exploration).

1.3.2 Summary of EAP's Past Experience

Shango Solutions, registered as Dunrose Trading 186 (Pty) Ltd and established in April 2004, provides a diverse range of services to the mineral and mining sectors. Currently, 30 permanent multi-disciplinary employees and about 24 nationally and internationally recognised affiliates are employed. The company has a track record of successful project management and leadership, including complex multi-disciplinary assignments.

Consultancy activities straddle the entire mining value chain from exploration to beneficiation, thereby providing the client with complete solutions. Activities are performed in multi-disciplinary teams. Areas of specialisation

include target generation, exploration, geodatabase compilation and management, geological modelling, resource estimation, mineral asset valuations, due diligences, desktop project reviews and technical reporting. The company services the majority of the major mining houses, but also junior exploration companies, mineral resource investment firms, government institutions and departments and the artisanal and small-scale mining sectors. Shango Solutions collaborates closely with local and international experts in the mining and corporate industries. This, in conjunction with our affiliations with academic and parastatal institutions, ensures provision of the most innovative and appropriate solutions to clients.

Shango has completed in excess of 600 projects, of which the majority were situated in Africa. The company consequently has extensive ground-based mining related experience throughout Africa, especially southern, eastern and north-west African states. Our extensive knowledge of the African minerals industry has attracted some of the largest names in mineral extraction to our client base.

Shango incorporates in excess of 500 years of Africa-based mining and exploration experience. This includes, but is not limited to, gold, platinum, rare earth elements, base metals, uranium, coal, natural gas, ferrochrome, aggregate, heavy mineral sands and diamonds. Over the last decades, we have established comprehensive 2D Geographic Information Systems (GIS) databases throughout Africa, which consider geological and geophysical data, mineral occurrences, defunct and existing mines, infrastructure and mining statistics.

The declaration of independence of the EAP and the Curricula Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the Basic Assessment process and the compilation of this report are attached as Appendix C.

1.3.3 Specialist Consultants

The following specialist consultants provided inputs into this report:

- Biodiversity (Fauna and Flora) and Wetland Impact Assessment: The Biodiversity Company.
- Heritage and Palaeontological Impact Assessment: NGT Holdings (NGT).

2. DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

As part of the amended PWP, the following non-invasive prospecting activities have been conducted during Year 1 to Year 3 of the project:

1. Data Gathering

Desktop Studies:

Data Acquisition:	[Year 1: 12 months]
Database, Map Generation and Development of Geological Model:	[Year 1: 6 months]
Field Visit:	[Year 1: 1 week]

2. Geophysical Surveys

Geophysical Survey:	[Years 2 and 9: 24 months]
Seismic Survey:	[Year 3: 12 months]
Data Compilation and Interpretation:	[Year 3: 12 months]
Refinement of Geological Model:	[Years 2 and 3: 24 months]

3. Location of Key Historic Borehole Core, and Re-Logging and Re-Sampling [Year 3: 12 months]

The following invasive and non-invasive prospecting activities will be conducted during Year 4 and Year 5 of the project:

4.1 Drilling [Year 4: 6 months]

Based on the initial geological model established, a diamond drilling programme comprising of four boreholes (each to a depth of 700 m) will be undertaken.

4.2 Revise Geological Model [Year 4: 6 months]

The data obtained from the logging and sampling of the historical boreholes will be integrated into the geological model to confirm the geology and drilling targets.

5.1 Drilling [Year 5: 4 months]

Should the drilling programme prove to be successful in Year 4, an additional four holes will be considered. It is imperative to note that the drilling in Year 5 is dependent on positive outcomes from the drilling in Year 4.

5.2 Finalisation of 3D Geological Model [Year 5: 3 months]

Based on the logging and sampling of the core, the 3D geological model will be updated and finalised for use during resource estimation.

5.3 Code Compliant Resource Estimation [Year 5: 3 months]

Utilising the finalised geological model together with historical assay results and any results from the drilling programme, a code compliant resource estimate will be performed.

5.4 Concept Study [Year 5: 2 months]

Should the exploration activities yield promising results, a concept study will be conducted. During this investigation, resources will be converted to reserves and a conceptual mine plan and schedule shall be established. This will reveal whether the deposit is economically mineable or not.

2.1 Listed and Specified Activities

The Listed activities are activities identified in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA – as amended), which are likely to have a detrimental effect on the environment, and which may not commence without an Environmental Authorisation (EA) from the Competent Authority. An EA required for a listed activity is subject to the completion of an environmental process, either a Basic Assessment (BA) or a Scoping and Environmental Impact. A BA is being followed for this project. The applicable NEMA listed activities anticipated to be triggered by this project are outlined in Table 2. The DMR will act as the Competent Authority on the project, with the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs and the Department of Water and Sanitation (DWS) acting as the Commenting Authorities.

Table 2: Listed and specified activities.

Name of activity	Aerial extent of the activity (ha or m²)	Listed Activity	Applicable Listing Notice
An Environmental Authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid Environmental Authorisation where such change will result in increased level or change in the nature of impact where such level or change in nature of impact was not: (a) Assessed and included in the initial application for Environmental Authorisation; or (b) Taken into consideration in the initial Environmental Authorisation, and the change itself does not, on its own, constitute a listed or specified activity.	9 510.03 ha	X	Activity 31 (Part 2) of GNR 326 of 2017
Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral 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.	9 510.03 ha	X	Activity 20 of GNR 327 of 2017
The project will involve drilling of eight (8) diamond core drill holes. The establishment of a drill pad will disturb an area of up to 30 x 30 m per site. As such, the total/maximum of 8 drill holes would disturb an area covering approximately 7 200 m^2 or 0.72 ha.	0.72 ha	X	Activity 20 of GNR 327 of 2017
The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of such indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan (i) within any critically endangered or endangered ecosystem listed in terms of Section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004 and (ii) within critical biodiversity areas identified in bioregional plans. The project will include clearance of an area of approximately 7 200 m^2.	0.72 ha.	X	Activity 12(b) of GNR 324 of 2017
Desktop studies and acquisition of historical data	9 510.03 ha	X	Activity 20 of GNR 327 of 2017

Name of activity	Aerial extent of the activity (ha or m²)	Listed Activity	Applicable Listing Notice
Acquisition and synthesis of historical data	9 510.03 ha	X	Activity 20 of GNR 327 of 2017
Geological models	9 510.03 ha	X	Activity 20 of GNR 327 of 2017
Generation of geological models	9 510.03 ha	X	Activity 20 of GNR 327 of 2017
Possible geophysics and regional surveys	-	X	Activity 20 of GNR 327 of 2017
Re-logging and re-sampling of historical boreholes	-	X	Activity 20 of GNR 327 of 2017
Sourcing existing borehole core, reclogging, resampling and re-assaying core/chips	-	X	Activity 20 of GNR 327 of 2017
Resource estimation	9 510.03 ha	X	Activity 20 of GNR 327 of 2017
Concept study	9 510.03 ha	X	Activity 20 of GNR 327 of 2017

2.2 Description of Activities to be Undertaken

This section presents a detailed description of all the activities associated with the proposed prospecting application. Due to the nature of the PWP, and the fact that the specific prospecting activities required are dependent on the preceding phase, assumptions are presented where required. These assumptions are based on similar projects undertaken by the Applicant and are therefore regarded as indicative of what will be undertaken. Should the proposed prospecting activities change, this will be indicated in the form of a Section 102 Amendment Application (of the MPRDA) together with the proposed revised prospecting programme.

The following non-invasive prospecting activities have been conducted during Year 1 to Year 3 of the project:

2.2.1 Data Gathering

Desktop Studies:

Data Acquisition: [Year 1: 12 months]

Database, Map Generation and Development of Geological Model: [Year 1: 6 months]

Field Visit: [Year 1: 1 week]

2.2.2 Geophysical Surveys [Years 2 and 3: 24 months]

Geophysical Survey

Seismic Survey

Data Compilation and Interpretation

Refinement of Geological Model

2.3 Activities Associated With Planned Prospecting

The activities associated with each phase of prospecting operations are described in Table 3.

Table 3: Activities associated with planned prospecting.

Main activity/action/process	Ancillary activity
Construction	
General management	Human resource management Employment Interaction with local community
Site preparation and site establishment	Vehicle and foot traffic on-site Clearance and preparation of soil stockpile areas Dust suppression Employment Fencing Hazardous substances management Site security Soil management Utilisation of portable toilets and generation of sewage Vegetation clearance Waste management
Operation	
General management	Employment Human resource management Interaction with local community

Main activity/action/process	Ancillary activity
Drilling of 8 drillholes	Site security Employment Soil management Noise management Dust management Vegetation clearance Waste management Vehicle and foot traffic on-site Hazardous substances management Interaction with local community
Decommissioning	
General management	Employment Human resource management Interaction with local community
General decommissioning activities	Dust suppression Removal of waste
Infrastructure removal	Dismantling, removal and rehabilitation of unnecessary infrastructure Removal of fencing
Rehabilitation and Closure	
General surface rehabilitation	Profiling of area Replacement of subsoil and topsoil Ripping of roads and other compacted areas Managing the site for all post prospecting impacts to prevent any further pollution Vehicle and foot traffic on-site
Re-vegetation	Dust suppression Fertilisation Seeding with local indigenous species
Post closure monitoring and maintenance	Alien vegetation management Environmental monitoring of rehabilitated areas Erosion control measures

2.4 Description of Site Activities

2.4.1 Access Roads

Access to the site will be required during diamond core drilling activities. A number of existing roads and farm tracks already traverse the proposed prospecting site, and where practicable, these roads will be utilised.

2.4.2 Water Supply

It is unknown if there are any water boreholes situated on-site and if access and supply will be granted by landowners. It is anticipated that water brought onto site will be sourced from the Local Municipality. Water will be trucked from these sources to the identified drill sites. The required water includes service water (for operating machinery and dust suppression), and potable water (for domestic use within the drilling sites). A water tank will be utilised for the storage of water on-site.

2.4.3 Ablution

Ablution facilities on-site will be required and may involve the installation of drum or tank type portable toilets. The toilets should be emptied through the services of a registered sewage waste service provider. The ablution facilities must be provided at a ratio of 15: 1 (15 people per 1 toilet).

2.4.4 Temporary Office Area

A temporary shaded site office area may be erected on-site. The office must be established away from the water drainage lines. A shaded eating area may be provided.

2.4.5 Accommodation

No accommodation for staff and workers will be provided on-site unless permission is granted by the landowner. Should the landowner not grant permission, all persons will be accommodated in nearby towns (i.e. Bothaville) and workers will be transported to and from the prospecting site on a daily basis. Night security staff may be employed once equipment is stationed on-site.

2.4.6 Waste Management

2.4.6.1 Hazardous Waste

Hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Hydrocarbon waste will be collected in drums for storage. The removal of the drums or any other appropriate receptacle 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.

Mineral residue will include muds generated during diamond core drilling. The mineral residue will be removed from the site and disposed of at a registered waste disposal site.

2.4.6.2 General Waste

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

2.4.6.3 Storage of Dangerous Goods (Hydrocarbons)

During diamond core drilling activities, limited quantities of diesel fuel, oil and lubricants may be stored on-site. A maximum amount of 60 m^3 of diesel fuel may be stored in above ground diesel storage tanks with elevated bunded walls.

2.4.7 Equipment and/or Technology That May Be Used

- Drill rig/s.
- Bakkie/s.
- Geological modelling software.
- A water tank.

2.5 Geological Formation and Prospecting Targets

The surface geology of the prospecting area contains (i) thin Quaternary sediments, mostly recent sand and gravel in the river valleys, as well as (ii) the Karoo Dolerite Suite and (iii) the sedimentary rocks of the Karoo Supergroup (Figure 2). The Witwatersrand Supergroup which hosts gold is generally overlain by 500 m of Karoo Supergroup strata, which is predominantly consisting of horizontally bedded sandstones and shales of the Ecca Group. The Ecca Group contains coal at shallow depths which might be exploitable.

The Welkom Goldfield hosted eleven mines in the triangle between Allanridge, Welkom and Virginia, 270 km southwest of Johannesburg. Historically, these mines have collectively produced in excess of 9.6 Million kilograms Au (gold). The Central Rand Group of the Witwatersrand Supergroup is present at Bothaville with four potentially economic placer deposits. The mineralised reefs at Bothaville are the Basal Reef, Big Pebble Conglomerate, A Reef and the B Reef. In addition to gold, the primary exploration target, silver, uranium, sulphur, diamonds, rare earths and platinum group metals have been historically extracted as by-products of gold mining.

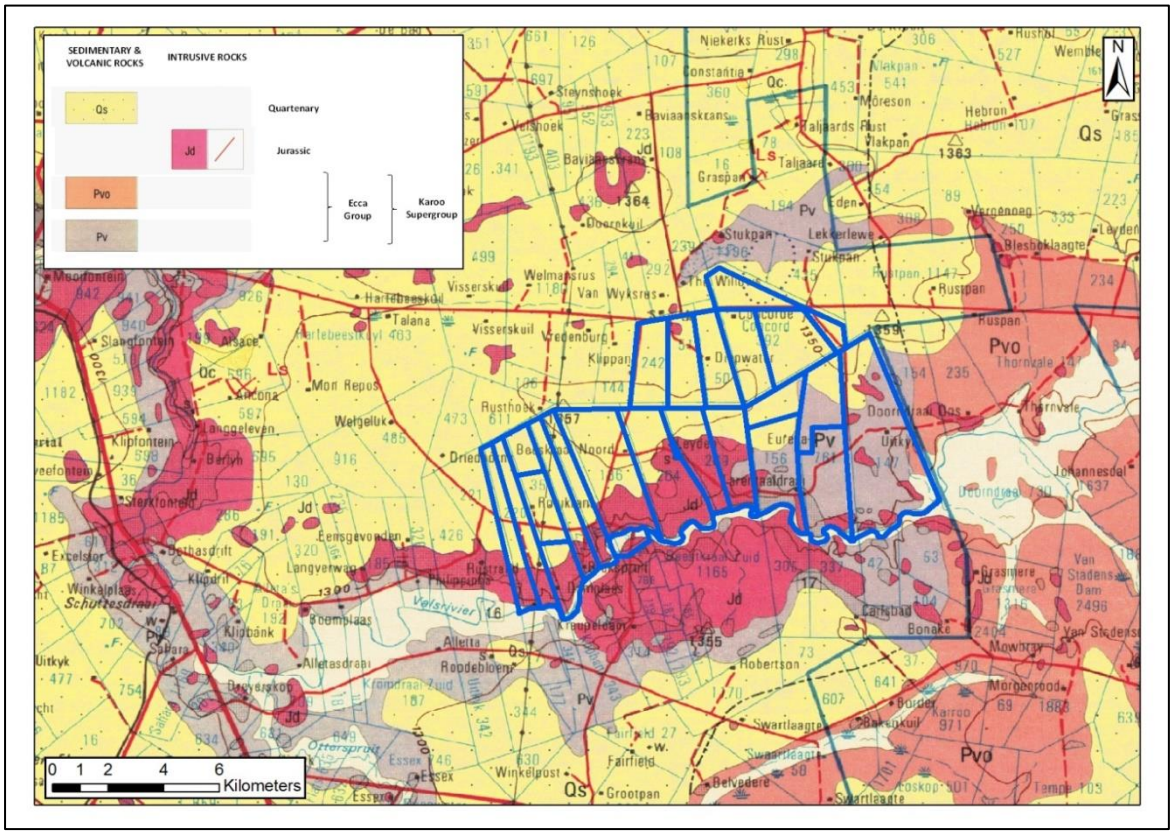

Figure 2: Surface geological map with project area boundaries superimposed (Qs = Quaternary cover, Jd = Karoo Dolerite Suite, Pv and Pvo = sedimentary rocks of the Karoo Supergroup). Geological map taken from the 1:250 000 geological series (refer to Appendix D for enlarged map).

3. POLICY AND LEGISLATIVE CONTEXT

The Bothaville NE Ext A Prospecting Right Amendment Application requires authorisation in terms of the following interlinked pieces of legislation:

- The Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act 28 of 2002 - amended).
- The National Environmental Management Act, 1998 (NEMA, Act 107 of 1998 – as amended).

These pieces of core legislation stipulate the required studies, reports and legal processes to be conducted and the results thereof submitted to the relevant authorities for approval prior to commencement.

In addition to the above, there are various pieces of legislation which govern certain aspects of the prospecting operations and these are summarised in Table 4, together with the main legislative requirements mentioned above.

Table 4: Policy and legislative context.

Applicable legislation and guidelines	Reference where applied	How does this development comply with and respond to the legislation and policy context
National Environmental Management Act,1998 (Act 107 of 1998)	This entire report is prepared as part of the Application for an amended EA under the NEMA.	In terms of the NEMA, an Application for an amended EA subject to a BA Process has been applied for.
Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002)	This entire report is prepared as part of the amended PR Application under the MPRDA.	In terms of the MPRDA, an amended PR Application has been applied for.
National Environmental Management Waste Act, 2004 (Act 26 of 2014)	A framework for management of waste is presented in this report.	This report has been drafted in with due consideration to this Act.
National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004)	A framework for management of alien invasive species is presented in this report.	The management of alien invasive species is governed under the NEMBA. This report includes a framework for the management of alien and invasive species. The holder of a right will be required to develop a detailed alien invasive species management plan.
National Water Act, 1998 (Act 36 of 1998) Section 21	Due to the nature of the proposed prospecting activities, it is not anticipated that Section 21 water uses will be triggered. Therefore, there is no requirement to apply for Water Use Authorisation in terms of the NWA.	In terms of the NWA, no Water Use License has been applied for.
National Heritage Resources Act, 1999 (Act 25 of 1999)	The framework for a Heritage Management Plan is provided in this EMPR.	A specialist heritage impact study has been undertaken in support of this PR application.

3.1 Environmental Authorisation Process

3.1.1 Mineral and Petroleum Development Act

In terms of the MPRDA, 2002 (Act 28 of 2002 as amended), a Prospecting Right must be issued prior to the commencement of any prospecting activities. As per Section 16 of the MPRDA, the Applicant is required to conduct a Basic Assessment (BA) and submit an EMPR for approval as well as to notify in writing and consult with Interested and Affected Parties (I&APs) within 90 days of acceptance of the application. The MPRDA also requires adherence with related legislation, chief amongst them is the National Environmental Management Act, 1998 (Act 107 of 1998, NEMA) and the National Water Act, 1998 (Act 36 of 1998, NWA).

Several amendments have been made to the MPRDA (2008). These include, but are not limited to, the amendment of Section 102, concerning amendment of rights, permits, programmes and plans, to requiring the written permission of the Minister for any amendment or alteration; and the section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days' written notice prior to any activities taking place

on their properties. One of the most recent amendments requires all mining related activities to follow the full NEMA process as per the 2014 EIA Regulations, which came into effect on 8 December 2014.

A PR is exclusive, transferable, valid for 5 years, and renewable for a maximum of 3 years. Prospecting allows the holder of the right to conduct activities as per the PWP to establish the presence of economically viable mineral resources. A PR does not grant the holder the right to conduct any mining related activities.

3.1.2 National Environmental Management Act

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the proponent is required to appoint an EAP to undertake the EIA as well as the public participation process. In South Africa, EIA became a legal requirement in 1997 with the promulgation of Regulations under the Environmental Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported to the competent authority responsible for granting the relevant Environmental Authorisation. On 21 April 2006 the Minister of Environmental Affairs and Tourism promulgated Regulations in terms of Chapter 5 of the NEMA.

The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the activities that have been identified. The purpose of these procedures is to provide the Competent Authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

The aim of the EIA process is to identify and assess the potential impacts associated with the proposed project and to develop measures through which potential negative biophysical and socio-economic impacts can be mitigated and positive benefits can be enhanced. The EIA will ensure that all issues are integrated into the lifecycle of the exploration or mining operations and its infrastructure. This will occur during the planning, construction, operation and decommissioning and site closure phases.

The BAR and the associated EMPR will indicate how the identified impacts will be avoided, mitigated and/or managed by setting environmental objectives and goals. The EMPR will further outline the implementation programme for the environmental objectives and goals. The EMPR is a legal requirement of the MPRDA and all applicants, are required to possess an approved EMPR prior to initiating any prospecting operations. The EMPR is legally binding and the proponent is required to meet the requirements specified in the document.

3.1.3 National Environmental Management: Waste Amendment Act

On the 2nd June 2014 the National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014) came into force. Waste is accordingly no longer governed by the MPRDA, but is subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEMWA). Section 16 of the NEMWA must also be considered which states as follows:

1. “A holder of waste must, within the holders power, take all reasonable measures to:

    a) Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated.

b) Reduce, re-use, recycle and recover waste.

c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner.

d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts.

e) Prevent any employee or any person under his or her supervision from contravening the Act.

f) Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management are incorporated into the requirements in the EMPR to be implemented for this project.

Schedule 3: Defined Wastes have been broken down into two categories: Category A being hazardous wastes and Category B being general wastes. Under Category A (hazardous wastes) the act makes allowance for "wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals".

In order to attempt to understand the implications of this it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means "any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."
- Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."
- Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."

Various regulations have been drafted in support of the NEMWA, as discussed below:

- Proposed Regulations regarding the planning and management of waste from a prospecting, mining, exploration or production operations (2014):
    - Chapter 2, Section 3 states the identification and assessment of any environmental impacts, including those on groundwater, arising from waste must be done as part of the Environmental Impact Assessment (EIA) conducted in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) (hereafter referred to as the NEMA). The pollution control barrier system shall be defined by the (a) Waste Classification and Management Regulations (2013); (b) National Norms and Standards for the Assessment of Wastes for Landfill Disposal (2013); and (c) National Norms and Standards for Disposal of Waste to Landfill (2013).
    - Waste Characterisation must be done in terms of physical and chemical composition as well as content. The classification must be done in terms of the health and safety classification and the environmental classification.

- Proposed Regulations to exclude a waste stream or a portion of a waste stream from the definition of a waste (2014);
    - This regulation will give the holder of the right the opportunity to exclude a waste stream, or a portion of a waste stream from the definition of a waste. Chapter 2, Section 4 of this Regulation, Sub-section (1) states that any portion of a waste generated from a source listed in Category A of Schedule 2 of the NEMWA, may be excluded from being defined as hazardous on demonstration that such portion of waste in non-hazardous in accordance with the Waste Classification and Management Regulations of 2013.
    - The application process will be in the form of a prescribed process and application must be made to the Minister.
    - This Regulation is however not yet in force.
- National Norms and Standards for the assessment of waste for landfill disposal (23 August 2013):
    - These norms and standards prescribe the requirements for the assessment of waste prior to disposal to landfill.
    - The aim of the waste classification tests is to characterise the material to be deposited or stored in terms of the above-mentioned waste classification guidelines set by the Department of Environmental Affairs (DEA).
- The outcomes of the tests provide the necessary information in terms of:
    - Identification of chemical substances present in the waste.
    - Determination of the total concentrations (TC) and leachable concentrations (LC) of the elements and chemical substances that have been identified in the waste and that are specified in Section 6 of the above-mentioned Regulations. The obtained TC and LC values of the waste material will be compared to the threshold limits for total concentrations (TCT limits) and leachable concentrations (LCT limits) specified in Section 6 of the above-mentioned Regulations. Based on the TC and LC values of the elements and chemical substances in the waste exceeding the corresponding TCT and LCT limits respectively, the specific type of waste for disposal to landfill will be determined in terms of Section 7 of the Regulations.

3.1.4 The National Environmental Management: Biodiversity Act

The National Environmental Management: Biodiversity Act, 2004 (NEMBA - Act 10 of 2004), “provides for: the management and conservation of South Africa’s biodiversity within the framework of the NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute (SANBI); and for matters conducted therewith”.

- In terms of the Biodiversity Act, the applicant has a responsibility for: The conservation of endangered ecosystems and restriction of activities according to categorisation of the area (not just by listed activity as specified in the EIA regulations):

- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Regulations published under the NEMBA also provide a list of protected species, according to the Act (GN R151 dated 23 February 2007, as amended in GN R1187 dated 14 December 2007). Section 57 of NEMBA identifies restricted activities involving threatened or protected species. Restricted activities include the gathering, collecting, cutting, uprooting, damaging or destroying a listed species.

3.1.5 The National Environmental Management: Protected Areas Act

The National Environmental Management: Protected Areas Act, 2003 (NEMPAA - Act 57 of 2003) observes to: "provide for the protection and conservation of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes and seascape; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; for the continued existence, governance and functions of South African National Parks; and for matters in connection therewith."

- The objectives of this Act are:

a) To provide, within the framework of the national legislation, including the National Environmental Management Act, for the declaration and management of protected areas.

b) To provide for co-operation governance in the declaration and management of protected areas.

c) To effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity.

d) To provide for a diverse and representative network of protected areas on state land, private land, communal land and marine water.

e) To promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas.

f) To promote participation of local communities in the management of protected areas, when appropriate.

g) To provide for the continued existence of South African National Parks.

3.1.6 National Water Act

The National Water Act, 1998 (NWA - Act 36 of 1998) makes provision for two types of application for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the Applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the EIA regulations. A person may use water, if the use is-

- Permissible as a continuation of an Existing Lawful Water Use (ELWU).
- Permissible in terms of a General Authorisation (GA).
- Permissible under Schedule 1.

- Authorised by a License.

The NWA defines 11 water uses. A water use may only be undertaken if authorised. Water users are required to register certain water uses that actually took place on the date of registration, irrespective of whether the use was lawful or not.

Section 21 of the National Water Act 1998 lists the following 11 water uses which can only be legally undertaken through the water use authorisation issued by the Department of Water and Sanitation (DWS):

- Taking water from a water resource.
- Storing water.
- Impeding or diverting the flow of water in a watercourse.
- Engaging in a stream flow reduction activity contemplated in Section 36.
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1).
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits.
- Disposing of waste in a manner which may detrimentally impact on a water resource.
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.
- Altering the bed, banks, course or characteristics of a watercourse.
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
- Using water for recreational purposes.

In terms of the NWA, no Water Use License has been applied for this project.

3.1.7 National Heritage Resources Act

The National Heritage Resources Act, 1999 (NHRA - Act 25 of 1999) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…” The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and specifically, those resources impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA and MPRDA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for development.

The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b). The NEMA 23(2)(b) states that an integrated environmental management plan should, “…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”.

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be

taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 (Fourie, 2008b).

MPRDA defines 'environment' as it is in the NEMA and therefore acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

In accordance with the legislative requirements and EIA rating criteria, the regulations of the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive and legally compatible Heritage Impact Assessment Report is compiled.

4. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

In terms of the EIA (2014) Regulations the need and desirability of any development must be considered by the relevant competent authority reviewing an application. The need and desirability must be included in the reports to be submitted during the Environmental Authorisation application process. This section of the BAR and EMPR indicates the need and desirability for the proposed Bothaville NE Ext A Prospecting Right project.

Assessment of the geological data available has determined that the area in question may have gold, silver, coal, diamond (alluvial), platinum group metals, rare earths, sulphur and uranium. As such, prospecting activities are needed in order to confirm and obtain additional information concerning potential targets through non-invasive (desktop studies and acquisition of historical data, acquisition and synthesis of historical data, geological modelling, possible geophysics and regional surveys, resource estimation and concept study) and invasive activities (diamond core drilling). There will also be an assessment if the resource can be extracted through future mining in an environmentally, socially and economically viable manner. Mining will contribute greatly to the socio-economic status quo in the form of increased income, employment and other benefits that would cascade through the local, regional and national levels.

5. MOTIVATION FOR THE OVERALL PREFERRED DEVELOPMENT FOOTPRINT

The drill sites have been selected based on their potential geological prospectivity in terms of mineralisation and due to the shallow nature of the reef at these locations. According to the Free State Terrestrial Critical Biodiversity Areas Plan, two of the proposed drillhole positions are situated in areas which are classified as Critical Biodiversity (CBA) whilst six are in areas classified as Ecological Sensitive Area (ESA) 2. In terms of the ecosystem threat status, the proposed prospecting footprint falls within two ecosystems which are listed as Least Threatened and Endangered. No identified heritage resources are present within a 500 m buffer around each proposed drill site. Furthermore, the preliminary drill sites are not situated in close proximity to any protected areas. Therefore, no alternative site locations were assessed as the preliminary drillhole locations are based on expected mineral resources within the application area and they are not positioned in close proximity to any sensitive features, thus limiting the potential negative impacts.

6. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

The NEMA (2014) EIA Regulations require a BAR and EMPR to identify alternatives for projects applied for. In terms of the above-mentioned regulations an alternative in relation to a proposed activity means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to (i) the property on which or location where it is proposed to undertake the activity, (ii) the type of activity to be undertaken, (iii) the design or layout of the activity, (iv) the technology to be used in the activity, (v) the operation aspects of the activity and (vi) the option of not implementing the activity.

White Rivers Exploration proposes to undertake prospecting within the project area in order to determine if an economically viable mineral resource exists. The proposed prospecting programme will include the drilling of eight diamond drillholes. The development footprint is expected to be a fraction (up to 0.72 ha) of the project area size, which is 9 510.03 ha.

6.1.1 Property

The project area has been selected based on a number of criteria, which include the environmental considerations (how sensitive the area is in terms of flora, fauna, wetlands, etc.) and historic and current data available for the region, which indicates the potential for economically viable mineral deposits to occur. Due to the geological features (in terms of mineralisation) present within the project area and the low sensitivity of the receiving socio-economic and biophysical environment, no property alternatives are suggested.

6.1.2 Type of Activity

The prospecting activities proposed in the PWP follow a phased approach, whereby the preceding phase determines if further work is warranted. As such, no alternatives are indicated but rather a phased approach of trusted prospecting techniques/activities.

6.1.3 Design or Layout

A specific area within the application area has been identified for drilling in order to minimise land destruction during invasive prospecting. Prospecting is temporary in nature; consequently no permanent or complicated surface infrastructure will be constructed on-site. Therefore, no design and layout alternatives have been proposed for this project.

6.1.4 Technology Alternatives

The technologies listed in the PWP have been selected as they have proven effective in the determination of resource viability within the proposed prospecting area. The prospecting techniques as proposed in the PWP are dependent on the preceding phase, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

6.1.5 Operational Aspects

Operational aspects that have been considered for the effective implementation of the PWP include financial arrangements, and the availability of appropriate equipment and the technical skills. An amount of ZAR 7 951 063 will be required to finance the PWP. The cost estimate depicts an exploration budget planned in phases that naturally follow each other assuming the success of the previous phase. At any one point in time the scope and money alsituated to a follow-up phase could be affected by success or failure to delineate

the mineralisation in the previous stage. The above exploration budget could therefore change dramatically during the exploration process.

The Creasy Group of companies has committed to finance the prospecting costs for White Rivers Exploration. This group is a long standing investor into the South African minerals industry.

6.1.6 Option of Not Implementing ('No-Go')

The 'no-go' alternative is the option of not undertaking prospecting activities on the project site. The 'no-go' option assumes the site remains in its current state. Drilling is required in order to investigate the potential and feasibility of a resource and also to generate a South African Code for the Reporting of Exploration Results (SAMREC, 2016) compliant mineral resource estimate. There is no potential for any future investment in a mine without confirmation of the mineral resources which can only be obtained through drilling activities.

Should this Amendment Application be refused, a potential mineral resource will be sterilised. The socio-economic benefit and most notably the future employment potential of a mine development will also be lost if the prospecting activities are not implemented in order to determine the feasibility of any mineral deposits that may occur within the application area.

7. PUBLIC PARTICIPATION PROCESS

7.1. Public Participation Methodology

South Africa, being one of the countries with the most progressive constitutions, enshrined the public's right to be involved in decisions. Section 57(1) of the new Constitution that provides: "The National Assembly may (b) make rules and orders concerning its business, with due regard to representative and participatory democracy, accountability, transparency and public involvement". This provision, along with several others gave rise to many new trends in South African legislation. In environmental legislation, the idea of public participation (or stakeholder engagement) features strongly and especially the National Environmental Management Act, 1998 (Act 107 of 1998, NEMA – as amended) and the recent regulations passed under the auspices of this Act makes very strict provisions for public participation in environmental decision-making.

Public participation can be defined as "a process leading to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce better decisions than if they had acted independently" (Greyling, 1999). From this definition, it can be seen that the input of the public is regarded as very important indeed.

The PPP is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

1. Raise issues of concern and suggestions for enhanced benefits.
2. Verify that their issues have been recorded.
3. Assist in identifying reasonable alternatives.
4. Contribute relevant local information and knowledge to the environmental assessment.
5. Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.
6. Comment on the findings of the environmental assessments.

Refer to Appendix E for proof of PPP undertaken to date.

7.1.1 Identification of I&APs

The first phase of the PPP includes the identification of I&APs. An initial I&AP database was compiled using WinDeed searches, internet searches and previous BA projects in the vicinity of the study area. The I&AP database was compiled containing the following categories of stakeholders:

1. National, provincial and local government.
2. Agricultural sector.
3. Organised business.
4. Host and adjacent communities.
5. Land claimants.
6. Other organisations, clubs, communities, and unions.
7. Various Non-Government Organisations (NGOs).

7.1.2 List of Authorities Identified and Notified

The following authorities have been identified and notified of the proposed Bothaville NE Ext A Prospecting Right:

1. National Department of Mineral Resources
2. National Department of Agriculture, Forestry and Fisheries
3. National Department of Rural Development and Land Reform
4. South African National Roads Agency Ltd (SANRAL)
5. South African Heritage Resources Agency (SAHRA) – National
6. Free State Department of Mineral Resources
7. Free State Department of Agriculture and Rural Development
8. Free State Department of Cooperative Governance, Traditional Affairs and Human Settlements
9. Free State Department of Economic Development, Tourism, Environmental Affairs and Small Business
10. Free State Department of Police, Roads and Transport
11. Free State Department of Public Works
12. Free State Department of Water and Sanitation
13. Moqhaka Local Municipality
14. Nala Local Municpality
15. Lejweleputswa District Municipality
16. Fezile Dabi District Municipality
17. Eskom
18. Transnet

7.1.3 List of Key Stakeholders Identified and Notified

The following key stakeholders have been identified and notified of the proposed Bothaville NE Ext A Prospecting Right:

1. The Council for Scientific and Industrial Research
2. Wildlife and Environment Society of South Africa (WESSA)
3. Agri South Africa
4. Agri Free State
5. South African National Parks (SANParks)

6. Federation for a Sustainable Development
7. Birdlife South Africa
8. Agricultural Research Council
9. Endangered Wildlife Trust

7.1.4 List of Surface Rights/Land Owners Identified and Notified

The following surface rights/landowners of the area under application have been identified and notified of the proposed Bothaville NE Ext A Prospecting Right:

1. Kotze Familie Trust
2. Brakspruit Trust
3. Taljaard Jacobus Christoffel
4. PC Joubert CC
5. Joharmar Boedery CC
6. Roux Christiaan Greyling
7. T D Trust
8. Doornheuwel Trust
9. Boomplaas Boerdery CC
10. Gerhard Van Den Berg Familie Trust
11. Rietpan Boerdery CC
12. Leyden Trust
13. Kotze Josef Emmanuel and Johan Kotze
14. Boehankie Trust
15. Jordaan Louisa Maria
16. Jordaan Maria Elizabeth
17. Premru Familie Trust
18. Tarantaal Trust
19. Bastow Jacomina Hendrina
20. Weestevrede Trust
21. Badimo Gas Properties (Pty) Ltd

7.1.5 List of Surface Rights/Land Owners Identified and Notified

The following I&APs registered during the registration period and have been notified of the Bothaville NE Ext A Amendment application:

1. Setsoto Matlokotsi
2. Chris Joubert
3. A. J. S. Jordaan
4. Giepie Rossouw
5. Gerrie Rossouw
6. Ester Olivier
7. R. J. v.d Berg
8. J. v.d Berg
9. P. D. Roux
10. J. L. Kotze

7.2. Notification of I&APs

This section provides details on the notification that was distributed as part of the BA process to date.

7.2.1. Initial Notification

The PPP commenced on the 14th March 2019 with an initial notification and call to register within the period ending on the 23rd April 2019. Initial notification was given in the following manner:

7.2.1.1. Registered Letters, Faxes and E-mails

Notification letters, faxes and e-mails were distributed to all pre-identified I&APs including affected and adjacent surface landowners, government organisations, NGOs, relevant municipalities, ward councillors and other organisations that might be affected. The notification letters included the following information:

1. List of anticipated activities to be authorised.
2. Scale and extent of activities to be authorised.
3. Sufficient detail of the intended operation (to enable I&APs to assess/surmise what impact the activities will have on them or on the use of their land).
4. The purpose of the proposed project.
5. Details of the affected properties (including a locality map).
6. Details of the MPRDA and NEMA Regulations that must be adhered to.
7. Date by which any request to register as an I&AP must be forwarded through to Shango Solutions.
8. Contact details of the EAP.

In addition, a questionnaire was included in the registered letters, e-mails and facsimiles sent which requested the following information from I&APs:

1. Information on any potential impacts from the proposed project.
2. Suggestions on potential mitigation measures for their anticipated impacts.
1. Information on current land uses and their location within the area.
2. Information on the location of any environmental features of note within and in the vicinity of the study area.
3. Details of the landowner and information (contact details) of lawful property occupiers, if any.
4. Details of any other I&APs that should be notified.
5. Details on any land developments proposed in the near future.
6. Any specific comments or concerns regarding the application.

7.2.1.2. Background Information Document (BID)

A Background Information Document (BID) was prepared. The BID includes the following information:

1. Project name.
2. Applicant name.
3. Project location.
4. Map of affected project area.
5. Description of the application process.
6. Information on document review.
7. Relevant Shango Solutions contact person for the project

7.2.1.3. Newspaper Advertisement

Newspaper advertisements describing the proposed project and BA process featured in a local newspaper with adequate circulation in the area. The advertisement featured in The Vista News (in English and Afrikaans and Sesotho) on the 14th March 2019. The newspaper advert included the following information:

1. Project name.
2. Applicant name.
3. Project location.
4. Nature of the activity.
5. Relevant Shango Solutions contact person.

7.2.1.4. Site Notice Placement

14 A1 Correx site notices (in English, Afrikaans and Sesotho) were placed along and within the perimeter of the proposed project area on the 14th March 2019. The on-site notices included the following information:

1. Project name.
2. Applicant name.
3. Project location.
4. Map of proposed project area.
5. Project description.
6. Legislative requirements.
7. Relevant Shango Solutions contact person.

7.2.1.5. Poster Placement

A3 posters in English, Afrikaans and Sesotho were placed at the Bothaville Golf Club, Bothaville Spur and at a local petrol station. The notices and written notification afforded all pre-identified I&APs the opportunity to register for the project as well as to submit their issues/queries/concerns and indicate the contact details of any other potential I&APs that should be contacted. The contact details of the EAP were clearly stated on the notification. Comments/concerns and queries were encouraged to be submitted in either of the following manners:

1. Electronically (fax, e-mail).
2. Telephonically.
3. Written letters.

7.2.2. Availability of Draft Bar and EMPR Notification

The Basic Assessment Report and Environmental Management Programme were made available for public review, for a period of at least 30 days, from the 20th March 2019 until 23rd April 2019 at the Bothaville Golf Club. Furthermore, an electronic copy was made available on the Shango Solutions website for download.

Notification regarding the availability of the Draft BAR and EMPR was given in the following manner:

1. Notification letters (in English, Afrikaans and Sesotho), faxes and/or e-mails will be distributed to all pre-identified I&APs, I&APs registered during the initial notification period, as well as affected and adjacent surface landowners.

Comments received from I&APs during the Draft BAR and EMPR review period have been included in the final Comments and Responses Report to be submitted to the DMR for consideration as part of the Final BAR and EMPR.

7.2.3. Public Meeting/Open Day

During the draft BAR and EMPR review period, an Open Day was held to present findings of the Basic Assessment process. The Open Day took place on the 11th April 2019 at the Bothaville Golf Club from 09:00 to 17:00. During the Open Day session, informative A1 posters were displayed on the walls prior to the open session. English A4 versions of the Open Day poster were provided to I&APs. The EAP was available during the public Open Day for one-on-one discussions and questions from the public.

7.3. Issues and Responses

The Public Participation Process was initiated on 14th March 2019. I&APs are given until the 23rd April 2019, a period of at least 30 days, to register for this project. The draft BAR and EMPR were made available from the 20th March 2019 to 23rd April 2019 and I&APs are provided opportunity to comment on the draft BAR and EMPR. All comments or issues received from I&APs during the project registration period have been included in this final Basic Assessment Report.

7.3.1. How Issues Raised Were Addressed

Comments raised were addressed in a transparent manner and included in the compilation of the BAR and EMPR in the following manner:

- Issues raised were used quantitatively to calculate the significance of impacts, both real and perceived.
- Issues raised were used to provide further suggestions and recommendations with regard to technical management options for impacts.

7.3.2. Summary of Issues Raised by I&APs

Comments received by Shango Solutions to date have been included in the Comments and Responses Report (Appendix E) as part of the report submission to the DMR (the competent authority), (Table 5).

Table 5: Summary of issues raised by I&APs.

I&AP	Consulted	Date comments received	Comment received	Response issued
Key Stakeholders				
Landowner/s				
Kotze Familie Trust	X		No comment received to date.	
Brakspruit Trust	X		No comment received to date.	
Taljaard Jacobus Christoffel	X	24th April 2019	Blank e-mai with attached registration form	Good day, Thank you for your correspondence. Your comments and concerns have been take into consideration. Should you have any further comments and queries in this regard, please do not hesitate to contact me. Regards Nyandala Adi Ramaru
PC Joubert CC	X		No comment received to date.	
Joharmar Boedery CC	X		No comment received to date.	
Roux Christiaan Greyling	X		No comment received to date.	
T D Trust	X		No comment received to date.	
Doornheuwel Trust	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Boomplaas Boerdery CC	X		No comment received to date.	
Gerhard Van Den Berg Familie Trust	X		No comment received to date.	
Rietpan Boerdery CC	X		No contact details sourced for this landowner.	
Leyden Trust	X		No comment received to date.	
Kotze Josef Emmanuel & Johan Kotze	X	23rd April 2019	Blank e-mail with attached registration form	Good day, Thank you for your correspondence. Your comments and concerns have been take into consideration. Should you have any further comments and queries in this regard, please do not hesitate to contact me. Regards Nyandala Adi Ramaru
Boehankie Trust	X		No comment received to date.	
Jordaan Louisa Maria	X		No comment received to date.	
Jordaan Maria Elizabeth	X		No comment received to date.	
Premru Familie Trust	X		No comment received to date.	
Tarantaal Trust	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Bastow Jacomina Hendrina	X		No comment received to date.	
Weestevrede Trust	X		No comment received to date.	
Badimo Gas Properties (Pty) Ltd	X		No comment received to date.	
Lawful Occupier/s				
NA				
Adjacent Landowners				
NA				
Local Municipality – Moqhaka Local Municipality				
Executive Mayor	X		No comment received to date.	
Municipal Manager	X		No comment received to date.	
Speaker	X		No comment received to date.	
Ward 23 Councillor	X		No comment received to date.	
Local Municipality – Nala Local Municipality				
Executive Mayor	X		No comment received to date.	
Municipal Manager	X		No comment received to date.	
Speaker	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Director Corporate Services	X		No comment received to date.	
Speaker of the Council	X		No comment received to date.	
Ward 10	X		No comment received to date.	
District Municipality – Lejweleputswa District Municipality				
Municipal Manager	X		No comment received to date.	
Communities				
N/A	X		No comment received to date.	
Traditional Leaders				
N/A	X		No comment received to date.	
Organs of State				
National Department of Mineral Resources	X		No comment received to date.	
National Department of Agriculture, Forestry and Fisheries	X	12th March 2019	Lesley S telephoned and requested title deeds for the properties that will be affected by invasive prospecting activities.	Dear Lesley, As requested, please find herewith attached title deeds of the properties to be affected by the planned invasive prospecting activities, as well as the map indicating the locations of the said properties. Should you have any questions in this regard, please do not hesitate to contact

I&AP	Consulted	Date comments received	Comment received	Response issued
				me. Best regards, Zizo Siwendu.
	X	27th March 2019	Dear Sir/Madam This serves as a notice of receipt and confirms that your application has been captured in our electronic AgriLand tracking and management system. It is strongly recommended that you use the on-line AgriLand application facility in future. Detail of your application as captured: Type: ***EIA: Prospecting Right: Bothaville NE Ext A*** Your reference number: ***30/5/1/1/3/2/1/10273 EM*** Property Description: ***Farms Eureka 761, Concord 392, Tarantaaldraai 156*** Dated: ***12 March 2019*** Please use the following reference number in all enquiries: **AgriLand reference number: 2019_03_0116** Enquiries can be made to the above postal, fax or e-mail address.	Good day, Thank you for your correspondence. It has been noted. Should you have any further comments or queries in this regard, please do not hesitate to contact me. Regards Nyandala Adi Ramaru

I&AP	Consulted	Date comments received	Comment received	Response issued
			Yours sincerely, K. MALULEKE **pp DIRECTOR: LAND USE AND SOIL MANAGEMENT** Online application available at: http://www.agis.agric.za/agriland	
National Department of Rural Development and Land Reform	X		No comment received to date.	
South African National Roads Agency Ltd (SANRAL)	X		No comment received to date.	
South African Heritage Resources Agency (SAHRA) – National	X	13th March 2019	Good morning, Please note that your application was reviewed. To download the response please go to your application on SAHRIS: https://sahris.sahra.org.za/cases/bothaville-ne-ext. Kind regards, Ragna Redelstroff The following document was attached: **In terms of Section 38(8) of the National**	Good day Ragna, Thank you for your correspondence. The draft BAR and EMPR, along with the initial notification documents, for the Bothaville NE Ext A PR and EA amendment application will be uploaded onto SAHRIS on the 20th of March 2019. Should you have any further queries, please do not hesitate to contact me. Regards, Nyandala Ramaru

I&AP	Consulted	Date comments received	Comment received	Response issued
			Heritage Resources Act (Act 25 of 1999) Attention: White Rivers Exploration (Pty) Ltd **White Rivers Exploration (Pty) Ltd (hereafter referred to as White Rivers Exploration) holds an executed Prospecting Right (FS 30/5/1/1/2/10273 PR) and an approved Environmental Management Plan (EMP) in terms of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002, as amended) (MPRDA). The Prospecting Right was executed by the Department of Mineral Resources (DMR) Free State Regional Office on 8 September 2015. The project is known as Bothaville NE Ext A and it considers the non-invasive prospecting of the following commodities: gold, silver, coal, diamond (alluvial), platinum group metals, rare earths, sulphur and uranium.The project area covers an aerial extent of 9 510.03 hectares (ha). It is situated in the Magisterial District of Bothaville, approximately 30 kilometres**	

I&AP	Consulted	Date comments received	Comment received	Response issued
			(km) south of the town of Bothaville in the Free State Province of South Africa. Thank you for your notification regarding a Prospecting Right (FS 30/5/1/1/2/10273 PR) and an approved Environmental Management Plan (EMP) for the non-invasive prospecting of gold, silver, coal, diamond (alluvial), platinum group metals, rare earths, sulphur and uranium over an area covering 9 510.03 hectares, situated in the Magisterial District of Bothaville, approximately 30 km south of the town of Bothaville in the Free State Province. As no documents were submitted and the Propsecting Right has been granted in 2015, it is unclear what activities the applicant is applying for. The draft SR/BAR/EIA and EMP must be submitted to the application. No comment can be issued by SAHRA without any information on the application. Should you have any further queries, please contact the designated official using the case number quoted	

I&AP	Consulted	Date comments received	Comment received	Response issued
			above in the case header. Yours faithfully	
Free State Department of Mineral Resources	X		No comment received to date.	
Free State Department of Agriculture and Rural Development	X		No comment received to date.	
Free State Department of Cooperative Governance, Traditional Affairs & Human Settlements	X		No comment received to date.	
Free State Department of Economic Development, Tourism, Environmental Affairs & Small Business	X		No comment received to date.	
Free State Department of Police, Roads and Transport	X		No comment received to date.	
Free State Department of Public Works	X		No comment received to date.	
Free State Department of Public Works	X		No comment received to date.	
Free State Department of Water and Sanitation	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Eskom	X	13th March 2019	Please send me KMZ files of the affected properties and proposed activities. Please find general Eskom requirements for works at or near Eskom infrastructure. Regards, John Geeringh The following document was attached: Eskom requirements for work in or near Eskom servitudes. 1. Eskom's rights and services must be acknowledged and respected at all times. 2. Eskom shall at all times retain unobstructed access to and egress from its servitudes. 3. Eskom's consent does not relieve the developer from obtaining the necessary statutory, land owner or municipal approvals. 4. Any cost incurred by Eskom as a result of non-compliance to any	Good morning John, Thank you for the correspondence. The general Eskom requirements for works at or near Eskom infrastructure have been noted. Please find the attached KMZ file and below, a summary of the proposed activities. As part of the amended PWP, the following invasive and non-invasive prospecting activities will be conducted during Year 4 and Year 5 of the project: 1. **Drilling (4 holes each to a depth of 700 metres)** [Year 4: 6 months] 2. **Revise Geological Model** [Year 4: 6 months] 3. **Drilling (4 holes each to a depth of 700 metres)** [Year 5: 4 months] 4. **Finalisation of 3D geological model** [Year 5: 3 months]

I&AP	Consulted	Date comments received	Comment received	Response issued
			relevant environmental legislation will be charged to the developer. 5. If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the developer's activities or because of the presence of his equipment or installation within the servitude restriction area, the developer shall pay such costs to Eskom on demand. 6. The use of explosives of any type within 500 metres of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the developer must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process. It is advisable to make application separately in this regard.	5. **Code Compliant Resource Estimation** [Year 5: 3 months] 6. **Concept Study** [Year 5: 2 months] If you have any further queries, please do not hesitate to contact me. Regards, Nyandala Ramaru

I&AP	Consulted	Date comments received	Comment received	Response issued
			7. Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom's satisfaction. 8. Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the servitude area by the developer, his/her agent, contractors, employees, successors in title, and assignees. The developer indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom's services or apparatus or otherwise. Eskom will not be held responsible for	

I&AP	Consulted	Date comments received	Comment received	Response issued
			damage to the developer's equipment. 9. No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the developer must give at least seven working days' notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager . Note: Where and electrical outage is required, at least fourteen work days are required to arrange it. 10. Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.	

I&AP	Consulted	Date comments received	Comment received	Response issued
			11. Under no circumstances shall rubble, earth or other material be dumped within the servitude restriction area. The developer shall maintain the area concerned to Eskom's satisfaction. The developer shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom. 12. The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993). 13. Equipment shall be regarded electrically live and therefore dangerous at all times. 14. In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as an additional safety precaution, Eskom	

I&AP	Consulted	Date comments received	Comment received	Response issued
			will not approve the erection of houses, or structures occupied or frequented by human beings, under the power lines or within the servitude restriction area. 15. Eskom may stipulate any additional requirements to highlight any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant. 16. It is required of the developer to familiarise himself with all safety hazards related to Electrical plant. 17. Any third party servitudes encroaching on Eskom servitudes shall be registered against Eskom's title deed at the developer's own cost. If such a servitude is brought into being, its existence should be endorsed on the Eskom servitude deed concerned, while the third party's servitude deed must also include the rights of the affected Eskom servitude.	

I&AP	Consulted	Date comments received	Comment received	Response issued
			John Geeringh	
		14th March 2019	Good morning Nyandala I am busy with your application and we have numerous lines affected by the exploration. Can you please let me know the following: • What is the diameter of the holes being drilled at 700m deep? • How will the project affect the surface or will the exploration be underground eventually? Kind Regards Rene	Good day Rene, Thank you for your correspondence. The diameter of the holes will be 50 to 95 milimetres and each borehole will have a surface disturbance of approximately 10 m x 10 m. Exploration is only going to take place on the surface. Vegetation may be cleared, however it will be later rehabilitated. No infrastructure shall be damaged and the general Eskom requirements for works at or near Eskom infrastructure will be adhered to. Should you have any further queries in this regard, please do not hesitate to contact me. Regards, Nyandala Ramaru
		5th April 2019	Dear Nyandala	Good morning Jack,

I&AP	Consulted	Date comments received	Comment received	Response issued
			Thank you for sending this – although I will not be able to attend on the 11th, some of our local affected farmers members indicated that they will attend. Can you kindly send me the KMZ files that I can see the location of the project in relation to Bothaville / other projects. Appreciated, Jack	It is unfortunate that you will not be able to attend the Open Day. Please find the attached KMZ file of the project area. I have also included the proposed locations of the drillholes so that you can identify which properties are affected by the invasive prospecting. If you have any further queries in this regards, please do not hesitate to contact me. Regards Nyandala Adi Ramaru
Transnet	X		No comment received to date.	
Other Affected Parties				
The Council for Scientific and Industrial Research	X		No comment received to date.	
Wildlife and Environment Society of South Africa (WESSA)	X		No comment received to date.	
Agri South Africa	X		No comment received to date.	
Agri Free State	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
South African National Parks (SANParks)	X		No comment received to date.	
Federation for a Sustainable Development	X		No comment received to date.	
Birdlife South Africa	X		No comment received to date.	
Agricultural Research Council	X		No comment received to date.	
Endangered Wildlife Trust (EWT)	X		No comment received to date.	
Catchment Management Agency	X		No comment received to date.	
Registered Interested and Affected Parties				
Setsoto Matlokotsi	X	18th March 2019	Dear Ms. Nyandala Ramaru, I have developed so much interest in this project with a will to attend a stakeholders Open Day 11 April 2019. What must one have to be part of the secondary processing of the mineral resource, smelting, refining, beneficiation, etc.? Kindest regards. Setsoto Ansherers Matlokotsi	Good day Setsoto, Thank you for your correspondence. You have been registered as an Interested and Affected party for the Bothaville NE Ext A project. The processes that you have mentioned (mineral resource, smelting, refining, beneficiation etc) pertain to the mining stage of a project. This project is currently at a prospecting phase and does not include the above mentioned. I have

I&AP	Consulted	Date comments received	Comment received	Response issued
				attached a Background Information Document which outlines all the activities which have taken place and those that are still to be undertaken. You are welcome to attend the Open Day and address any other queries that you might have. Regards, Nyandala Ramaru
Chris Joubert	X	27th March 2019	FYI Attached Questionnaire	Good day, Thank you for your correspondence. You have been registered as an Interested and Affected Party for the Bothaville NE Ext A project. Your feedback has been received and is appreciated. Should you have any further comments or questions in this regard, please do not hesitate to contact me.

I&AP	Consulted	Date comments received	Comment received	Response issued
				Regards Nyandala Adi Ramaru
Giep Rossouw	X	22nd April 2019	Sien aangeheg. G J Rossouw Attached registration form.	Goeie dag, Baie dankie vir u korrespondensie. U opmerkings en sorge word in ag geneem. Neem asseblief kennis van die volgende: 1. Die arbeiders sal met goedkeuring van die grondeienaar in 'n kamp op die perseel woon, of in die dorp (Bothaville). 2. Die Omgewingsbestuurprogram hanteer u sorge oor waterbesoedeling. Versagtende maatreëls sal in werking gestel word om vervuiling van waterbronne te verhoed. 3. Eer indringende prospekteringsaktiwiteite begin, sal 'n ooreenkoms aangegaan word tussen geaffekteerde grondeienaars en White Rivers Exploration. Shango Solutions

I&AP	Consulted	Date comments received	Comment received	Response issued
				kan nie ingaan op die terme en voorwaardes hiervan nie, wat vergoeding van die gedeelte waarop prospektering sal plaasvind, insluit. Verder sal die ooreenkoms ook toegangsbeheer tot die prospekteerarea insluit. Voel asseblief vry om my te kontak, sou u enige opmerkings of vrae hê. Regards Nyandala Adi Ramaru
Gerrie Rossouw	X	23rd April 2019	Blank e-mail with attached regsitartion form	Goeie dag, Dankie vir u korrespondensie. U opmerkings en sorge word in ag geneem. Voel assebleif vry om my te kontak, sou u enige opmerkings of vrae hê. Regards, Nyandala Ramaru

8. ENVIRONMENTAL ATTRIBUTES AND ASSOCIATED ALTERNATIVE

8.1 Baseline Receiving Environment

This section describes the baseline receiving environment of the project area. Information in this section is based on desktop studies by the EAP, a site visit and specialist studies undertaken in support of this Amendment Application as well as input from the public through the I&AP Questionnaire. As such, the descriptions of environmental features below represent a consolidation of relevant information to the project area.

8.1.1 Socio-Economic

The a project area is situated in the Free State Province, approximately 30 km east of Bothaville. It is situated in the Bothaville Magisterial District and falls under the Nala (Ward 10) and Moqhaka (Ward 23) Local Municipalities, within the Lejweleputswa and Fezile Dabi District Municipalities respectively. (Figure 3).

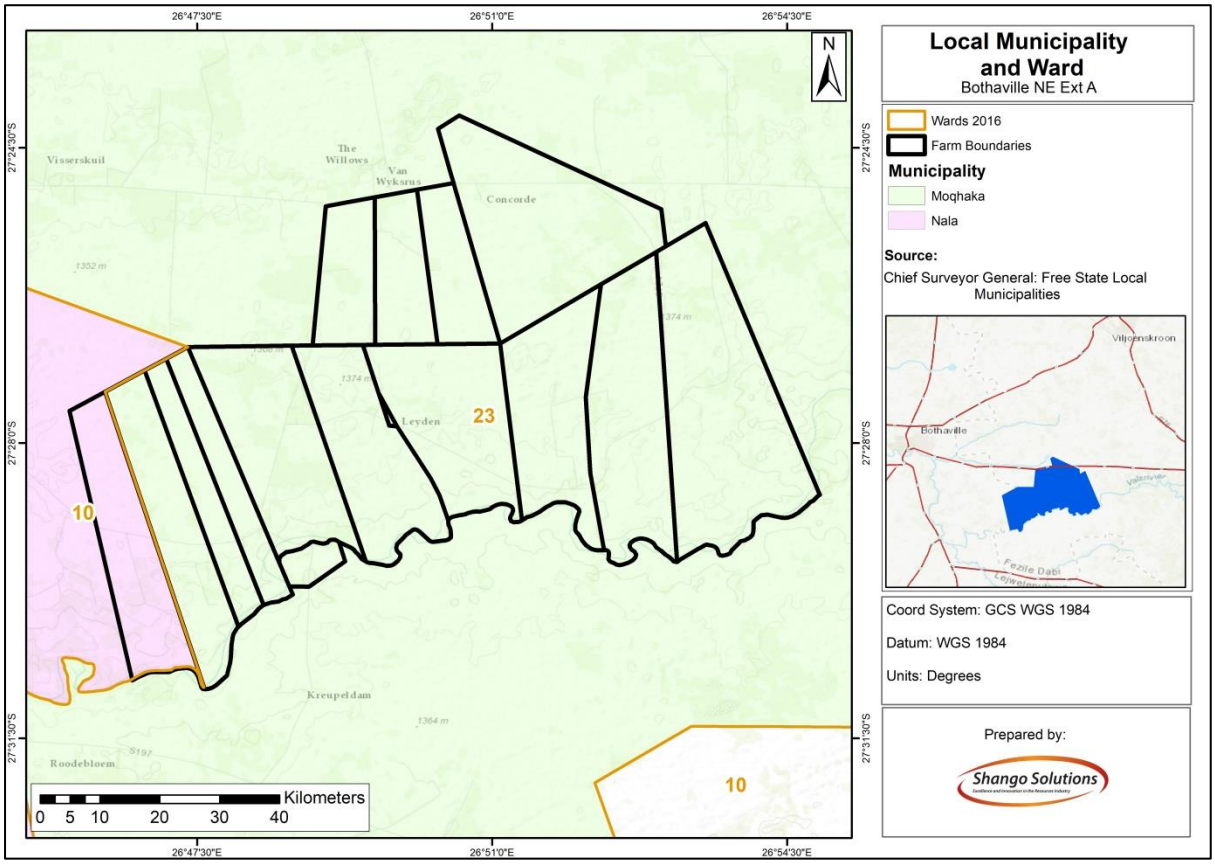

Figure 3: The affected local municipality and ward (refer to Appendix D for an enlarged map).

According to the 2011 census data, the Moqhaka Local Municipality has a population of 160 532. Approximately 87.2% of the population is African, 9.3 % is White and 3.5% Coloured, Indian, Asian or other. The Moqhaka unemployment rate (32.5%) is marginally lower than the provincial rate of 33% and the district rate of 34.0%. The Moqhaka Local Municipality Integrated Development Plan (IDP) 2017/2018 states that the region is situated within a significant agricultural region. Kroonstad is the centre of a large agricultural community that plays a crucial role in the economy of the region. In addition to agriculture, mining remains one of the primary economic sectors within the Moqhaka Local Municipality through the De Beers and Lace diamond mines situated approximately 15 km from Kroonstad CBD. The possible re-opening of Vierfontein Colleries in the area of Viljoenskroon, also plays the same important economic role (Moqhaka Local Municipality IDP, 2017/2018).

The Nala Local Municipality is 4 135 km^2 in aerial extent and is therefore the smallest of all local municipalities in the Lejweleputswa District. According to Statistics SA's Community Survey of 2016, it has an estimated population of 76 515. Commercial agriculture is the main focus for expanded economic growth in the Nala Local Municipality (Nala Local Municipality IDP, 2017-2022). The advent of Bio-fuel could result in greater economic spin-offs for the municipality to cause expansion and growth in other areas of the economic such as the manufacturing, service and retail sectors.

The Lejweleputswa District Municipality Integrated Development Plan (IDP, 2017/22) states that mining and community service (46.5% and 14.2%, respectively) are the dominant sectors within the municipality. However, in the recent years, the contribution of mining in Lejweleputswa District's economy has been declining for various reasons including the lowering of world commodity prices.

According to the Fezile Dabi District Municipality Integrated Development Plan (IDP, 2017/22), mining and manufacturing are the dominant sectors within the municipality due to the strong petrochemical industry provided by Sasol and other activities in the area. The expansion of these sectors as well as agricultural and tourism within the Moqhaka and Ngwathe Local Municipalities have been identified as future leading sectors to support economic and socioeconomic development in the area.

8.1.2 Geology

The surface geology of the project area contains (i) thin Quaternary sediments, mostly recent sand and gravel in the river valleys, as well as (ii) the Karoo Dolerite Suite and (iii) the sedimentary rocks of the Karoo Supergroup (Figure 4). The Witwatersrand Supergroup which hosts gold is generally overlain by 500 m of Karoo Supergroup strata, which is predominantly consisting of horizontally bedded sandstones and shales of the Ecca Group. The Ecca Group contains coal at shallow depths which might be exploitable.

The Welkom Goldfield hosted eleven mines in the triangle between Allanridge, Welkom and Virginia, 270 km southwest of Johannesburg. Historically, these mines have collectively produced in excess of 9.6 Million kilograms Au (gold). The Central Rand Group of the Witwatersrand Supergroup is present at Bothaville with four potentially economic placer deposits. The mineralised reefs at Bothaville are the Basal Reef, Big Pebble Conglomerate, A Reef and the B Reef. In addition to gold, the primary exploration target, silver, uranium, sulphur, diamonds, rare earths and platinum group metals are currently and have been historically, extracted as by-products of gold mining.

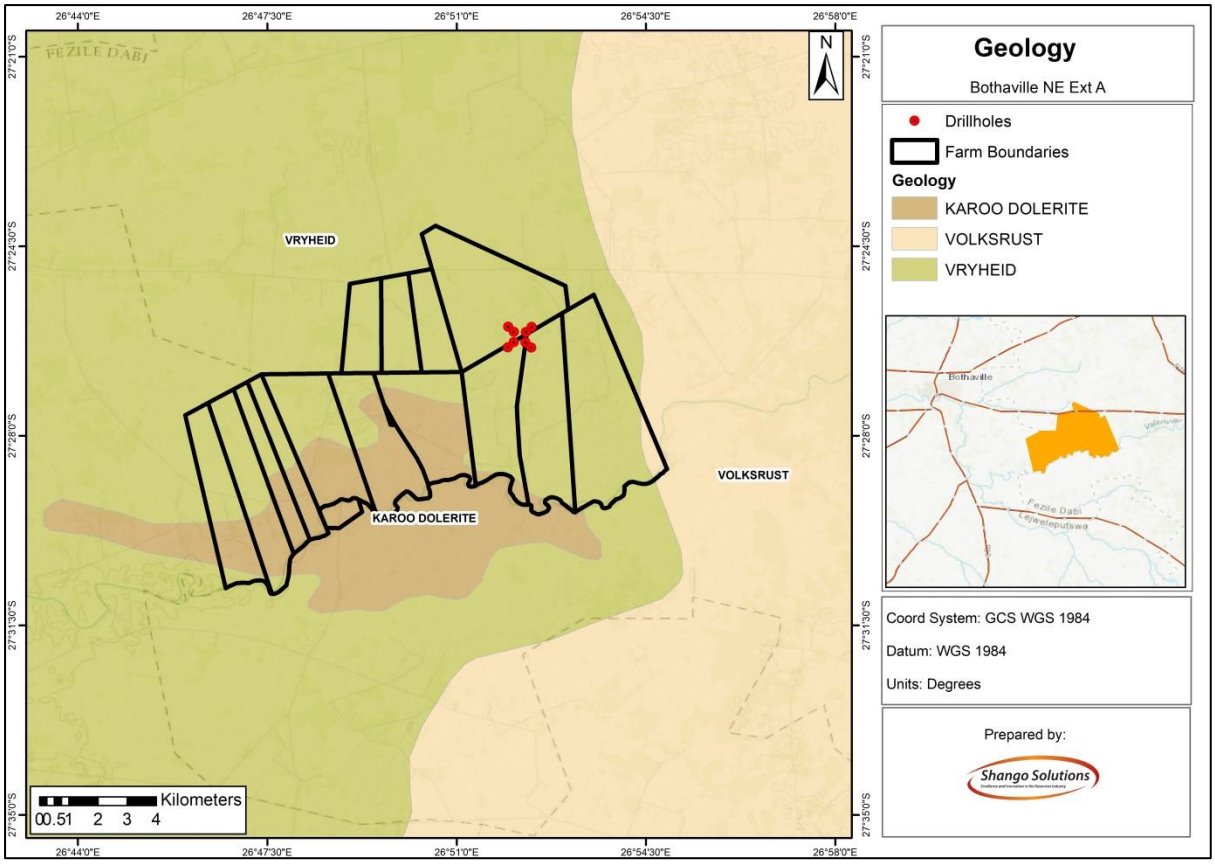

Figure 4: Surface geological map with project area boundaries superimposed (refer to Appendix D for enlarged map).

Mining in the Free State Goldfield has concentrated on the extraction of the Basal, Steyn, Saaiplaas and Leader reefs of the Central Rand Group (Figure 5). Several other ore bodies are extracted, also belonging to the Kimberley and Elsburg formations. These geological formations are generally marked by angular, erosional unconformities, which are on lapping towards the edge of the Witwatersrand Basin.

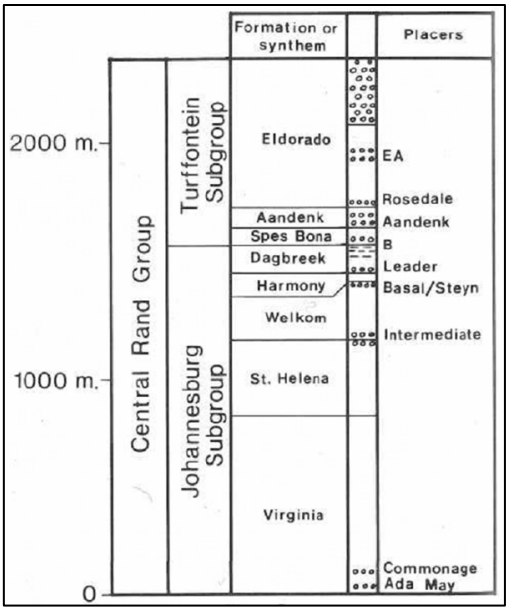

Figure 5: Simplified stratigraphic column of the Central Rand Group as preserved in the Free State Goldfield (Minter et al., 1986).

8.1.3 Climate

According to Mucina and Rutherford (2006), the application area is characterised by mild to hot summer and extremely cold winter temperatures with an average frost incidence of 37 days a year. Summer rains occur and the mean annual precipitation is 530 millimetres (mm) (Figure 6).

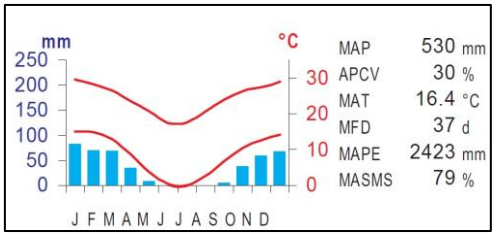

Figure 6: Climate diagram for the project area (Mucina and Rutherford, 2006).

8.1.4 Land Type and Soils

According to the land type database (Land Type Survey Staff, 1972 - 2006), the application area consists of the Bc 24, Bd 15 and Dc 6 land types. The proposed drillhole positions are situated within the Bd 15, a land type which is characterised by plinthic catena, upland duplex and margalitic soils which rarely occur. Eutrophic, red soils are not widespread within the project area.

8.1.5 Land Uses and Land Cover

The land in the project area is predominantly utilised for agricultural purposes, natural areas, livestock and game farming. Infrastructure such as secondary tar roads, gravel roads and homesteads occur within proximity of the project area. In terms of land cover, the project area is covered by low shrubland, cultivated fields (high and medium use), grassland and woodland/open bush (Figure 7).

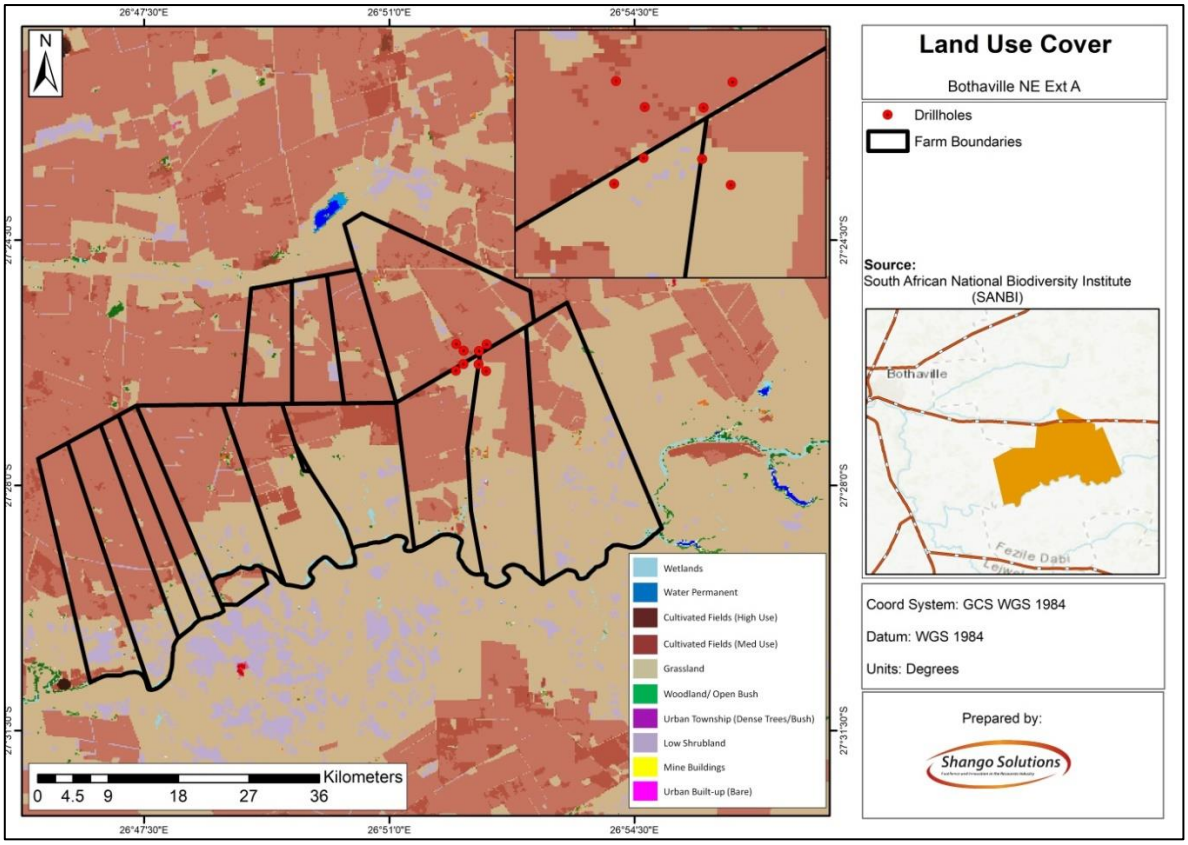

Figure 7: Land cover within and around the application area (refer to Appendix D for an enlarged map).

8.1.6 Wetland Assessment

A Wetland Assessment (Appendix F) was undertaken by The Biodiversity Company. The assessment specifically focused on wetlands that were likely to be impacted upon by the proposed invasive prospecting activities. Wetlands situated within a 500 m radius of the drill sites, but not in a position within the landscape to be measurably affected by the prospecting activities, were not considered as part of this assessment.

8.1.6.1 Desktop Assessment

Surface Hydrology

The project area falls within the Vaal Water Management Area (WMA 5) which contains the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo rivers (Figure 8). It comprises 12 tertiary catchment areas and the project area is situated in the C60J quaternary catchment (Figure 9). According to the South African Mine Water Atlas (SAMWA, 2018), this catchment is of moderate ecological sensitivity.

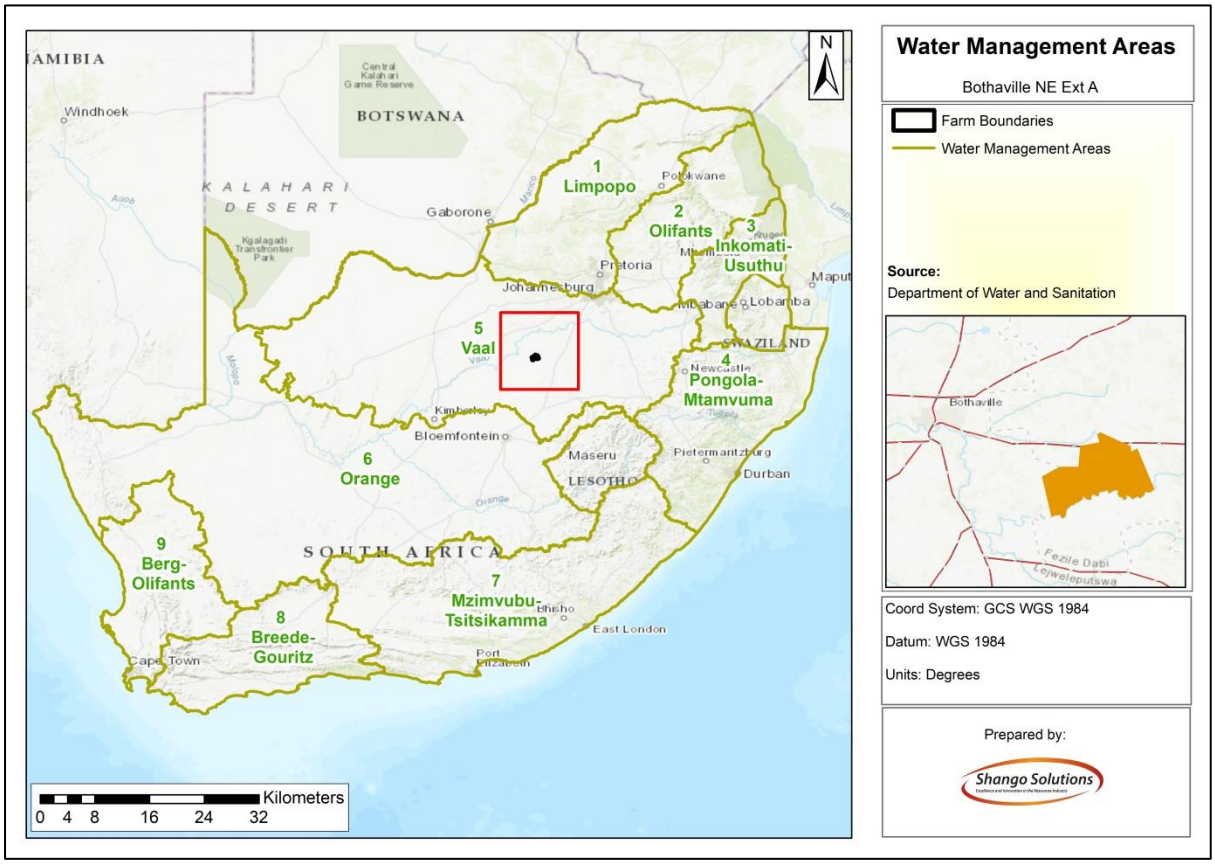

Figure 8: Water Management Areas of South Africa (refer to Appendix D for an enlarged map).

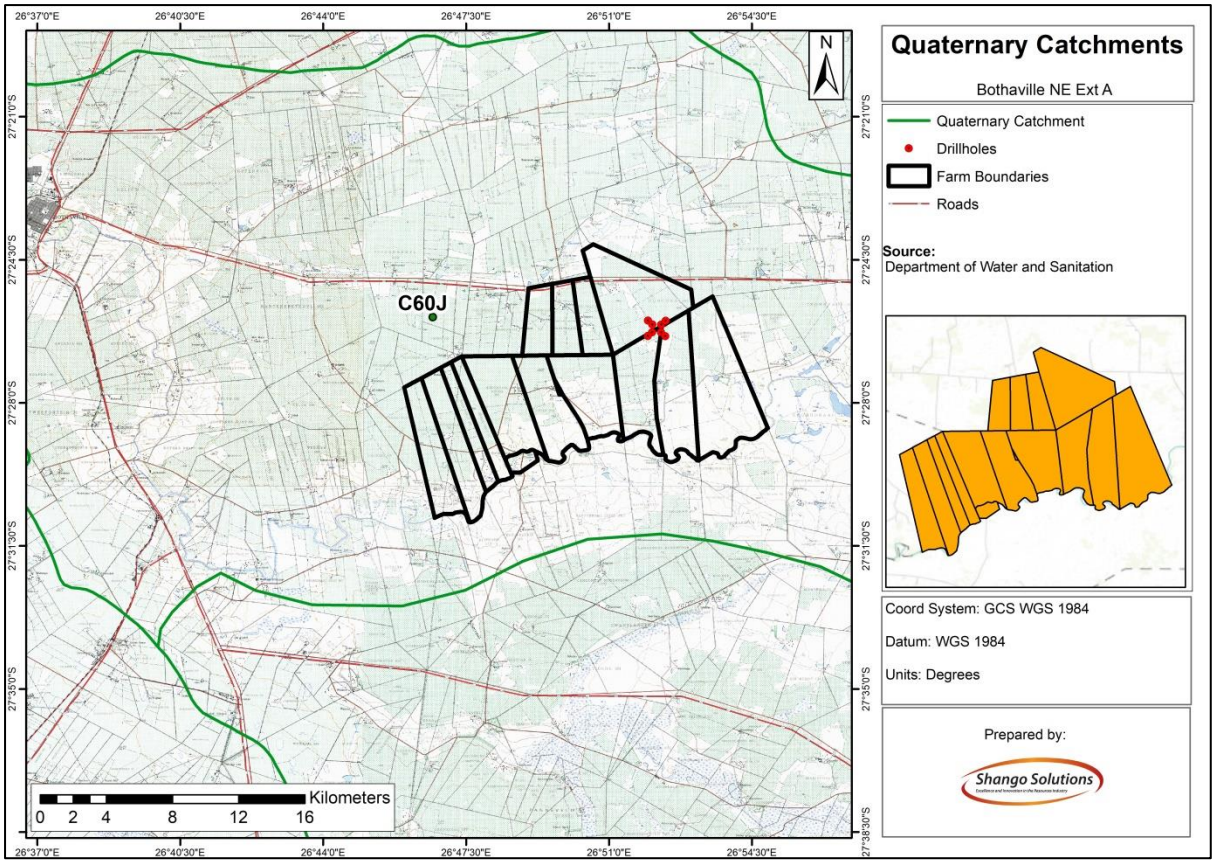

Figure 9: Quaternary catchment areas of the application area (refer to Appendix D for an enlarged map).

The water resources of the Vaal River system support major economic activities. The Vaal River system has extensive water resource infrastructure and is linked by substantial transfer systems to other water resource systems (Thukela, Usutu, Lesotho). There are also significant transfers out of the Vaal catchment through the distribution system of Rand Water to the Crocodile West and Marico catchments. System supply reaches most of Eskom's power stations and Sasol's plants on the eastern Highveld, the North West and Free State goldfields, the North West platinum and chrome mines, iron and manganese mines in the Northern Cape, the town of Kimberley, several small towns along the main course of the river, as well as several large irrigation schemes.

With particular reference to the project application area, the Vaal WMA is highly altered by catchment development with agriculture and mining being the main activities. Catchment development has led to deterioration in the water quality of the water resources, requiring that management interventions are sought to ensure that water of acceptable quality is available to all users in the system, especially as land use activities continue to grow and intensify. Salinisation and eutrophication of the water resources in the Vaal River system appear to be the two major water quality problems experienced. The main mining activities in the Vaal catchment are related to gold, uranium, coal and semi-precious stones. Running through the project area is the Vaal River (Figure 10).

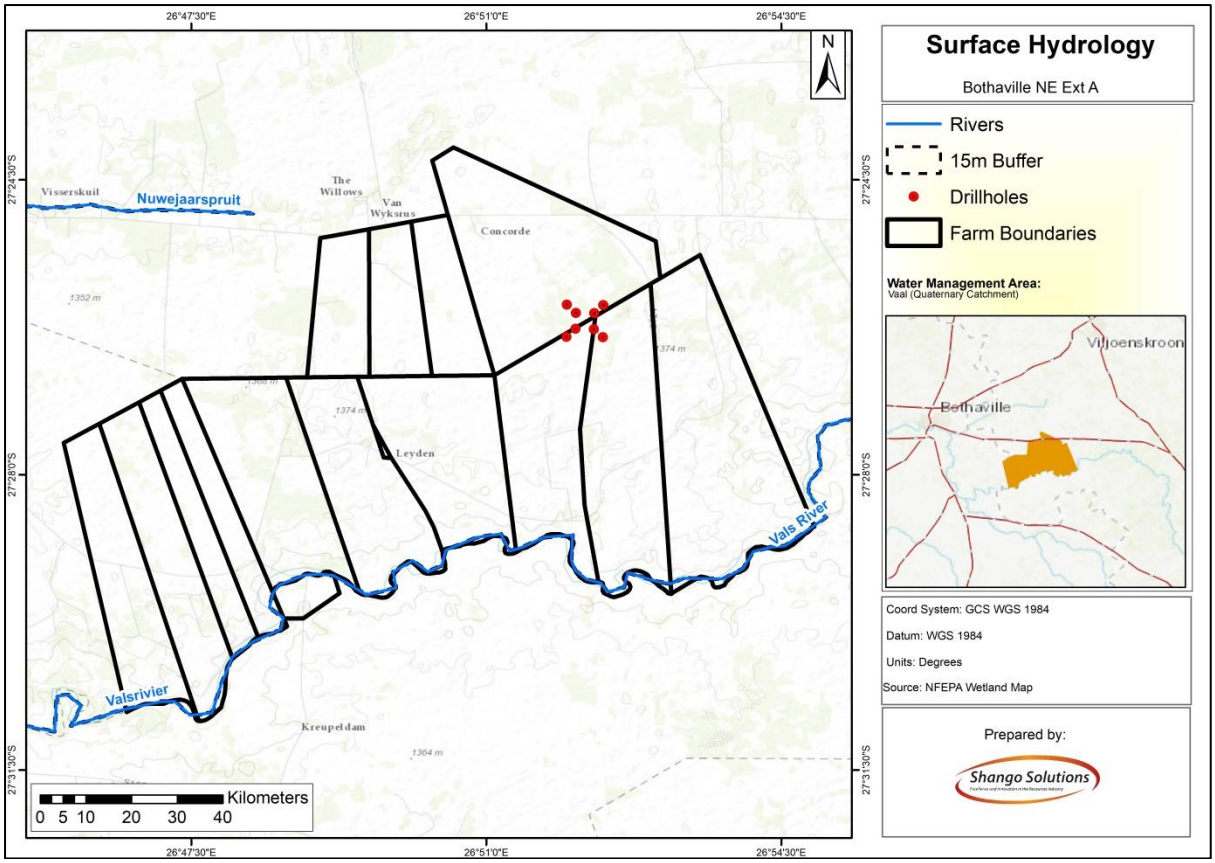

Figure 10: Map depicting the surface hydrology of the application area (refer to Appendix D for an enlarged map).

Freshwater Ecosystem Priority Area (NFEPA) Status

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al., 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act, 2005 (Act 10 of 2004) (NEMBA) biodiversity goals (Nel et al., 2011). The National Freshwater Ecosystem Priority Areas (NFEPA) (Nel et al., 2011) were used to determine the presence of NFEPA wetlands. A true Freshwater Ecosystem Priority Area (FEPA) river (Vals River) forms the border of the prospecting area in the south, while a non-FEPA river (Nuwejaarspruit) can be found just to the north of the prospecting area. No true FEPA wetlands are found within the prospecting area although a large number of non-FEPA wetlands can be found within the project area and a few can be found in close proximity to the proposed drillholes

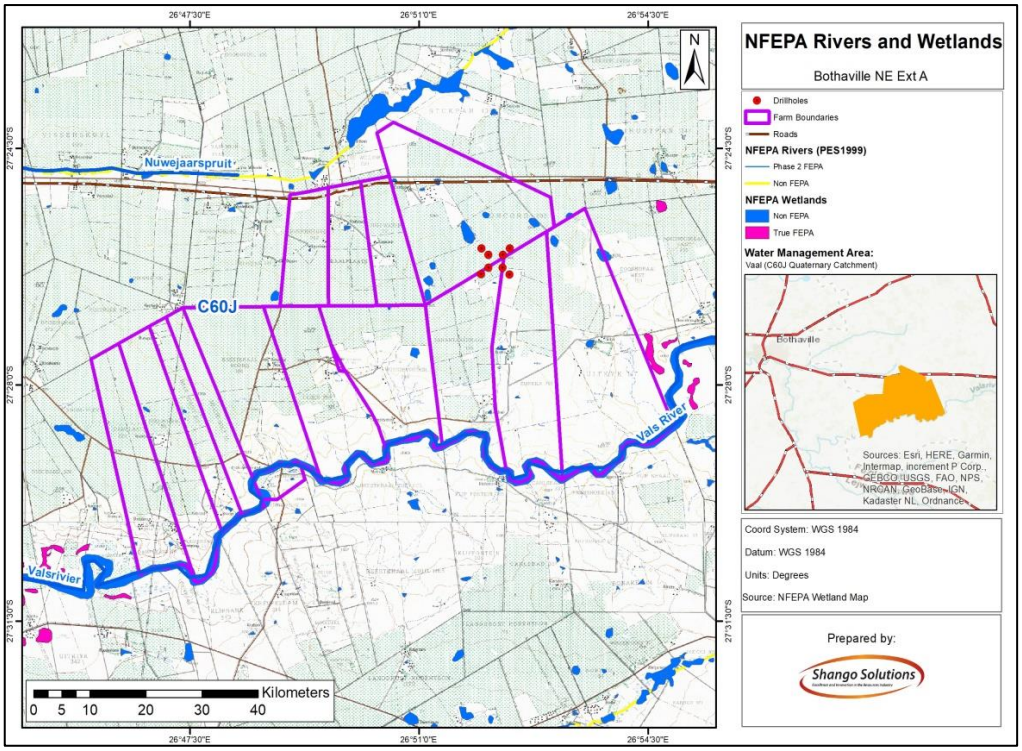

Figure 11: NFEPA wetlands identified within the project area (refer to Appendix D for an enlarged map).

8.1.6.2 Field Survey

Wetland Delineation and Description

The wetland areas were delineated in accordance with the DWAF (2005) guidelines. The extent of the delineated wetland areas is presented in Figure 12. The river present in the proposed application area is in a moderately modified ecological state (Class C).

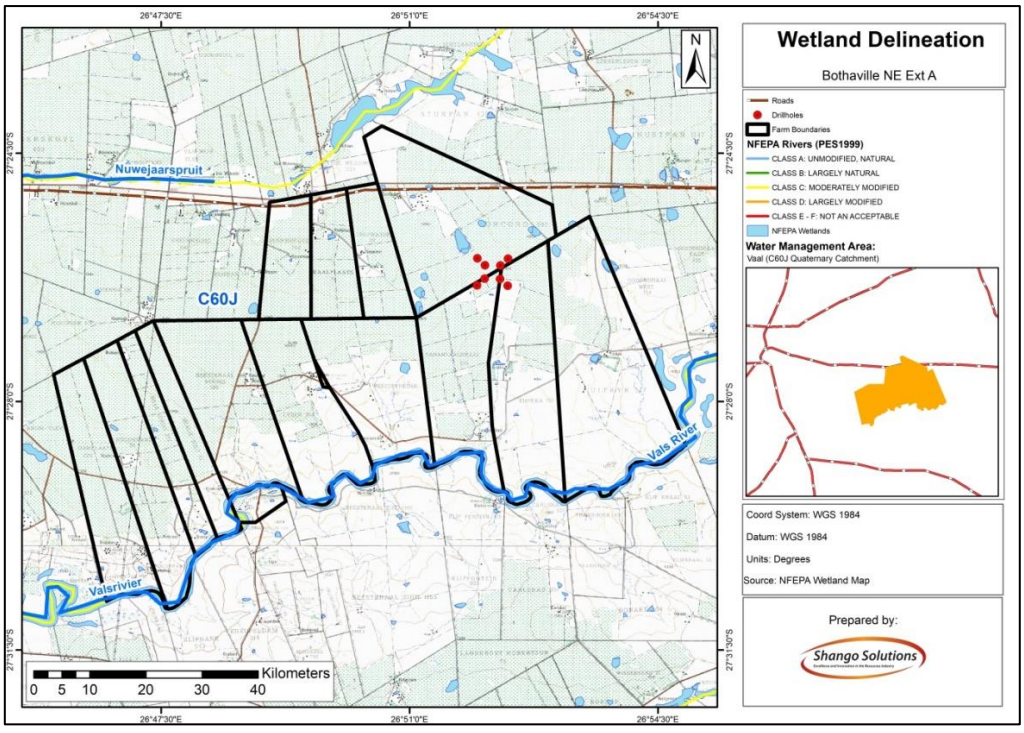

Figure 12: Delineation of wetlands within the application area (refer to Appendix D for an enlarged map).

During the field survey, four hydrogeomorphic (HGM) units were identified, of which three are depressions and one is a dam. The dam is regarded as an artificial system and no ecological assessments were completed for the system. Ecological assessments were only undertaken for the three depression systems, and they are referred to as HGM 1, HGM 2 and HGM 3 in Figure 13. These three depressions mainly collect water from runoff after high rainfall events and store water for extended periods due to the nature of the hydromorphic soils making up the area's soil profiles.

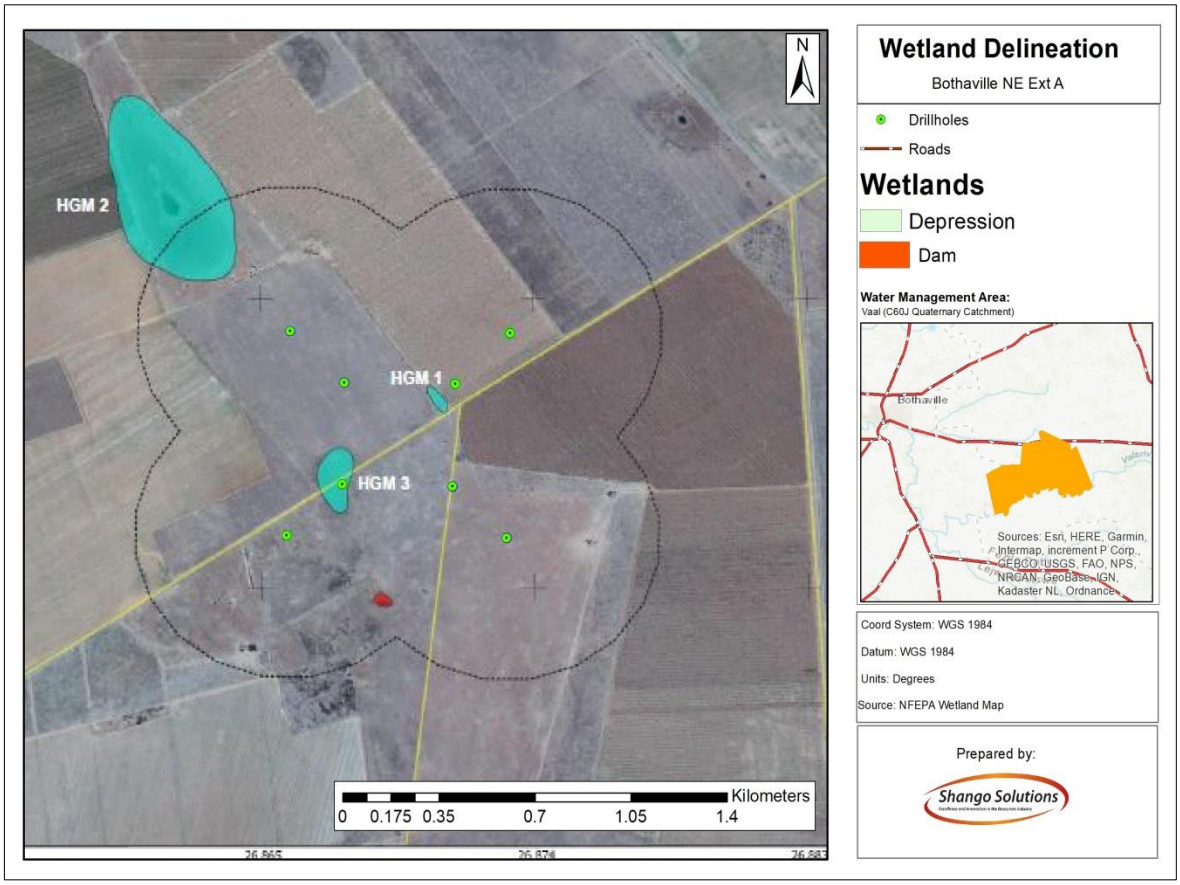

Figure 13: HGM units identified 500 m buffer around the proposed drillhole sites (refer to Appendix D for an enlarged map).

Wetland Unit Identification

The wetland classification as per SANBI guidelines (Ollis et al., 2013) is presented in Table 6. One wetland type, consisting of three HGM units was identified within the project assessment boundary, namely a depression.

Table 6: Wetland classification as per SANBI guideline (Ollis et al., 2013).

Wetland System	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	4A	4B	4C
HGM 1	Inland	Highveld	Dry Highveld Grassland Group 3	Bench	Depression	Endoheric	Without channelled inflow

Wetland Unit Setting

The depressions, as mentioned in Table 6, are situated on the “bench” landscape unit. Depressions are inward draining basins with an enclosing topography which allows for water to accumulate within the system. Depressions, in some cases, are also fed by lateral sub-surface flows in cases where the dominant geology allows for these types of flows.

Wetland Soils (Wetland Indicator)

A Sepane soil form has been identified within the depressions, which according to DWAF (2005) can be classified as a soil which indicates a terrestrial, temporary or seasonal wetland zone. This soil form consists of an Orthic A-horizon on top of a Pedocutanic B-horizon, which is underlain by a saprolite layer. The soil family group identified for the Swartland soil form on-site has been classified as the Gemvale (1121) soil family due to the non-calcareous nature of the soil profile as well as the fact that the top soil has not been leached (Figure 14). Additionally, this soil form is characterised by medium sized, rough grained peds and lacks red colours.

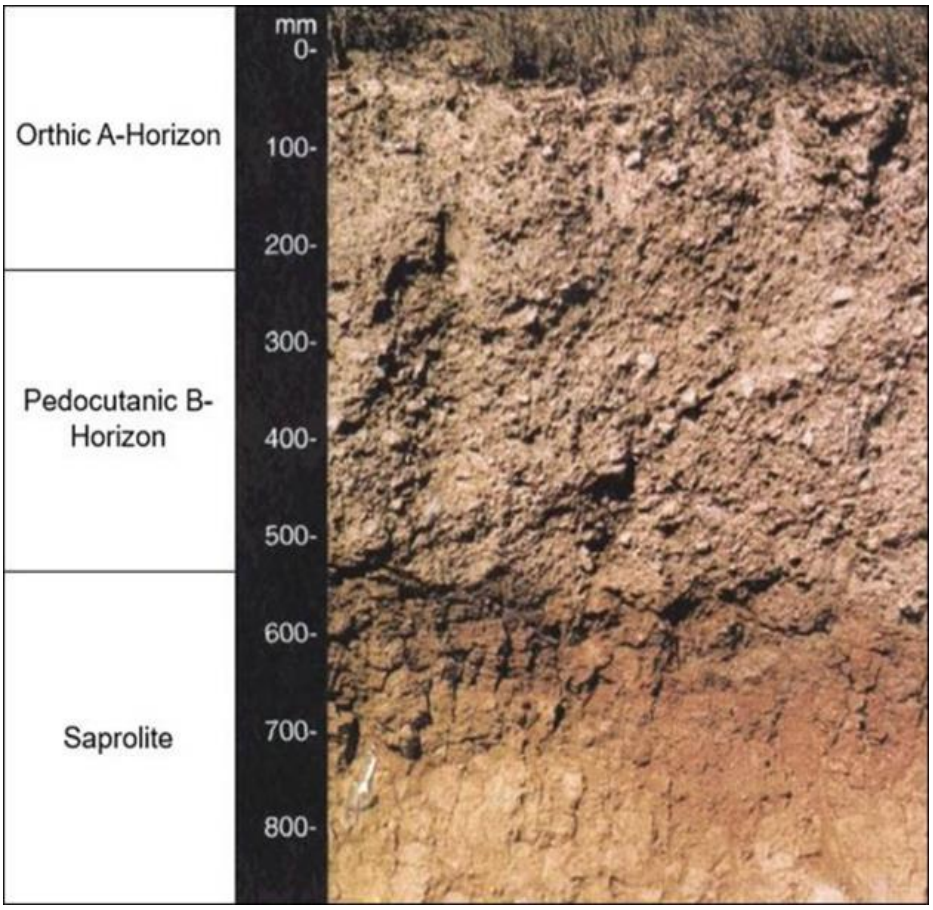

Figure 14: Example of a Swartland soil form (SASA, 1999).

Wetland Ecological Functional Assessment

The ecosystem services provided by the wetlands identified on-site was assessed and rated using the WET-EcoServices method (Kotze et al., 2008). The summarised results for HGM units are illustrated in

Table 7. The average ecosystem services score has been determined to be “Intermediate” for HGM 2. HGM 1 and HGM 3 both scored “Low” with regards to average ecosystem services. HGM 2 is recorded to be the “best” functioning system, the majority of the indirect services providing intermediate to moderately high levels of importance.

Table 7: The ecosystem services provided by the HGM units (source: The Biodiversity Company, 2019).

Wetland Unit					HGM 1	HGM 2	HGM 3
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		0.6	1.5	0.5
			Streamflow regulation		0.6	0.8	0.6
			Water Quality enhancement benefits	Sediment trapping	1.2	1.8	0.6
				Phosphate assimilation	1.2	2.3	1.0
				Nitrate assimilation	0.6	1.8	0.6
				Toxicant assimilation	0.7	1.9	0.6
				Erosion control	0.7	2.4	0.8
			Carbon storage		0.6	1.3	0.6
	Direct Benefits	Biodiversity maintenance			0.1	1.9	0.6
		Provision benefits	Provisioning of water for human use		0.0	0.0	0.3
			Provisioning of harvestable resources		0.1	0.0	0.0
			Provisioning of cultivated foods		0.1	0.0	0.0
		Cultural benefits	Cultural heritage		0.0	0.0	0.0
			Tourism and recreation		0.0	1.2	0.0
			Education and research		0.0	1.1	0.0
Overall					6.5	18.0	5.8
Average Eco Services Score					0.4	1.2	0.4

Ecological Health Assessment

Table 8 presents the Present Ecological Status (PES) for the assessed HGM units. The hydrology component for the units ranges from “Largely Natural” to “Large Modified”.

Table 8: Summary of the scores for the Wetland PES (source: The Biodiversity Company, 2019).

Wetland	Area (ha)	Hydrology		Geomorphology		Vegetation	
		Rating	Score	Rating	Score		
HGM 1	0.29	Largely Modified	5.2	Modretely Modified	3.5	Largely Modified	5.8
Overall PES Score		4.9		Overall PES Class		Largely Modified	
HGM 2	18.2	Largely Natural	1.3	Largely Natural	1.6	Largely Natural	1.6
Overall PES Score		1.5		Overall PES Class		Largely Natural	
HGM 3	1.91	Largely Modified	4.8	Modretely Modified	3.5	Largely Modified	5.5
Overall PES Score		4.6		Overall PES Class		Largely Modified	

The primary contributor to the impaired hydrology is mainly due to the extent of bare areas within the wetland’s catchment. The geomorphological component of these HGM units has been rated from “Largely Natural” to “Moderately Modified” with changes as a result of trampling caused by livestock and also changes in run-off characteristics. The vegetation component also ranges from “Largely Natural” to “Largely Modified” with impacts as a result of field encroachment into catchment areas, grazing of livestock and the establishment of alien vegetation within these systems. The overall PES for the HGM units has been determined to be “Largely Natural” for HGM 2 and “Largely Modified” for HGM 1 and HGM 3. Figure 15 illustrates vegetation within the HGM unit’s catchment.

Figure 15: Crop fields within the HGM unit's catchment (source: The Biodiversity Company, 2019).

Ecological Importance and Sensitivity (EIS)

The wetland EIS assessment was applied to the HGM units described in the previous section in order to assess the levels of sensitivity and ecological importance of the wetland. The results of the assessment are shown in Table 9.

Table 9: The EIS for the delineated HGM types (source: The Biodiversity Company, 2019).

Wetland Importance and Sensitivity	Importance		
	HGM 1	HGM 2	HGM 3
Ecological importance and sensitivity	**1.2**	**2.7**	**1.2**
Hydrological/functional importance	**0.8**	**1.7**	**0.7**
Direct human benefits	**0.1**	**0.3**	**0.1**

The Ecological Importance and Sensitivity has been scored "Moderate" for HGM 1 and HGM 3. A "High" EIS score was determined for HGM 2. The Hydrological/Functional Importance has been scored "Low" and "Moderate" for HGM1/HGM 3 and HGM 2, respectively. A "Low" direct human benefits score has been calculated for all three HGM units given the lack of provisioning functions provided by the systems.

Wetland Delineation and Buffer Zone

In accordance with the buffer zone guidelines for wetlands, rivers and estuaries (Macfarlane and Bredin, 2017) a minimum buffer width of 15 m and 10 m is recommended for prospecting. This is based on the assumption that there will be a commitment to rehabilitate and manage buffer zones to ensure that these areas function optimally. Additional mitigation measures would also typically need to be implemented to reduce some of the key threats that pose a risk to water resources.

The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane et al., 2014) was used to determine the appropriate buffer zone for the proposed activity. No wetland areas have been identified within the 500 m assessment boundaries by means of desktop studies. The threats calculated by means of the latter mentioned tool is illustrated in Table 10. None of the threats posed by the proposed invasive prospecting activity are expected to exceed "Low" significance, which has therefore ensured a conservative buffer of 15 m for the proposed exploration activities.

Table 10: Buffer determination - threats posed by the proposed exploration activities (source: The Biodiversity Company, 2019).

Threat Posed by the proposed land use / activity		Specialist Rating	Refined Class
Construction Phase	Alteration to surface run-off flow volumes	Very Low	Very Low
	Alteration of patterns of flows (increased flood peaks)	Very Low	Very Low
	Increase in sediment inputs and turbidity	Low	Low
	Increased nutrient inputs	Very Low	Very Low
	Inputs of toxic organic contaminants	Very Low	Very Low
	Inputs of toxic heavy metal contaminants	Low	Low
	Alteration of acidity (pH)	Very Low	Very Low
	Increased inputs of salts (salinisation)	N/A	N/A
	Change (elevation) of water temperature	Low	Low
	Pathogen inputs (i.e. disease-causing organisms)	Very Low	Very Low
Operational Phase	Alteration to flow volumes	Low	Low
	Alteration of patterns of flows (increased flood peaks)	Low	Low
	Increase in sediment inputs and turbidity	Low	Low
	Increased nutrient inputs	Very Low	Very Low
	Inputs of toxic organic contaminants	Low	Low
	Inputs of toxic heavy metal contaminants	Low	Low
	Alteration of acidity (pH)	Low	Low
	Increased inputs of salts (salinisation)	Low	Low
	Change (elevation) of water temperature	Low	Low
	Pathogen inputs (i.e. disease-causing organisms)	Very Low	Very Low

8.1.7 Biodiversity Assessment

The Biodiversity Assessment was undertaken by The Biodiversity Company. It was conducted on a desktop level and a field survey was undertaken during which the floral and faunal communities within the prospecting footprint and the overall application area were assessed.

The Biodiversity Assessment discusses the following components:

- Vegetation Assessment.
- Faunal Assessment.
- Critical Biodiversity Areas and Ecological Support Areas.
- Ecosystem Threat Status and Ecosystem Protection Level.
- The project area in relation to protected areas.

8.1.7.1 Desktop Assessment

Vegetation Assessment

The project area falls within the grassland biome (MP302) and is characterised as an area dominated by grasses and herbaceous vegetation of relatively short and simple structure (Mucina and Rutherford, 2006). There are three vegetation units naturally occurring in the area. These vegetation units are classified as Vaal Vet Sandy Grassland, Central Free State Grassland and Highveld Alluvial Vegetation (Figure 16). The eight proposed drill sites fall entirely within one vegetation type, namely Vaal Vet Sandy Grassland.

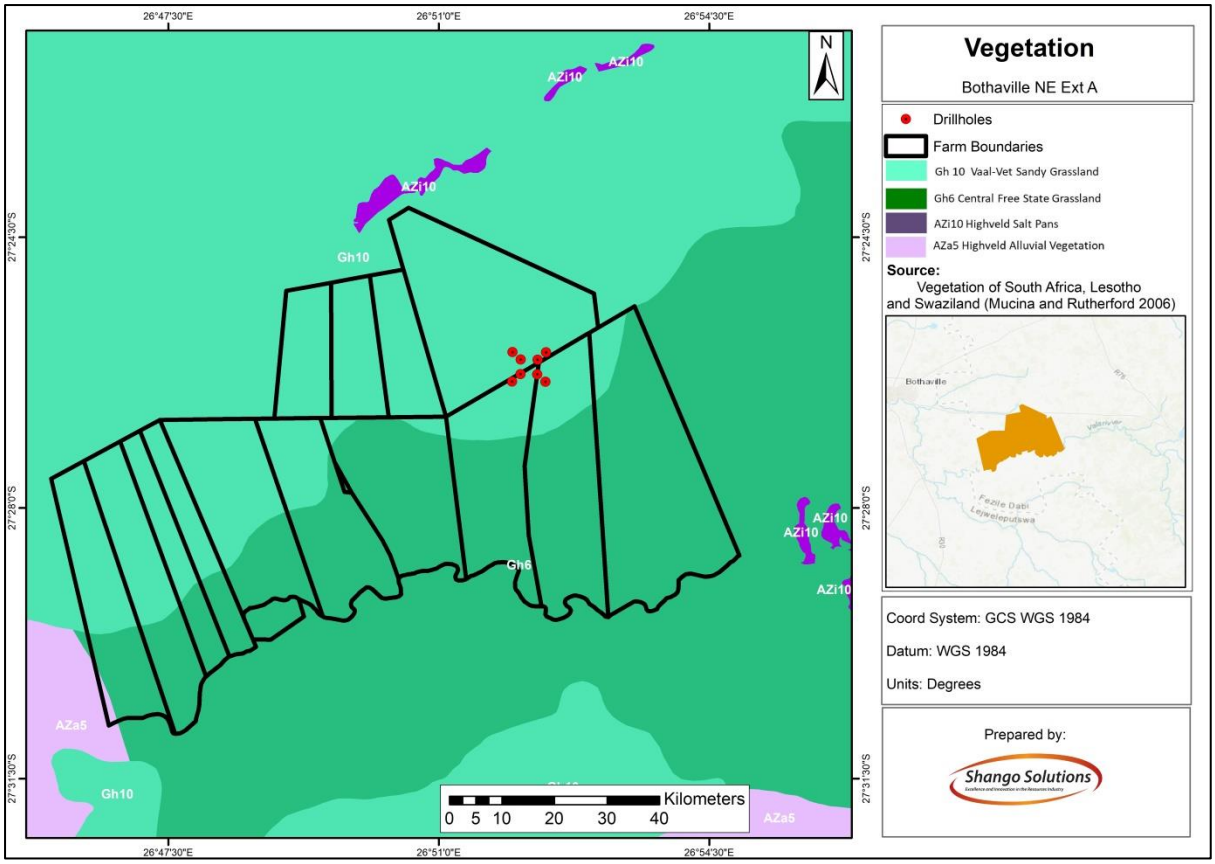

Figure 16:Vegetation types of the application area (refer to Appendix D for an enlarged map).

Central Free State Grassland (Gh 6)

The Central Free State Grassland is found in the Free State Province and marginally in the Gauteng Province at an altitude of 1 300-1 640 m above mean sea level. It occurs in a broad zone from around Sasolburg to Dewetsdorp and other large settlements, namely Kroonstad, Ventersburg, Steynsrus, Winburg, Lindley and Edenville, are also found within this vegetation unit.

The landscape is undulating plains with short grasslands which are dominated by *Themeda triandra* if it is in its natural condition ad conversely *Eragrostis curvuls* and *E. chloromelas* when it is degraded. Important Taxa include:

- Graminoids: *Aristida adscensionis (d), A. congesta (d), Cynodon dactylon (d), Erasgrostis chloromelas (d), E. curvula (d), E.plana (d), Panicum coloratum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus koeleriodes (d), Agrostis lachnantha, Andropogon appendiculatus, Aristida biparita, A. canescens, Cymbopogon pospischilii, Cynodon transvaalensis, Digitaria argyrograpta, Elionurus muticus, Eragrostis lehmanniana, E. micrantha, E. obtuse, E. racemosa, E. trichophora, Heteropogon contortus, Microchloa caffra, Setariaincrassata, Sporobolus discosporus.*
- Herbs: *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteo-album*, *Salvia stenophylla*, *Selago densiflora*, *Sonchus dregeanus*.
- Geophytic herbs: *Oxalis depressa*, *Raphionacme dyeri*.
- Succulent herb: *Tripteris aghillana* var. *integrifolia*.

- Low shrubs: *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Melolobium candicans*, *Pentzia globosa*.

According to Mucina and Rutherford (2006), the national target for conservation protection for this vegetation type is 24%, but only small portions enjoy statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves). About 25% of the area has been transformed for agriculture and the construction of dams. Alien flora is not problematic besides in the degraded southern parts of the vegetation unit where the encroachment of dwarf karoo shrubs is present.

Vaal-Vet Sandy Grassland (Gh 10)

Vaal-Vet Sandy Grassland is found in the North West and Free State Provinces at an altitude of 1 260 – 1 360 m above mean sea level. It occurs south of Litchenburg and Ventersdorp and stretches southwards towards Klerksdorp, Leeudoringstad, Bothaville and to the north towards Brandfort.

The landscape is plains-dominated with irregular, undulating plains with mainly low–tussock grasslands with an abundant karroid element. A characteristic feature of this vegetation unit is the dominance of *Themeda triandra*.

Important taxa include:

- Graminoids: *Anthephora pubescens (d), Aristida congesta, Chloris virgata (d), Cymbopogon caesius (d), Cynodon dactylon (d), Digitaria argyrograpta, Elionurus muticus, Eragrostis chloromelas (d), E. lehmanniana (d), E. plana (d), E. tichophora (d), Heteropogon contortus (d), Panicum gilvum (d), Setaria Sphacelata (d), Themeda triandra (d), Targus berteronianus (d), Brachiaria serrata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, E. obtusa, E. superba, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides.*
- Herbs: *Stachys spathulata (d), Barleria macrostegia, Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Geigeria aspera* var. *aspera, Helichrysum caespititium, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Rhynchosia adenodes, Selago densiflora, Vernonia oligocephala.*
- Geophytic Herbs: *Bulbine narcissifolia, Ledebouria marginata.*
- Succulent Herbs: *Tripteris aghillana* var*. integrifolia*

According to Mucina and Rutherford (2006), the national target for conservation protection for this vegetation type is 24%, but only 0.3% enjoys statutory conservation (Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves). More than 63% of the area has been transformed for cultivation and the remaining area is under pressure from grazing by sheep and cattle

Highveld Alluvial Vegetation (AZa5)

Highveld Alluvial Vegetation type is distributed in the Free State, North-West, Mpumalanga and Gauteng provinces. This vegetation type typically comprises of flat topography accommodating *Acacia karroo* dominated riparian thickets accompanied by seasonally flooded grasslands and disturbed herblands (Mucina and Rutherford, 2006).

Important taxa include:

Riparian thickets

- Small Trees: *Acacia karroo (d), Salix mucronata subsp. mucronata (d), S. mucronata subsp. woodii (d, within subescarpment grasslands of KwaZulu-Natal), Ziziphus mucronata (d), Celtis africana, Rhus lancea.*

- Tall Shrubs*: Gymnosporia buxifolia (d), Rhus pyroides (d), Diospyros lycioides, Ehretia rigida, Grewia flava.*
- Low Shrubs: *Asparagus laricinus (d), A. suaveolens (d).*
- Woody Climber: *Clematis brachiata.*
- Succulent Shrubs: *Lycium hirsutum (d).*
- Graminoids: *Setaria* verticillata (d), *Panicum maximum*.
- Herb: *Pollichia campestri.*

Reed beds

- Megagraminoid: *Phragmites australis* (d).

Flooded grasslands & herblands

- Low Shrubs: *Gomphocarpus fruticosus* (d), *Felicia muricata*.
- Succulent Shrub: *Salsola rabieana. Graminoids: Agrostis lachnantha (d), Andropogon eucomus (d), Chloris virgata (d), Cynodon dactylon (d), Eragrostis plana (d), Hemarthria altissima (d), Imperata cylindrica (d), Ischaemum fasciculatum (d), Miscanthus junceus (d), Paspalum distichum (d), Andropogon appendiculatus, Brachiaria marlothii, Cyperus denudatus, C. longus, Echinochloa holubii, Eragrostis obtusa, E. porosa, Fimbristylis ferruginea, Panicum coloratum, Pycreus mundii, Sporobolus africanus, S. fimbriatus, Themeda triandra, Urochloa panicoides.*
- *Herbs: Persicaria lapathifolia (d), Alternanthera sessilis, Barleria macrostegia, Corchorus asplenifolius, Equisetum ramosissimum, Galium capense, Hibiscus pusillus, Lobelia angolensis, Nidorella resedifolia, Persicaria amphibia, P. hystricula, Pseudognaphalium oligandrum, Pulicaria scabra, Rorippa fluviatilis var. fluviatilis, Senecio inornatus, Stachys hyssopoides, Vahlia capensis.*
- Geophytic Herbs: *Crinum bulbispermum, Haplocarpha lyrata.*

Open water

- Aquatic Herb: *Myriophyllum spicatum*.

According to Mucina and Rutherford (2006), the national target for conservation protection for this vegetation type is 31%, but only 10% enjoys statutory conservation (Barberspan (a Ramsar site), Bloemhof Dam, Christiana, Faan Meintjes, Sandveld, Schoonspruit, Soetdoring and Wolwespruit Nature Reserves). More than 25% of the area has been transformed for cultivation and the building of dams. Alien flora has been observed in the vegetation of the Highveld Alluvial.

Plant Species of Conservation Concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 198 plant species are expected to occur in the application area. Of the 198 plant species, none is listed as being a Species of Conservation Concern (SCC).

Faunal Assessment

The desktop component of the Faunal Assessment included the compilation of a list of expected species and identified species as well as the identification of any Red Data or SCC present or potentially occurring in the area. Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.

Table 11 summarises the diversity of fauna that is expected to occur in the application area.

Table 11: Animals groups considered for this study along with the total species possibly occurring in or near the application area and how many of these species are SCC.

Animal Group	Total Species	Species of Conservation Concern
Avifauna	176	2
Mammals	73	10
Reptiles	28	0
Amphibians	14	1

Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 176 bird species are expected to occur in the vicinity of the application area. Of the expected bird species, two (2) species are listed as SCC either on a regional scale or international scale. These are listed as Near Threatened (NT) on a regional basis.

Important Bird Areas

Important Bird Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Area, sites that contribute significantly to the global persistence of biodiversity (BirdLife, 2017).

According to BirdLife International (2017), the selection of Important Bird and Biodiversity Areas (IBAs) is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels.

No IBAs occur within the proximity of the proposed application area. The nearest IBA to the project area is the Sandveld and Bloemhof Dam Nature Reserve which is situated approximately 61 km west of the application area.

Mammals

The IUCN Red List Spatial Data (IUCN, 2017) lists seventy-three (73) mammal species that could be expected to occur within the vicinity of the application area. Of these species, eight (8) are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros), in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. Of the remaining sixty-five (65) small to medium sized mammal species, ten (10) are listed as being of conservation concern on a regional or global basis. The list of potential species includes:

- One (1) is listed as Least Concern (LC) on a regional basis.
- Four (4) that are listed as Vulnerable (VU) on a regional basis.
- Five (5) that are listed as Near Threatened (NT) on a regional scale.

Reptiles

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) twenty-eight (28) reptile species are expected to occur in the application area. No reptile species of conservation concern is expected to be present in the application area.

Amphibians

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017) fourteen (14) amphibian species are expected to occur in the application area.

One (1) amphibian species of conservation concern could be present in the application area, namely the Giant Bull Frog (*Pyxicephalus adspersus*). The Giant Bull Frog is listed as near threatened on a regional scale.

8.1.7.2 Field Survey

The application area was ground-truthed on foot, which included spot checks in pre-selected areas to validate desktop data.

Vegetation Assessment

The vegetation assessment was conducted throughout the extent of the project prospecting footprint. A total of forty (40) shrub and herbaceous plant species were recorded in the application area during the field assessment. The plant species recorded were observed while accessing the eight proposed drill sites (Figure 17). Two of the eight bore holes were placed in agricultural fields that consisted of either Maize or Sunflower and did not contain any natural vegetation. The other six remaining bore holes were places in areas regarded as secondary grassland which have been disturbed due to continues grazing by cattle.

Figure 17: Some of the flora species observed in the project area (source: The Biodiversity Company, 2019).

Alien and Invasive Plants

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of these systems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

Three (3) Category 1b invasive plant species were recorded within the project area and must therefore be removed by implementing an alien invasive plant management programme in compliance of section 75 of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA).

Below is a brief description of Category 1b invasive species in terms of the NEMBA, 2004 (Act 10 of 2004):

- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

Faunal Assessment

The field survey component of this study utilised a variety of sampling techniques including, but not limited to, visual observations, camera trapping, identification of tracks and signs as well as utilisation of local knowledge and results from previous assessments carried out within the project area. Table 12 summarises the diversity of fauna that was observed in the application area during the field survey.

Table 12: Groups identified in the application area during the field survey.

Animal Group	Total Species	Species of Conservation Concern
Avifauna	24	0
Mammals	7	0
Reptiles	0	0
Amphibians	0	0

Avifauna

Twenty-four (24) bird species were recorded in the application area during the field survey based on either direct observations, vocalisations, or the presence of visual tracks and signs (Figure 18). No SCC were observed, as the habitat is favourable and the likelihood of finding SCC is still rated as high.

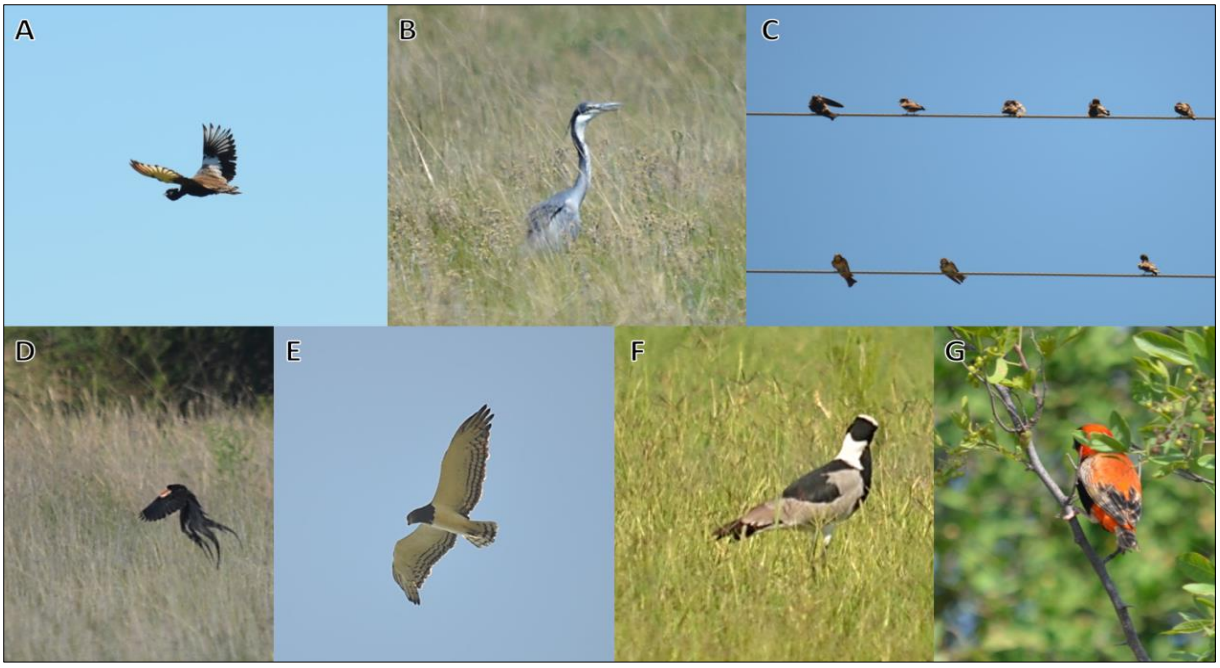

Figure 18: Some of the avifauna found in the project area (source: The Biodiversity Company, 2019).

Mammals

Overall, mammal diversity in the project area was moderate, with seven (7) mammal species being recorded on-site (Figure 19). One (1) SCC was observed in the project area, but due to the habitat type it is very likely that other SCC's could occur here as well.

Figure 19: Some of the mammal species found in the project area (source: The Biodiversity Company, 2019).

Herpetofauna (Reptiles and Amphibians)

Herpetofauna diversity is considered to be low with no reptile species nor amphibian species being observed or recorded in the project area during the field survey. It is likely that the species are absent due to the disturbed nature of the area and the large amount of agriculture that is taking place in the areas surrounding the prospecting drillholes.

8.1.7.3 The Mining and Biodiversity Guidelines

The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to "foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector. In identifying biodiversity priority areas which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:

- Legally protected areas, where mining is prohibited.
- Areas of highest biodiversity importance, which are at the highest risk for mining.
- Areas of high biodiversity importance, which are at a high risk for mining.
- Areas of moderate biodiversity importance, which are at a moderate risk for mining.

According to the guidelines, the project area is not classed as being of significant biodiversity importance and does not represent a risk to mining.

8.1.7.4 Critical Biodiversity Areas

A Critical Biodiversity Area (CBA) is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems (SANBI, 2017). A CBA represents the best choice for achieving biodiversity targets. Ecological Support Areas (ESAs) are not essential for achieving targets, but they play a vital role in the continued functioning of ecosystems and often are essential for proper functioning of adjacent CBAs.

Two of the proposed drillholes are situated in areas which are classified as CBA whilst six are in areas classified as ESA 2 (Figure 20). This area has been extensively altered from its natural condition, mostly due to agricultural transformation of the landscape.

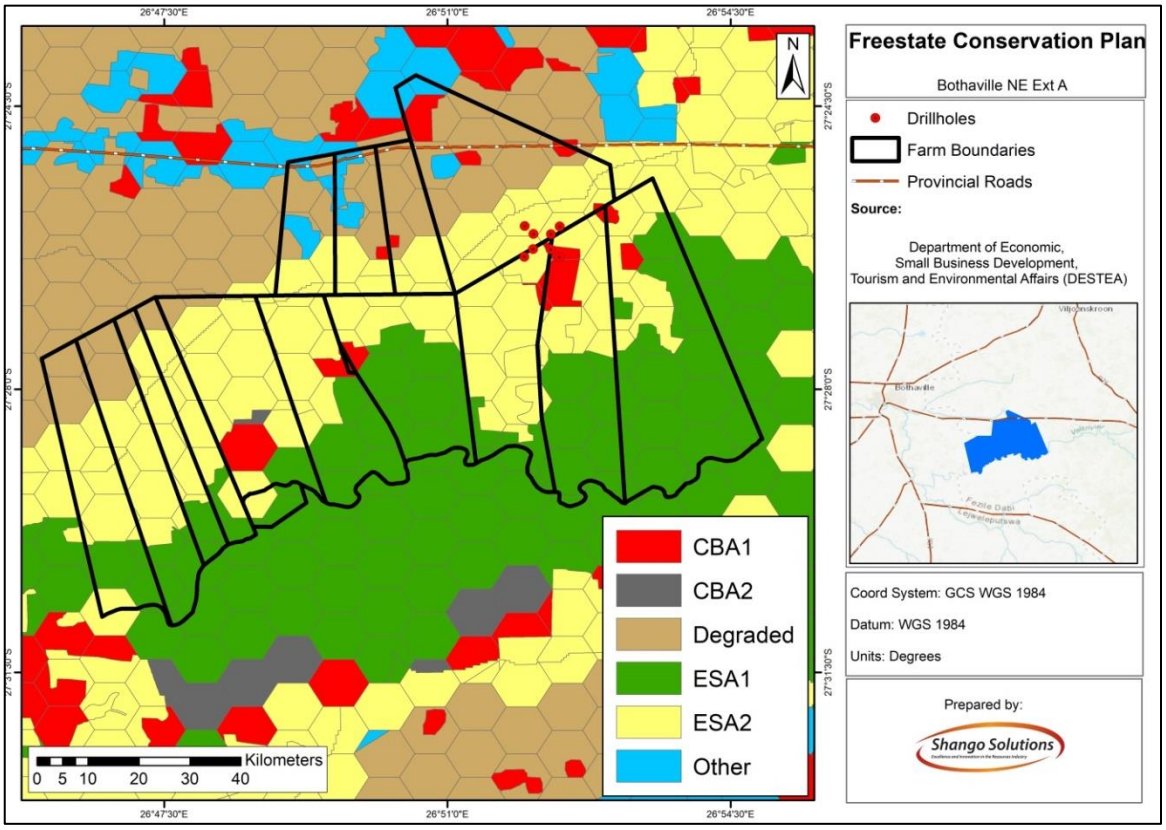

Figure 20: Critical Biodiversity Areas and Ecological Support Areas within the application area (refer to Appendix D for an enlarged map).

8.1.7.5 Ecosystem Threat Status

The ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver et al., 2011). Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Driver et al., 2011).

The proposed application area was superimposed on the terrestrial ecosystem threat status. As seen in Figure 21, the application area falls entirely within two ecosystems, which are listed as *Endangered* (EN) *and Least Threatened* (LT).

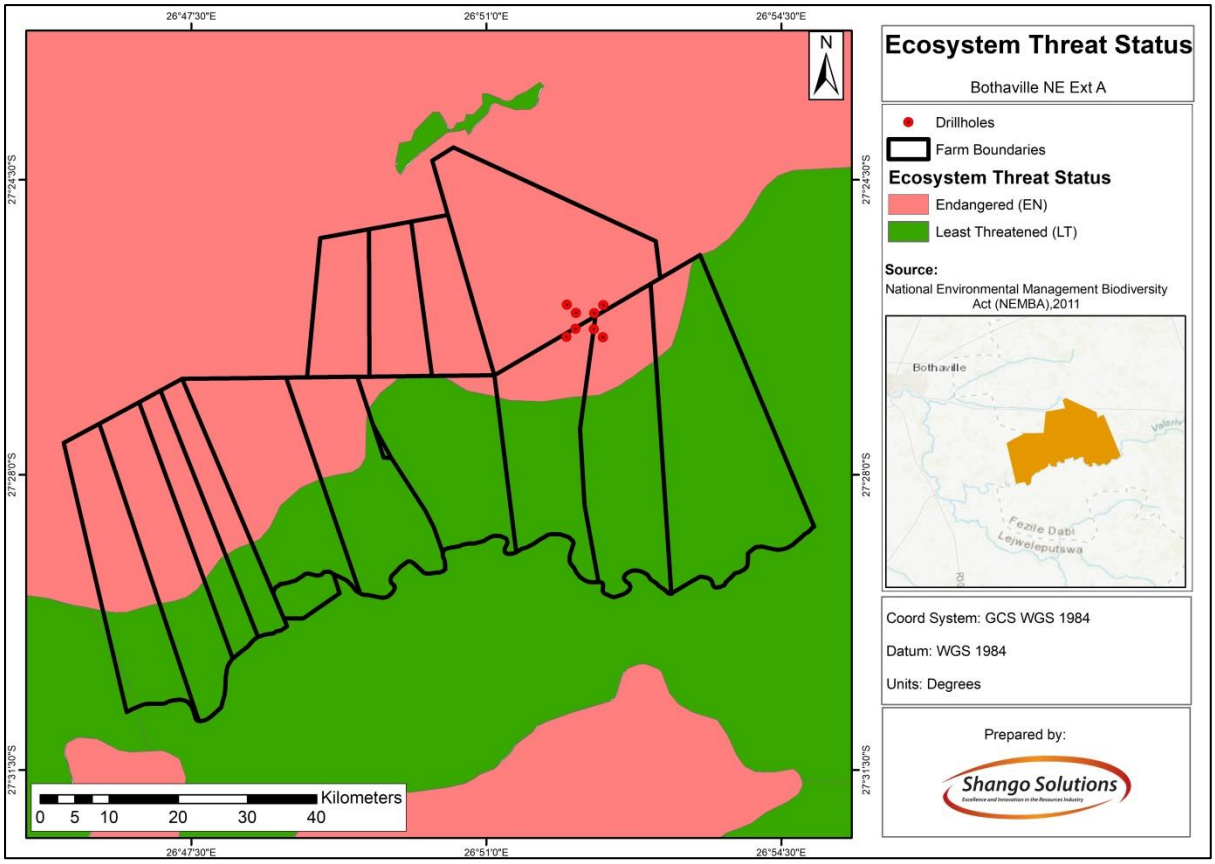

Figure 21: The application area showing the ecosystem threat status of the associated terrestrial ecosystems (refer to Appendix D for an enlarged map).

8.1.7.6 Ecosystem Protection Level

Ecosystem protection levels indicate whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003) (Driver et al., 2011).

The application area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development footprint (Figure 22). Based on Figure 22, the terrestrial ecosystems associated with the proposed application area are rated as not protected and poorly protected. This means that this ecosystem type (and associated habitats) are not well protected or are poorly protected anywhere in the country (such as in nationally protected areas).

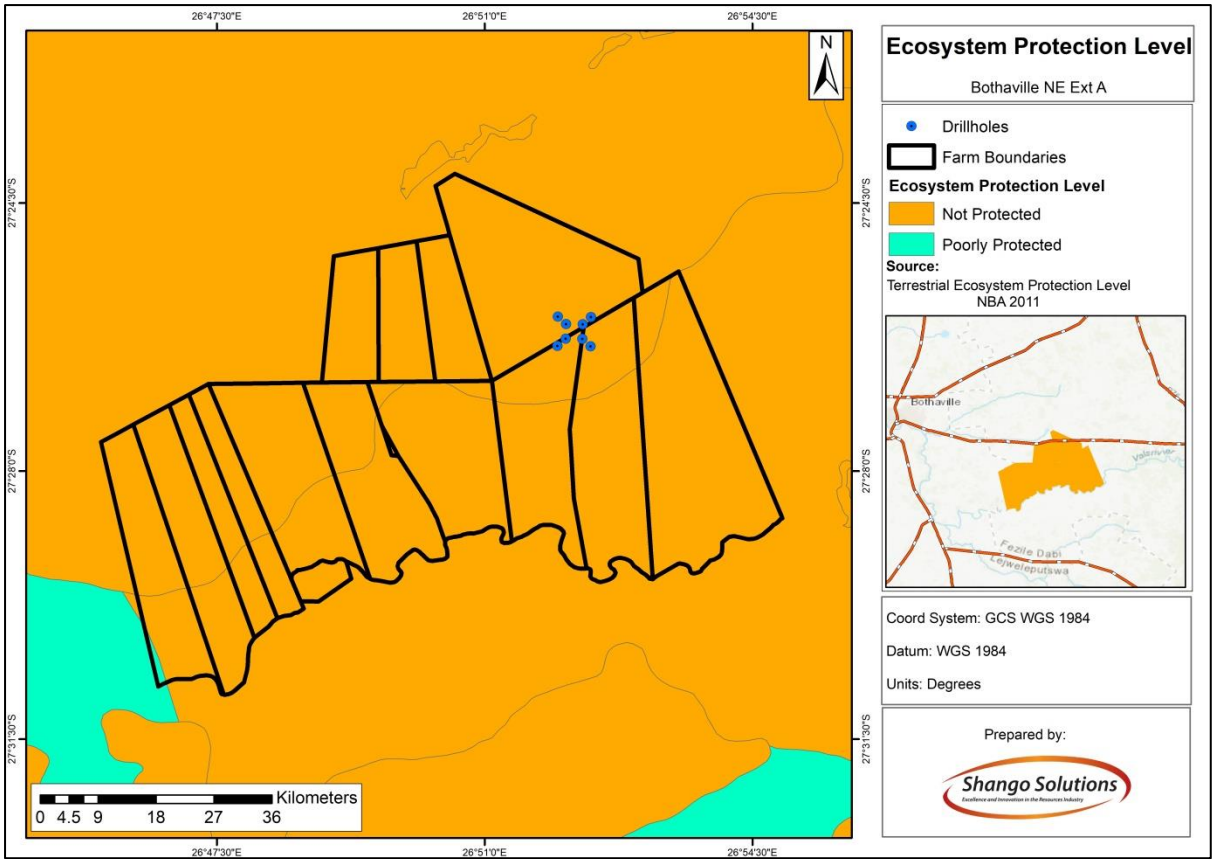

Figure 22: The project area showing the level of protection of terrestrial ecosystems (refer to Appendix D for an enlarged map).

8.1.7.7 Project Area in Relation to Protected Areas

Formally protected areas refer to areas protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map and the National Protected Areas Expansion Strategy (NPAES), the application area does not overlap with, nor will it impact upon, any formally protected areas.

8.1.8 Heritage and Cultural Assessment

A Heritage Impact Assessment was undertaken over the application area (Appendix F). The study was conducted on a desktop level and a field survey was undertaken in order to identify archaeological sites, burial grounds and built environment features within the area proposed for the eight drillholes and within the 500 m assessment boundary. The survey was conducted on foot and a vehicle was utilised to access the site.

According to the literature review compiled for the Heritage Impact Assessment report (NGT Holdings, 2019), archaeology is divided into three periods, namely the Stone Age, the Iron Age and the Historical Period. It is during these periods that diverse groups of people settled on the southern African landscape.

The Stone Age is divided into three periods, namely the Early Stone Age (ESA) (2 million to 300 000 years ago), the Middle Stone Age (MSA) (300 000 – 40 000 years ago) and the Later Stone Age (LSA) (40 000 to 2 000 years ago).The ESA comprises the Oldowan stone tool complex (2 - 1.5 million years ago), and the Acheulean stone tool complex (1.5 million - 300 000 years ago) (Klein, 2000). The Oldowan industry is characterised by flakes produced from pebbles, cobbles and percussive tools (Klein 2000; Roche et al., 2009). The Acheulean industry is characterised by large hand axes, cleavers and other bifacial tools (Klein 2000). ESA stones tools and faunal material have been found in the Vaal River, situated approximately 26 km northwest from the project area (van Schalkwyk 2003).

The Iron Age can be divided into the Early Iron Age (EIA) (AD 200 – 900), the Middle Iron Age (MIA) (AD 900 – 1 300) and the Late Iron Age (LIA) (AD 1300 – 1840). The Iron Age is characterised by farming communities who domesticated animals, produced various ceramic vessels, smelted iron for weapons and manufactured tools. Several Iron Age stone wall settlements have been found in the Kroonstad region.

The Historical Period dates from AD 1600 and it is generally the period related to colonial settlement in South Africa. During the 1820's and 1830's, the *Mfeqane* conflict and expansion of the Voortrekkers caused instability in South Africa. The conflict mainly came about due to environmental changes that caused drought in southern Africa, thus arable land was scarce, which in turn caused competition for land and invasions were on the rise (Eldredge. 1987). In the highveld region, the *Mfeqane* conflict was escalated by Mzilikazi. At about 1827, Mzilikazi migrated north-wards from Natal settling in the interior of South Africa. Mzilikazi invaded parts of the interior of South Africa capturing, killing and driving away the Sotho-Tswana groups. Consequently, expanding his territory in the Highveld region (Okihiro 1973). At the same time, in the 1830s, the Voortrekkers were migrating northwards from the Cape Colony due to dissatisfaction with the British rule (Eldredge 1987). The migration of the Voortrekkers is known as the Great Trek.

The proposed application area is situated in a region rich in archaeology, history and heritage in terms of the Iron Age and Historic Period.

8.1.8.1 Heritage Study

The field survey was undertaken in the areas proposed for the eight proposed drillhole locations situated on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1). It was established that the drilllholes are situated in a grassland area which is dominated by agricultural activities. No archaeological resources and burial grounds or graves were identified at the proposed drillholes sites, nor the 500 m zone of influence surrounding the drillhole locations.

The areas for the proposed drilling activities are largely utilised for agricultural activities, including the growing of corn and cattle grazing (Figure 23 to 30). As such, the eight proposed drillhole sites are highly disturbed.

Figure 23: General view of drillhole CD01 situated on the farm Concord 392 (source: NGT Holdings, 2018).

Figure 24: General view of drillhole CD02 situated on the farm Concord 392 (source: NGT Holdings, 2019).

Figure 25: General view of drillhole CD03 situated on the farm Eureka 761 (source: NGT Holdings, 2019).

Figure 26: General view of drillhole CD04 situated on the farm Eureka 761 (source: NGT Holdings, 2019)

Figure 27: General view of drillhole CD05 situated on the farm Tarantaaldraai 156 (source: NGT Holdings, 2019).

Figure 28: General view of drillhole CD06 situated on the farm Tarantaaldraai 156 (source: NGT Holdings, 2019).

Figure 29: General view of drillhole CD07 situated on the farm Concord 392 (source: NGT Holdings, 2019).

Figure 30: General view of drillhole CD08 situated on the farm Concord 392 (source: NGT Holdings, 2019).

8.1.9 Heritage Sensitivity

No archaeological resources and burial grounds or graves were identified at the proposed drillholes sites, nor the 500 m zone of influence surrounding the drillhole locations. The area is of low heritage significance and have no heritage value.

8.1.10 Palaeontological Impact Assessment

In this north-western part of the Karoo Basin, the Ecca Group comprises two formations, the lower one being the Vryheid Formation and the upper the Volksrust Formation. Fossil plants are common in the former but rare from latter formation. Fossil vertebrates are extremely rare from this time period as very few had evolved. Coals and impression fossils of the *Glossopteris* flora are abundant in some parts of the Vryheid Formation and include *Glossopteris* leaves, roots, fructifications, sphenophytes, lycopds and ferns and silicified wood (Plumstead, 1969, Anderson and Anderson, 1985 and Bamford, 2004).

The Volksrust Formation is predominantly argillaceous (clay) and represents a transgressive open shelf sequence composed mostly of muds deposited from suspension. There is evidence that the upper and lower layers of the Volksrust Formation were deposited in lacustrine, to lagoonal and shallow coastal embayment settings. In contrast, the older Vryheid Formation has a patchy but significant fossil record with a variety of plant impressions from the *Glossopteris* flora.

Quaternary sands do not preserve fossils as they are too friable, often mobile and oxidized by more drying out of the global climate and so form calcretes. In exceptional circumstances fossils and archaeological material can be preserved in and around pans, but no pans occur in this site.

Jurassic dolerite dykes are common in the region as a whole but do not contain fossils as these would have been badly affected or destroyed by the intruding volcanic material.

According to the palaeosensitivity map developed by the South African Heritage Resources Agency (SAHRA), the proposed drill sites are situated in an area classified as moderately sensitive (Figure 31). The area is covered by Quaternary sands which are not fossiliferous, nor are the underlying ancient Witwatersrand Basin mineral rich deposits. Volksrust Formation shales in most cases are not fossiliferous The Vryheid Formation can potentially preserve fossils but for most of the area to be drilled, is underlain by the Kalahari sands and would not be visible until drilling or trenching begins. Currently the area is farmland and outcrops are not evident from the Google Earth map. Since there does not appear to be pans in the Kalahari sands, no fossils are likely to occur.

Notice of the proposed Prospecting Right Application has been uploaded onto the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS).

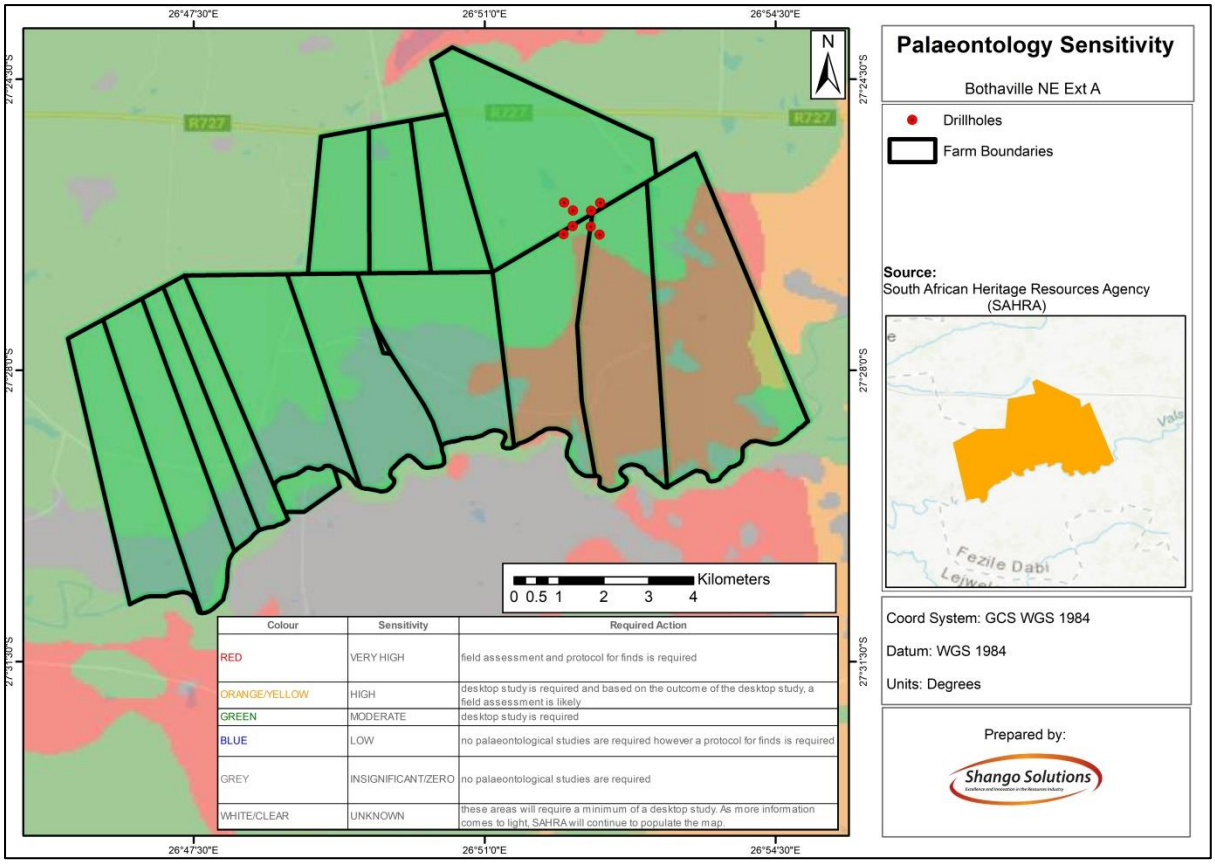

Figure 31: Map depicting the sensitivity of the underlying geology in relation to the occurrence of fossils (refer to Appendix D for an enlarged map).

8.2 Environmental Aspects Which May Require Protection and/or Remediation

Environmental aspects, both within the application and surrounding area, which may require protection or remediation, are listed in Table 13. The identified aspects are based on the information contained in the description of the baseline receiving environment as well as the impact assessment. These environmental aspects have been included in the action plan and technical management measures contained in this report.

Table 13: List of potential impacts per activity.

Aspect	Feature
Groundwater	Groundwater resources
	Groundwater quality and quantity
Surface Water	Surface water resources
	Surface water quality and quantity
	Wetlands and pans
Flora	Primary vegetation units Species of concern
Fauna	Species of concern
Air Quality	Ambient air quality
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity
Soil, Land Use and Land Capability	Stockpiled soils
	Soils of moderate to high agricultural potential
	Livestock grazing
	Cultivation
	Homesteads
	Agricultural potential
	Grazing potential

Aspect	Feature
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment
Heritage and Cultural	Heritage resources (cemeteries, graves, structures older than 60 years)
	Palaeontological features
Noise	Ambient noise levels
Socio-Economic	Livelihoods
	Employment

8.3 Description of Specific Environmental Features and Infrastructure On-Site

Specific environmental features and infrastructure on-site include rivers, wetlands, houses, homesteads, secondary tar roads, gravel roads, Eskom servitudes and telephone lines. These features have been verified and updated during the Public Participation Process and should be avoided during invasive prospecting activities, and where avoidance is not possible, impacts must be appropriately managed and remedied.

9. IMPACTS AND RISKS IDENTIFIED

Impacts and risks were identified based on the proposed prospecting activities to take place on-site. Table 14 lists the potential impacts related to each of the significant activities related to the prospecting operation.

Table 14: List of potential impacts per activity.

Aspect	Potential Impacts
Planning Phase	
Socio-Economic	Safety and security risks to landowners and lawful occupiers
	Interference with existing land uses
Construction Phase	
Socio-Economic	Safety and security risks to landowners and lawful occupiers
	Interference with existing land uses
	Ineffective communication channels leading to community unrest
	Friction between local residents/landowners and prospecting personnel
	Possible boost in short-term local small business opportunities
	Perceptions and expectations
	Job creation
	Training of unskilled labourers
Groundwater	Localised spillages of oils from machinery leading to groundwater contamination
Surface Water	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals.
Heritage Resources	Destruction/damage of graves and burial grounds
	Destruction/damage of built environment resources
	Destruction/damage of archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources
Flora	Loss and fragmentation of the vegetation community

Aspect	Potential Impacts
	(including portions of an Endangered vegetation type and a CBA1 area)
Fauna	Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance, poaching (due to increased human presence) and/or direct mortalities.
Air Quality	Possible increase in dust generation as a result of drilling and operation of heavy machinery
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment
Visual	Scaring of the landscape as a result of the clearance of vegetation
	Visual intrusion as a result of the movement of heavy machinery and the establishment of the required infrastructure
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity
Soil, Land Use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the provincial roads and farm tracks around the prospecting area
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices
Operational Phase: Drilling of 8 diamond core drillholes	
Socio-Economic	Safety and security risks to landowners and lawful occupiers
	Interference with existing land uses
	Perceptions and expectations
	Job creation
	Discovery of economically viable mineral resources
	Training of unskilled labourers
Groundwater	Pollution of groundwater due to spillage of hydrocarbons from vehicles and machinery during drilling operations
	Storage of hydrocarbons and chemicals may impact on groundwater as a result of spillages and uncontrolled release
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users
Surface Water	Contamination of surface water due to drilling muds and cuttings should spillages occur
Biodiversity (fauna and flora)	Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and on-going erosion
	Potential leaks, discharges, litter, pollutant from development into the surrounding environment
	Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)

Aspect	Potential Impacts
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals
Soil, Land Use and Land Capability	Soil contamination due to spillage of hydrocarbons
Air Quality	The prospecting operation will require vehicular movement which may result in possible increase in dust generation
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties
Heritage Resources	Destruction/damage of graves and burial grounds
	Destruction/damage of built environment resources
	Destruction/damage of archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity
Vibrations	Impact of drilling ground vibration resulting in possible damage to infrastructure
Decommissioning, Rehabilitation and Closure Phases	
Soil, Land Use and Land Capability	The removal of the campsite equipment and the rehabilitation of the drilling sites 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
Soils	Compaction of soil due to vehicles/machinery utilised during site rehabilitation
Air Quality	Rehabilitation of the prospecting sites and removal of equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearbyvegetation
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
Biodiversity (fauna and flora)	Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species
	Continued displacement of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)
	Encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and potential re-establishment of natural species that were removed. The nature of the erosion will depend on the amount of successful vegetation establishment
	Displacement of the faunal community (including threatened or protected species) due to rehabilitation of the anthropogenic disturbances and habitat degradation, rehabilitation resulting in the faunal species potentially re-establishing within the area

Aspect	Potential Impacts
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals
	Rehabilitating degraded wetland areas (including catchment) to such a degree that functionality of these wetlands is fully restored
Heritage Resources	Destruction/damage of graves and burial grounds
	Destruction/damage of built environment resources
	Destruction/damage of archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources
Environmental Pollution	Generation and disposal of waste

Each of the identified risks and impacts for these phases was assessed utilising the assessment methodology described in Section 9.1. The assessment criteria include the nature, extent, duration, magnitude/intensity, reversibility, probability, public response, cumulative impact and irreplaceable loss of resources. The full scoring of each impact is provided in the impact assessment table provided in Appendix G.

A summary of the impacts and their significance before and after mitigation is provided in Section 13 of this report (Potential impacts were identified during the BA and are for the prospecting layout as well as activities proposed (Table 27).

Table 27).

In order to calculate the significance of an impact, probability, duration, extent and magnitude will be used. The pre and post mitigation scores will provide an indication of the extent to which an impact can be mitigated.

9.1 THE IMPACT ASSESSMENT METHODOLOGY

The subsections below present the approach to assessing the identified potential environmental impacts with the aim of determining the relevant environmental significance.

9.1.1 Method of Assessing Impacts

The impact assessment methodology is guided by the requirements of the NEMA 2014 EIA Regulations (as amended). The broad approach to the significance rating methodology is to determine the Environmental Risk (ER) by considering the Consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the Probability/Likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a Prioritisation Factor (PF) which is applied to the ER to determine the overall Significance (S).

9.1.2 Determination of Environmental Risk

The significance (S) of an impact is determined by applying a Prioritisation Factor (PF) to the Environmental Risk (ER).

The Environmental Risk is dependent on the Consequence (C) of the particular impact and the Probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R) \times N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 15.

Table 15: Criteria for determination of impact consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (the impact will cease after the operational life span of the project)
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease) or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease)
Reversibility	1	Impact is reversible without any time and cost
	2	Impact is reversible without incurring significant time and cost
	3	Impact is reversible only by incurring significant time and cost
	4	Impact is reversible only by incurring prohibitively high time and cost
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 16.

Table 16: Probability scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%)
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%)
	3	Medium probability (the impact may occur; >50% and <75%)

	4	High probability (it is most likely that the impact will occur- > 75% probability) or
	5	Definite (the impact will occur)

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows (Table 17):

ER= C x P

Table 17: Determination of environmental risk.

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 18.

Table 18: Significance classes.

Environmental Risk Score	
Value	**Description**
< 10	Low (i.e. where this impact is unlikely to be a significant environmental risk)
≥ 10; < 20	Medium (i.e. where the impact could have a significant environmental risk)
≥ 20	High (i.e. where the impact will have a significant environmental risk)

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

9.1.3 Impact Prioritisation

In accordance with the requirements of Appendix 3(1)(j) of the NEMA 2014 EIA Regulations (GNR326, as amended), and further to the assessment criteria presented in the Section above it is necessary to assess

- Each potentially significant impact in terms of: cumulative impacts.
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion, sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact Prioritisation Factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/ significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented (Table 19).

Table 19: Criteria for the determination of prioritisation.

Public Response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public

		response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Table 20).

Table 20: Determination of prioritisation factor.

Priority	Ranking	Prioritisation Factor
3	Low	1.00
4	Medium	1.17
5	Medium	1.33
6	Medium	1.50
7	Medium	1.67
8	Medium	1.83
9	High	2.00

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance (Table 21).

Table 21: Environmental significance rating.

Environmental Significance Rating	
Value	**Description**
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).

Environmental Significance Rating	
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area)

9.2 ASSESSMENT AND EVALUATION OF POTENTIAL PROJECT IMPACTS

The following potential impacts were identified during the BA and are for the prospecting layout as well as activities proposed (Table 22 to 26).

It should be noted that this report will be made available to I&APs for review and comment and their comments and concerns will be addressed in the final report to be submitted to the DMR for adjudication. Furthermore, it should be noted that the impact scores themselves will include the results of the public response and comment. The results of the public consultation will be used to update the impact scores upon completion of the public review period.

Table 22: Impact Assessment Table for the Planning Phase.

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Socio-Economic	Safety and security risks to landowners and lawful occupiers	-1	3	2	3	4	2	-6.00	• Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate landowner's special conditions which would form legally binding agreement • All homestead gates must be closed immediately upon entry/exit • Vehicles used must be in a roadworthy condition. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport	-1	2	1	2	2	1	-1.75	-2.33
	Interference with existing land uses	-1	2	1	1	1	2	-2.50	• The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any loss of revenue due to the prospecting activities	-1	1	1	1	1	2	-2.00	-2.00
Heritage Resources	Destruction/damage of archaeology and living heritage resources	-1	3	3	3	3	3	-9.00	• The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any loss of revenue due to the prospecting activities	-1	2	2	2	2	2	-4.00	-5.33
	Destruction/damage of graves and burial grounds	-1	3	3	3	3	3	-9.00	• Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas	-1	1	2	2	2	2	-3.50	-4.67
	Destruction/damage of built environment resources	-1	3	3	3	3	3	-9.00	• Prospecting activities and machinery should completely avoid historical structures	-1	1	2	2	2	2	-3.50	-4.67
Palaeontological Resources	Destruction/damage of palaeontological resources.	-1	2	2	2	2	2	-4.00	• Prospecting activities and machinery should completely avoid archaeology and living heritage resources	-1	1	2	2	2	2	-3.50	-4.67

Table 23: Impact Assessment Table for the Construction Phase.

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Socio-Economic	Safety and security risks to landowners and lawful occupier	-1	2	2	3	5	2	-6.00	• Ensure construction activities are consistent with occupational health and safety requirements • Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate landowner's special conditions which would form legally binding agreement • All homestead gates must be closed immediately upon entry/exit • Vehicles used must be in a roadworthy condition and their loads secured. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport	-1	1	1	2	3	1	-1.75	-2.33
	Interference with existing land uses	-1	2	2	4	3	3	-8.25	• The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any loss of revenue due to the prospecting activities	-1	1	1	3	2	2	-3.50	-3.50
	Ineffective communication channels leading to community unrest	-1	3	2	1	1	2	-3.50	• Ensure that information is communicated in a manner which is understandable and accessible to I&APs	-1	2	1	1	1	1	-1.25	-1.25
	Friction between local residents/landowners and prospecting personnel	-1	3	2	2	2	3	-6.75	• All operations will be carried out under the guidance of an experienced manager with proven skills in public consultation and conflict resolution • All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area • There will be a strict requirement to treat local residents with respect and courtesy at all times	-1	2	1	1	1	2	-2.50	-2.50
	Possible boost in short-term local small business	1	4	1	2	2	2	4.50	• Contractors will utilise accommodation in nearby towns instead of staying on-site	1	5	2	3	3	3	9.75	13.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
	opportunities																
	Perceptions and expectations	-1	3	2	2	1	4	-8.00	• Adhere to an open and transparent communication procedure with stakeholders at all times • Ensure that accurate and regular information is communicated to I&APs • Enhance project benefits and minimise negative impacts through intensive consultation with stakeholders	-1	2	1	1	1	2	-2.50	-3.33
	Job creation	1	3	1	2	3	3	6.75	• Where possible, the Applicant and contractors will source local labour. However, the number of jobs would not be substantial and duration thereof would be short lived	1	4	2	3	3	4	12.00	16.00
	Training of unskilled labourers	1	3	1	2	3	3	6.75	• Where possible, the Applicant will source local unskilled labourers to train	1	4	2	3	3	4	12.00	16.00
Groundwater	Localised spillages of oils from machinery leading to groundwater contamination	-1	2	2	3	4	3	-8.25	• All construction equipment shall be parked in a demarcated area • Drip trays shall be used when equipment is not used for some time • All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site • Refuelling of vehicles will only be allowed in designated 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	-1	1	1	2	3	2	-3.50	-3.50
Surface Water	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances	-1	3	2	3	4	2	-6.00	• No construction activities will be undertaken within 100 metres of the nearby steams without consent from the DWS • Adequate storm water management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water • Prevent uncontrolled access of vehicles through the water resources	-1	2	1	2	3	2	-4.00	-4.67

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-1	2	2	2	2	4	-8.00	• Adhere to 15 m buffer recommended by specialist • Demarcate prospecting footprint and mark wetland areas as restricted	-1	1	2	2	2	3	-5.25	-5.25
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	-1	2	2	4	3	3	-8.25	• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned up and discarded correctly • Establish action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems • Ensure that hygienic and functioning temporary ablution facilities are present on site • Ensure that all ablution facilities on-site be cleaned regularly • Monitor all ablution facilities daily to ensure that no leaks occur • Establish an area suitable for such ablution facilities outside of the recommended buffer zone • Store all relevant waste material in bunded areas outside the recommended buffer zones • Laydown yards, camps and storage areas must be beyond the 15 m buffer zone, where possible • All chemicals and toxicants to be used for the construction must be stored outside the recommended buffer zone and in a bunded area • No dumping of construction material on-site may take place • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported	-1	2	1	2	3	2	-4.00	-4.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Heritage Resources	Destruction/damage of built environment resources	-1	3	4	3	3	4	-13.00	• Prospecting activities and machinery should completely avoid historical structures	-1	2	3	2	2	3	-6.75	-9.00
	Destruction/damage of graves and burial grounds	-1	3	4	3	4	4	-14.00	• Prospecting activities and machinery should completely avoid the cemetery and graves as it is a No-Go-Area	-1	2	3	2	3	3	-7.50	-10.00
	Destruction/damage of archaeology and living heritage resources	-1	3	3	3	4	4	-13.00	• Prospecting activities and machinery should completely avoid archaeology and living heritage resources	-1	2	2	2	3	3	-6.75	-9.00
Palaeontological Resources	Destruction/damage of palaeontological resources	-1	2	3	3	5	2	-6.50	• Conduct a field assessment and protocol for finds prior to commencement of the construction phase	-1	1	1	1	5	1	-2.00	-2.67
Biodiversity (Flora and Fauna)	Loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a CBA1 area)	-1	2	2	2	2	4	-8.00	• It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon (including temporarily demarcating the defined footprint) and preventing movement of workers into surrounding natural areas • Any areas of natural, indigenous vegetation should be declared a 'No-Go' area during the construction phase and all efforts must be made to prevent access to this area by construction workers, machinery, domestic animals and the general public • A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians) • If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action • During vegetation clearance, methods should be employed to minimise potential harm to fauna species. Clearing has to take place in a phased and slow manner, commencing from the	-1	1	1	2	2	2	-3.00	-3.00
	Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance, poaching (due to increased human presence) and/or direct mortalities	-1	2	2	2	2	4	-8.00		-1	1	1	3	2	2	-3.50	-3.50

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
									interior of the site progressing outwards towards the boundary to maximise potential for mobile species to move to adjacent areas • Construction activities and vehicles could cause spillages of lubricants, fuels and construction material. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the application area • Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery • Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO							
Air Quality	Possible increase in dust generation as a result of drilling and operation of heavy machinery	-1	4	1	3	2	4	-10.00	• Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities • A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road	-1	2	1	2	2	3	-5.25	-7.00
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment	-1	5	3	3	3	4	-14.00	• 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	-1	4	2	2	2	3	-7.50	-8.75
Visual	Scaring of the landscape as a result of the clearance of vegetation	-1	1	2	2	3	3	-6.00	• Ensure that areas stripped of vegetation are kept to a minimum	-1	1	2	2	2	2	-3.50	-4.08
	Visual intrusion as a result of the movement of heavy machinery and the establishment of the required infrastructure	-1	2	1	2	1	3	-4.50	• 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	-1	2	1	1	1	2	-2.50	-2.50

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity	-1	2	1	2	1	3	-4.50	• All construction vehicles and machinery must be maintained in good working order • When working or travelling past noise sensitive receptors, no unnecessary hooting or noise should occur	-1	1	1	1	1	2	-2.00	-2.33
Soil, Land Use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages	-1	2	3	3	4	3	-9.00	• Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of • Machinery to be used for the operation will be of good working conditions	-1	1	2	2	3	2	-4.00	-4.67
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion	-1	1	2	3	3	4	-9.00	• The time in which soils are exposed during construction activities should remain as short as possible • Due to the sensitivity of the soil layer and the associated risk of erosion, construction should occur only in dry season in order to prevent run-off and erosion	-1	1	1	2	2	3	-4.50	-4.50
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the provincial roads and farm tracks around the prospecting area	-1	2	1	2	1	3	-4.50	• Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads • The number of construction vehicles and trips shall be kept to a minimum	-1	2	1	1	1	2	-2.50	-2.92
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices	-1	1	2	3	4	3	-7.50	• Waste shall not be buried or burned on-site • No dumping shall be allowed near or on-site • All general waste shall be disposed of to the nearest licensed landfill site	-1	1	1	2	3	2	-3.50	-4.08

Table 24: Impact Assessment Table for the Operational Phase.

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Socio-Economic	Safety and security risks to landowners and lawful occupiers	-1	2	1	3	4	3	-7.50	• Ensure invasive prospecting activities are consistent with occupational health and safety requirements • Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowners. This formal agreement should additionally stipulate the landowner's special conditions which should form a legally binding agreement • All homestead gates must be closed immediately upon entry/exit • Vehicles used must be in a roadworthy condition and their loads secured. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport	-1	1	1	2	3	1	-1.75	-2.33
	Interference with existing land uses	-1	1	1	3	4	4	-9.00	• Avoid conducting drilling activities in active crop fields • Ensure that negotiations on compensation are undertaken before invasive activities can commence. This will include any other conditions that the landowner may deem necessary for the prospecting operation • Utilise sites that are unused and that are in a degraded state	-1	1	1	3	3	3	-6.00	-6.00
	Perceptions and expectations	-1	4	2	1	1	4	-8.00	• Adhere to an open and transparent communication procedure with stakeholders at all times • Ensure that accurate and regular information is communicated to I&APs • Enhance project benefits and minimise negative impacts through intensive consultation with stakeholders	-1	3	1	1	1	2	-3.00	-4.00
	Job creation	1	4	1	2	2	4	9.00	• Where possible, the Applicant and contractors will source local labour. However, the number of jobs would not be substantial and duration thereof would be short lived	1	5	1	3	2	5	13.75	18.33
	Discovery of economically viable mineral resources	1	1	2	5	5	4	13.00	• No mitigation measures are proposed for this impact	1	3	4	5	5	5	21.25	24.79
	Training of unskilled labourers	1	4	1	3	3	4	11.00	• Where possible, the Applicant will source local unskilled labourers to train	1	5	1	3	3	5	15.00	20.00
Groundwater	Pollution of groundwater due to spillage of hydrocarbons from vehicles and machinery during drilling	-1	3	3	3	4	3	-9.75	• Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes • Drip trays must be placed under vehicles • During refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks	-1	2	2	2	3	2	-4.50	-4.50

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
	Storage of hydrocarbons and chemicals may impact on groundwater as a result of spillages and uncontrolled release	-1	3	3	3	4	3	-9.75	• Drip trays must be placed under vehicles and machinery	-1	2	2	2	3	2	-4.50	-4.50
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users	-1	3	3	4	5	3	-11.25	• Ensure that the land owner's borehole yields are monitored during the drilling operation • Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated	-1	2	1	2	5	2	-5.00	-5.00
Surface Water	Contamination of surface water due to spillage of oils, fuels and chemicals	-1	4	3	3	4	2	-7.00	• It is proposed that the following condition for Environmental Authorisation be set from a groundwater perspective: ○ No development should take place within 100 m of the rivers and streams	-1	3	2	2	3	1	-2.50	-2.92
Heritage Resources	Destruction/damage of graves and burial grounds	-1	3	4	3	4	3	-10.50	• Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas	-1	2	3	3	2	2	-5.00	-7.50
	Destruction/damage of built environment resources	-1	3	4	3	4	3	-10.50	• Prospecting activities and machinery should completely avoid the historical structures	-1	2	3	3	3	2	-5.50	-8.25
	Destruction/damage of archaeology and living heritage resources	-1	3	4	3	4	3	-10.50	• Prospecting activities and machinery should completely avoid archaeology and living heritage resources	-1	2	3	3	2	2	-5.00	-7.50
Palaeontological Resources	Destruction/damage of palaeontological resources	-1	3	3	3	4	3	-9.75	• Conduct a field assessment and protocol for finds prior to commencement of prospecting activities	-1	1	3	3	2	2	-4.50	-6.75

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Biodiversity (Flora and Fauna)	Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and on-going erosion	-1	3	3	4	2	4	-12.00	• As far as possible, the proposed prospecting (including access routes) should be placed in areas that have already been disturbed, and no further loss of primary or secondary vegetation should be permitted • The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on flora. • Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste • Drilling activities should completely avoid trees, where possible (especially any protected tree species) • Any areas of natural, indigenous vegetation should be declared as ‘‘No-Go’’ areas during the operational phase and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public	-1	1	2	2	2	2	-3.50	-3.50
	Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to on-going anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	-1	2	2	2	2	4	-8.00	• All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the project prospecting footprint at all times • Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the prospecting footprint by a suitably qualified Ecology Specialist trained in the handling and relocation of animals • No trapping, killing, poaching, snaring or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals • The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna	-1	1	2	2	2	2	-3.50	-3.50
	Continued encroachment and displacement of an indigenous and EN vegetation community as well as a CBA1 area by alien invasive plant species and on-going erosion.	-1	3	3	4	2	4	-12.00	• As far as possible, the proposed prospecting (including access routes) should be placed in areas that have already been disturbed, and no further loss of primary or secondary vegetation should be permitted • The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on flora. • Areas of indigenous vegetation, even secondary	-1	1	2	2	2	2	-3.50	-3.50

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
									communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste • Drilling activities should completely avoid trees, where possible (especially any protected tree species) • Any areas of natural, indigenous vegetation should be declared as ''No-Go'' areas during the operational phase and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public								
	Potential leaks, discharges, litter, pollutant from development into the surrounding environment. Thus harming fauna and flora species	-1	2	3	2	4	4	-11.00	• Vehicles could cause spillages of lubricants and fuels. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas	-1	1	1	2	2	2	-3.00	-3.00
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-1	2	3	5	3	3	-9.75	• Ensure that the drilling and supporting aspects avoid the wetland and buffer areas • Rip all compacted areas within the drilling footprint areas • Re-vegetate the ripped areas with indigenous grass species	-1	2	1	2	3	2	-4.00	-4.00
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	-1	2	3	4	3	3	-9.00	• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off site • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly • Establish action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems • Ensure that hygienic and functioning temporary ablution facilities are present on site • Ensure that all ablution facilities on site be cleaned regularly • Monitor all ablution facilities daily to ensure that no leaks occur • Establish an area suitable for such ablution facilities outside of the recommended buffer zone • Store all relevant waste material in bunded areas outside the recommended buffer zones • Laydown yards, camps and storage areas must be beyond the 15 m buffer zone • All chemicals and toxicants to be used for the construction must be stored outside the recommended buffer zone and in a bunded area	-1	2	1	2	3	2	-4.00	-4.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
									• No dumping of construction material may take place on site • All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported								
Air Quality	The prospecting operation will require vehicular movement which may result in possible increase in dust generation	-1	4	1	3	3	3	-8.25	• Dust suppression must be conducted during the operational phase of the project • A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road	-1	2	1	2	2	2	-3.50	-4.08
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment	-1	5	3	3	3	4	-14.00	• Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes	-1	4	2	2	2	3	-7.50	-8.75
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties	-1	2	1	2	1	5	-7.50	• 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	-1	1	1	1	1	5	-5.00	-5.00
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity	-1	2	1	3	2	4	-8.00	• All vehicles and machinery must be maintained in good working order • When working or travelling past noise sensitive receptors, no unnecessary hooting or noise should occur	-1	1	1	2	2	3	-4.50	-5.25
Vibrations	Impact of drilling ground vibration resulting in possible damage to infrastructure	-1	3	2	4	4	3	-9.75	• Drill sites shall be situated as far from private property as is possible • Affected property owners shall be notified of any drilling activities before commencement of the activities • Should there be damage to private property as a result of drilling activities, property owners shall be appropriately compensated	-1	1	1	2	3	2	-3.50	-4.08
Soil, Land Use and Land Capability	Soil contamination due to spillage of hydrocarbons	-1	1	2	3	4	4	-10.00	• Drip trays must be placed under vehicles • Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of • Drilling fluids (mud) must be contained in the steel sumps and any spills or leaks must be cleaned up	-1	1	1	2	3	3	-5.25	-5.25

Table 25: Impact Assessment Table for the Decommissioning Phase.

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Heritage Resources	Destruction/damage of graves and burial grounds	-1	3	3	3	4	3	-9.75	• Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas	-1	2	2	3	2	2	-4.50	-6.75
	Destruction/damage of built environment resources	-1	3	3	3	3	3	-9.00	• Prospecting activities and machinery should completely avoid the historical structures	-1	1	2	3	2	2	-4.00	-5.33
	Destruction/damage of archaeology and living heritage resources	-1	3	3	3	4	3	-9.75	• Prospecting activities and machinery should completely avoid archaeology and living heritage resources	-1	2	3	3	2	2	-5.00	-7.50
Palaeontological Resources	Destruction/damage of palaeontological resources	-1	2	3	3	3	3	-8.25	• Prospecting activities and machinery should completely avoid palaeontological resources	-1	1	2	3	2	2	-4.00	-5.33
Biodiversity (Flora and Fauna)	Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species	-1	3	2	4	2	4	-11.00	• It is recommended that the prospecting footprint be demarcated during the decommissioning phase so that only the demarcated areas are impacted upon. Demarcation will also prevent movement of workers into surrounding natural areas • Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste • Any areas of natural, indigenous vegetation should be declared as ''No-Go'' areas during the decommissioning phase	-1	1	1	2	2	2	-3.00	-3.00
	Continued displacement of the faunal community (including threatened or protected species) due to on-going anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	-1	2	1	2	2	4	-7.00	• All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the prospecting footprint at all times • The duration of the decommissioning phase should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna and flora	-1	1	1	1	2	2	-2.50	-2.50
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-1	2	2	5	3	3	-9.00	• Rip all compacted areas within the drilling footprint areas • Re-vegetate the ripped areas with indigenous grass species	-1	2	1	2	3	2	-4.00	-4.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	-1	2	2	4	3	3	-8.25	• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off site • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly • Establish action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems • Ensure that hygienic and functioning temporary ablution facilities are present on site • Ensure that all ablution facilities on site be cleaned regularly • Monitor all ablution facilities daily to ensure that no leaks occur • Establish an area suitable for such ablution facilities outside of the recommended buffer zone • Store all relevant waste material in bunded areas outside the recommended buffer zones • Laydown yards, camps and storage areas must be beyond the 15 m buffer zone • All chemicals and toxicants to be used for the decommissioning must be stored outside the recommended buffer zone and in a bunded area • No dumping of decommission material may take place on site • All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported	-1	2	1	2	3	2	-4.00	-4.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Air Quality	Removal of equipment from the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds	-1	3	1	2	2	3	-6.00	• Dust suppression must be conducted during the decommissioning phase of the project whenever excessive dust is generated dust from the unpaved road	-1	2	1	2	2	2	-3.50	-4.08
Noise	Noise will be generated during the removal of equipment on site. This noise is not expected to exceed occupational noise limits and will be short lived	-1	1	1	2	2	4	-6.00	• 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	2	2	2	-3.00	-3.50

Table 26: Impact Assessment Table for the Rehabilitation and Closure Phases.

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Heritage Resources	Destruction/damage of built environment resources	-1	3	3	3	4	3	-9.75	• Monitor demarcated heritage sites	-1	2	2	3	2	2	-4.50	-6.00
	Destruction/damage of graves and burial grounds	-1	3	3	3	4	3	-9.75	• Monitor demarcated heritage sites	-1	1	2	3	2	2	-4.00	-5.33
	Destruction/damage of archaeology and living heritage resources	-1	3	3	3	4	3	-9.75	• Monitor demarcated heritage sites	-1	2	2	3	2	2	-4.50	-6.00
Palaeontological Resources	Destruction/damage of palaeontological resources	-1	2	3	3	4	3	-9.00	• Monitor demarcated palaentological sites	-1	1	2	2	2	2	-3.50	-4.67
Biodiversity (Flora and Fauna)	Encroachment and displacement of an indigenous and EN vegetation community as well as a CBA1 area by alien invasive plant species and potential re-establishment of natural species that were removed.	-1	4	3	3	3	4	-13.00	• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species • Rehabilitation must include re-filling or capping of drillholes, and the area must be re-vegetated with plant and grass species which are endemic to this vegetation type	-1	1	1	2	2	2	-3.00	-3.00
	Displacement of the faunal community (including threatened or protected species) due to rehabilitation of the anthropogenic disturbances and habitat degradation, rehabilitation resulting in the faunal species potentially re-establishing within the area	-1	2	3	2	2	4	-9.00	• All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the prospecting footprint at all times • Any larger fauna species noted during rehabilitation should be given the opportunity to move away	-1	1	1	1	2	2	-2.50	-2.50
Wetlands	Rehabilitating degraded wetland areas (including catchment) to such a degree that functionality of these wetlands is fully restored	1	3	1	3	1	3	6.00	• Store all excavated material in safe storage yards outside of the recommended buffer zones • Backfill the relevant material to such an extent that a heap of excess soil is available on top of the drilled cavity. This will ensure that the cavity is continuously filled during subsidence	1	3	1	3	1	3	6.00	6.00

Environmental Aspect	Potential impacts	Environmental Impact Significance Pre-mitigation							Mitigation Measures	Environmental Impact Significance Post-mitigation							Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Pre-Mitigation)		Nature	Extent	Duration	Magnitude	Reversibility	Probability	Environmental Risk (Post-Mitigation)	
Air Quality	Rehabilitation the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation	-1	4	2	3	3	3	-9.00	• All vehicles utilising public gravel roads must adhere to the speed • Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes • Dust suppression must be conducted during the rehabilitation and closure phases of the project whenever excessive dust is generated	-1	2	1	2	2	2	-3.50	-4.08
Noise	Noise will be generated during the rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived	-1	2	1	2	2	3	-5.25	• 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	2	2	2	-3.00	-3.00
Soil, Land Use and Land Capability	The removal of the campsite equipment and the rehabilitation of the drilling sites 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	1	1	5	4	4	3	9.75	• Ensure that the rehabilitation work is performed in such a manner that the soil is protected from probable spillages • All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility.	1	1	5	5	4	4	11.00	11.00
	Compaction of soil due to vehicles/machinery utilised during site rehabilitation	-1	2	2	2	2	3	-6.00	• Avoid having vehicles repeatedly travel on the same tracks • Reduce traffic	-1	2	1	2	2	2	-3.50	-3.50
Environmental Pollution	Generation and disposal of waste	-1	1	1	2	4	4	-8.00	• All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities e.g. sewage treatment plant or solid waste disposal site	-1	1	1	2	3	3	-5.25	-5.25

Refer to Appendix G for a summary of the full scoring for each of the assessed impacts.

10. MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

The project area has been selected based predominantly on historical data available for the region, which indicates the potential for economically viable mineral resources to occur. The sub-surface geology of the application area comprises rocks of the Central Rand Group of the Witwatersrand Supergroup, which contain conglomerate layers known as reefs. These reefs host the world's most prolific accumulation of gold. The application area does not overlap with, nor will it impact upon any formally protected areas. Furthermore, no Species of Conservation Concern were identified during the field survey undertaken as part of the Biodiversity Impact Assessment. As such, the overall site is regarded as the preferred site and alternative sites are not considered.

In terms of the drill sites, no alternative site locations are assessed as the preliminary drillhole positions are based on the expected mineral resources situated within the application area. Two of the proposed drillholes are situated in areas which are classified as CBA whilst six are in areas classified as ESA 2 according to the Free State Terrestrial Critical Biodiversity Areas Plan. Furthermore, no heritage or built environment features were identified within 500 m of the proposed drill sites. In terms of palaeosensitivity, the proposed drillholes are situated in an area classified as being of moderate sensitivity.

11. STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE

The preliminary drillhole locations are not in close proximity to any communities or residences, therefore, limiting the potential negative social impacts. The proposed drillhole locations are also not in close proximity to any sensitive environmental features, therefore, limiting the potential negative environmental impacts. Nor do they occur in close proximity to any burial grounds or built environment features. In terms of palaeosensitivity, the proposed drillholes are specifically situated in an area regarded as a moderate sensitivity area. As such, the preliminary drillhole locations do not require alternative development locations within the overall site.

Consultation with all I&APs is on-going, and no concerns have been raised regarding potential harm to faunal species and the risk of groundwater contamination. All concerns have been included and evaluated in this BAR and EMPR.

The identified negative impacts associated with the proposed invasive prospecting activities range from Medium to Low and would be reduced to Low should the proposed mitigation measures be implemented.

12. 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

The impact assessment process may be summarised as follows:

- Identification of proposed prospecting activities including their nature and duration.
- Screening of activities likely to result in impacts or risks.
- Utilisation of the above mentioned methodology to assess and score preliminary impacts and risks identified.
- Inclusion of I&AP comments regarding impact identification and assessment.
- Finalisation of impact identification and scoring.

13. IMPACT ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Potential impacts were identified during the BA and are for the prospecting layout as well as activities proposed (Table 27).

Table 27: Impact significance table.

Impact	Pre-mitigation ER	Post-mitigation ER	Final score
Planning Phase			
Safety and security risks to landowners and lawful occupiers	-6.00	-1.75	-2.33
Interference with existing land uses	-2.50	-2.00	-2.00
Destruction/damage of archaeology and living heritage resources	-9.00	-4.00	-5.33
Destruction/damage of graves and burial grounds	-9.00	-3.50	-4.67
Destruction/damage of built environment resources	-9.00	-3.50	-4.67
Destruction/damage of palaeontological resources.	-4.00	-3.50	-4.67
Construction Phase			
Safety and security risks to landowners and lawful occupiers	-6.00	-1.75	-2.33
Interference with existing land uses	-8.25	-3.50	-3.50
Ineffective communication channels leading to community unrest	-3.50	-1.25	-1.25
Friction between local residents/landowners and prospecting personnel	-6.75	-2.50	-2.50
Possible boost in short-term local small business opportunities	4.50	9.75	13.00
Perceptions and expectations	-8.00	-2.50	-3.33
Job creation	6.75	12.00	16.00
Training of unskilled labourers	6.75	12.00	16.00
Localised spillages of oils from machinery leading to groundwater contamination	-8.25	-3.50	-3.50
Potential deterioration in water quality due to the potential accidental spillages of hazardous substances	-6.00	-4.00	-4.67
Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-8.00	-5.25	-5.25
Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	-8.25	-4.00	-4.00
Destruction/damage of archaeology and living heritage resources	-13,00	-6.75	-9.00
Destruction/damage of graves and burial grounds	-14,00	-7.50	-10
Destruction/damage of built environment resources	-13,00	-6.75	-9.00
Destruction/damage of palaeontological resources.	-6.50	-2.00	-2.67
Loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a CBA1 area)	-8.00	-3.00	-3.00
Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance, poaching (due to increased human presence) and/or direct	-8.00	-3.50	-3.5

Impact	Pre-mitigation ER	Post-mitigation ER	Final score
mortalities			
Possible increase in dust generation as a result of drilling and operation of heavy machinery	-10.00	-5.25	-7.00
Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment	-14.00	-7.50	-8.75
Scaring of the landscape as a result of the clearance of vegetation	-6.00	-3.50	-4.08
Visual intrusion as a result of the movement of heavy machinery and the establishment of the required infrastructure	-4.50	-2.50	-2.50
The use of vehicles and machinery may generate noise in the immediate vicinity	-4.50	-2.00	-2.33
Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages	-9.00	-4.00	-4.67
Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion	-9.00	-4.50	-4.50
Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the provincial roads and farm tracks around the prospecting area	-4.50	-2.50	-2.92
Potential water and soil pollution as a result of inappropriate waste management practices	-7.50	-3.50	-4.08
Operational Phase			
Safety and security risks to landowners and lawful occupiers	-7.50	-1.75	-2.33
Interference with existing land uses	-9.00	-6.00	-6.00
Perceptions and expectations	-8.00	-3.00	-4.00
Job creation	9.00	13.75	18.33
Discovery of economically viable mineral resources	13.00	21.25	24.79
Training of unskilled labourers	11.00	15.00	20
Pollution of groundwater due to spillage of hydrocarbons from vehicles and machinery during drilling	-9.75	-4.50	-4.50
Storage of hydrocarbons and chemicals may impact on groundwater as a result of spillages and uncontrolled release	-9.75	-4.50	-4.50
The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users	-11.25	-5.00	-5.00
Contamination of surface water due to drilling muds and cuttings should spillages occur	-7.00	-2.50	-2.92
Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and on-going erosion	-12.00	-3.50	-3.50
Potential leaks, discharges, litter, pollutant from development into the surrounding environment. Thus harming flora and fauna species	-11.00	-3.00	-3.00
Continued encroachment and displacement of an indigenous and EN vegetation community as well as a CBA1 area by alien invasive plant species and on-going erosion.	-12.00	-3.50	-3.50

Impact	Pre-mitigation ER	Post-mitigation ER	Final score
Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-9.00	-4.00	-4.00
Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	-9.00	-4.00	-4.00
Soil contamination due to spillage of hydrocarbons	-10.00	-5.25	-5.25
The prospecting operation will require vehicular movement which may result in possible increase in dust generation	-8.25	-3.50	-4.08
Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment	-14.00	-7.50	-8.75
The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties	-7.50	-5.00	-5.00
Destruction/damage of archaeology and living heritage resources	-10.50	-5.00	-7.50
Destruction/damage of graves and burial grounds	-10.50	-5.50	-8.25
Destruction/damage of built environment resources	-10.50	-5.00	-7.50
Destruction/damage of palaeontological resources.	-9.75	-4.50	-6.75
The use of vehicles and machinery may generate noise in the immediate vicinity	-8.00	-4.50	-5.25
Continued displacement of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	-8.00	-3.50	-3.50
Potential leaks, discharges, litter, pollutant from development into the surrounding environment	-11.00	-3.00	-3.00
Impact of drilling ground vibration resulting in possible damage to infrastructure	-9.75	-3.50	-4.08
Decommissioning Phase			
Removal of equipment from the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds	-6.00	-3.50	-4.08
Noise will be generated during the removal of equipment on-site. This noise is not expected to exceed occupational noise limits and will be short lived	-6.00	-3.00	-3.50
Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species	-11.00	-3.00	-3.00
Continued displacement of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	-7.00	-2.50	-2.50
Degradation or partial loss of wetlands caused by the prospecting and supporting activities	-9.00	-4.00	-4.00
Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored	-8.25	-4.00	-4.00

Impact	Pre-mitigation ER	Post-mitigation ER	Final score
chemicals			
Destruction/damage of archaeology and living heritage resources	-9.75	-5.00	-7.50
Destruction/damage of graves and burial grounds	-9.75	-4.50	-6.75
Destruction/damage of built environment resources	-9.00	-4.00	-5.33
Destruction/damage of palaeontological resources.	-8.25	-4.00	-5.33
Rehabilitation and Closure Phase			
The removal of the campsite equipment and the rehabilitation of the drilling sites 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	9.75	11.00	11.00
Compaction of soil due to vehicles/machinery utilised during site rehabilitation	-6.00	-3.50	-3.50
Rehabilitation the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation	-9.00	-3.50	-4.08
Noise will be generated during the rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived	-5.25	-3.00	-3.00
Encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and potential re-establishment of natural species that were removed. The nature of the erosion will depend on the amount of successful vegetation establishment	-13.00	-3.00	-3.00
Displacement of the faunal community (including threatened or protected species) due to rehabilitation of the anthropogenic disturbances and habitat degradation, rehabilitation resulting in the faunal species potentially re-establishing within the area	-9.00	-2.50	-2.50
Rehabilitating degraded wetland areas (including catchment) to such a degree that functionality of these wetlands is fully restored	6.00	6.00	6.00
Destruction/damage of archaeology and living heritage resources	-9.75	-4.50	6.00
Destruction/damage of graves and burial grounds	-9.75	-4.00	-5.33
Destruction/damage of built environment resources	-9.75	-4.50	-6.00
Destruction/damage of palaeontological resources.	-9.00	-3.50	-4.67
Generation and disposal of waste	-8.00	-5.25	-5.25

Refer to Appendix G for a summary of the full scoring for each of the assessed impacts.

14. SUMMARY OF SPECIALIST REPORTS

Biodiversity and Wetland Impact Assessment

A Biodiversity and Wetland Impact Assessment was undertaken by the Biodiversity Company. The assessment was conducted on a desktop level and a field survey was undertaken in order to increase confidence in the information obtained from desktop studies. Listed below are the key findings:

- From an ecological perspective, the proposed prospecting developments are situated predominantly within a disturbed habitat. Although somewhat disturbed, it is believed these areas may still support some faunal species and there is a moderate likelihood that Species of Conservation Concern may occur.
- The application area is situated across three vegetation types, namely (i) Vaal Vet Sandy Grassland, (ii) Central Free State Grassland and (iii) Highveld Alluvial Vegetation. The development prospecting footprint is specifically situated within Vaal Vet Sandy Grassland, which is classified as Endangered according to Mucina and Rutherford (2006).
- According to the Mining and Biodiversity Guidelines (2013), the prospecting footprint is not classed as being of significant biodiversity importance and does not represent a risk to mining.
- The prospecting footprint falls entirely within one ecosystem, which is listed as Least Threatened (LT) and Endangered (EN).
- According to the Free State Terrestrial CBA Plan, two of the proposed drillholes are situated in areas which are classified as CBA whilst six are in areas classified as ESA 2. This areas has been extensively altered from their natural condition mostly due to agricultural transformation of the landscape.
- Based on the South African National Biodiversity Institute Protected Areas Map and the National Protected Areas Expansion Strategy, the project area does not overlap with, nor will it impact upon, any formally protected area.

Heritage and Palaeontological Impact Assessment

A Heritage and Palaeontological Assessment was undertaken by NGT Holdings over the application area. The assessment was conducted on a desktop level and a field survey was undertaken with the aim of identifying archaeological and heritage resources within the area proposed for the eight drillholes. Listed below are the key findings:

- No archaeological resources and burial grounds or graves were identified at the proposed drillholes sites, nor the 500 m zone of influence surrounding the drillhole locations.
- In terms of South African Heritage Resources Agency Paleontological Sensitivity Layer, the prospecting footprint is within a moderate sensitivity area. According to the Palaeontological Impact Assessment, there are no previously recorded fossils from the area that are preserved in the overlying rock formations (loose sands of the Quaternary).

15. ENVIRONMENTAL IMPACT STATEMENT

The majority of the prospecting activities are non-invasive and will consequently have no impact on the socio-economic and biophysical environment. Invasive activities will entail drilling of 8 drillholes each to a depth of 700 m. The total area to be disturbance is anticipated to be 0.72 ha which needs to be viewed in the context of the entire proposed application area which covers 9 510.03 ha.

All of the identified impacts will occur for a limited time period and the extent of the impacts will be localised. Based on the impact assessment conducted by the various specialists, the environmental impacts associated with prospecting activities are expected to be localised and of Medium to Low significance. The impacts will be

reduced to Low significance if mitigation measures are implemented. Figure 32 is a composite map of the following components:

- Critical Biodiversity Areas.
- Ecological Support Areas.
- Watercourses and wetlands.
- Heritage and archaeological sites.

FINAL SITE MAP

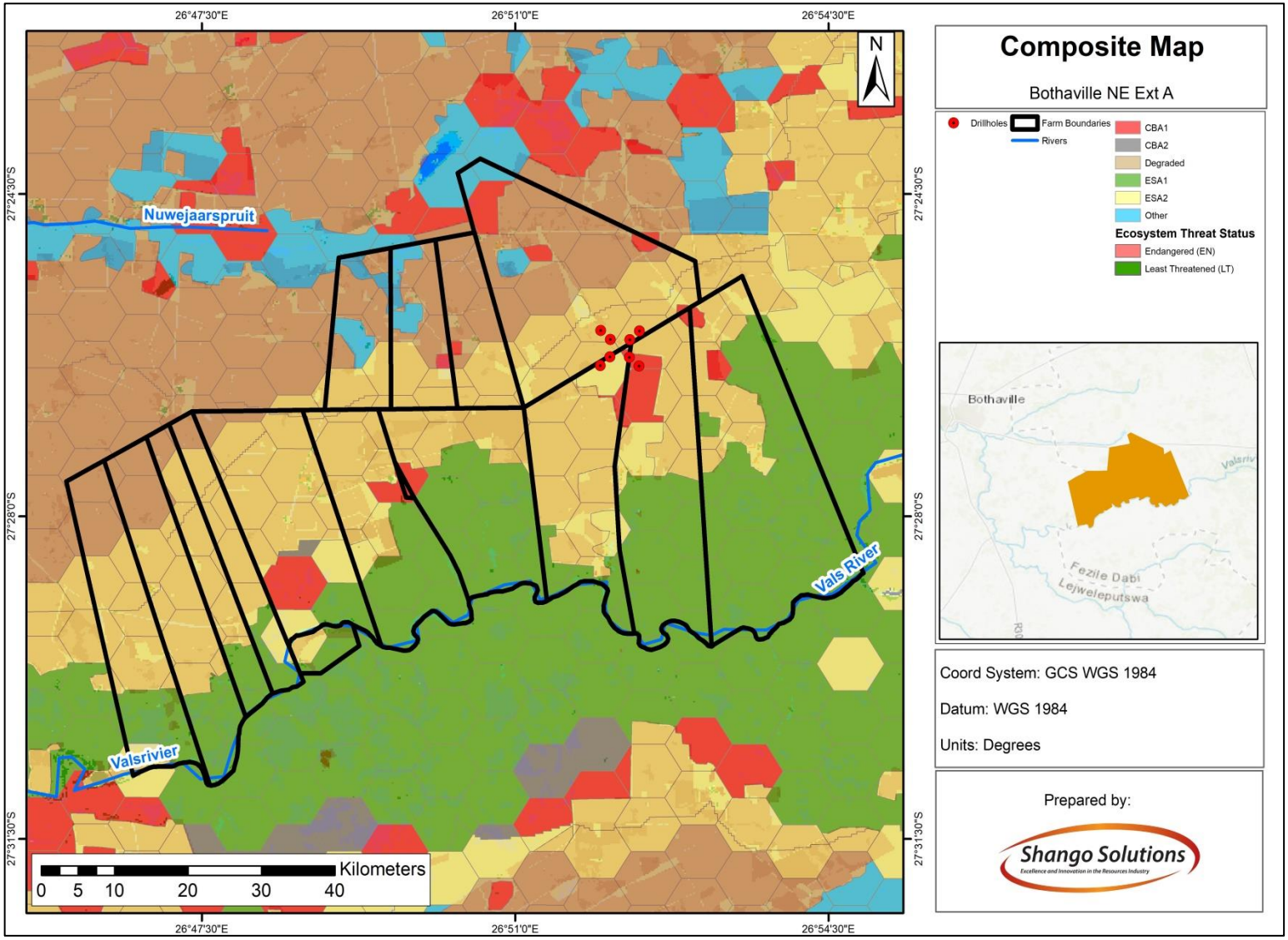

Figure 32: Composite map of the application area (refer to Appendix D for an enlarged map).

17. SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The following negative impacts were identified and assessed in the Basic Assessment Report:

- Safety and security risks to landowners and lawful occupiers.
- Interference with existing land uses.
- Ineffective communication channels leading to community unrest.
- Friction between local residents/landowners and prospecting personnel.
- Perceptions and expectations.
- Localised spillages of oils from machinery leading to groundwater contamination.
- Potential deterioration in surface water quality due to potential accidental spillages of hazardous substances.
- Destruction/damage to graves and burial grounds.
- Destruction/damage of built environment resources.
- Destruction/damage of palaeontological resources.
- Degradation or partial loss of wetlands caused by the prospecting and supporting activities.
- Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals.
- Loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a CBA1 area).
- Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance, poaching (due to increased human presence) and/or direct mortalities.
- Possible increase in dust generation as a result of drilling and operation of heavy machinery.
- Air pollution due to carbon emissions and ambient air pollutants.
- Scaring of the landscape as a result of the clearance of vegetation.
- Visual intrusion due to vehicle movement and established infrastructure.
- Noise generated by use of vehicles and machinery.
- Localised chemical pollution of soils as a result of hydrocarbon spillages.
- Possible drawdown which may affect the yield to the surrounding groundwater users.
- Soil erosion due to vegetation clearance.
- Localised loss of soil and land capability due to reduction in nutrient status.
- Increase in traffic volumes.
- Soil compaction caused by vehicles and machinery.
- Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species.
- Continued displacement of the faunal community (including threatened or protected species) due to on-going anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching).
- Potential leaks, discharges, litter, pollutant from development into the surrounding environment. Thus harming flora and fauna species.
- Encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and potential re-establishment of natural species that were removed. The nature of the erosion will depend on the amount of successful vegetation establishment.
- Displacement of the faunal community (including threatened or protected species) due to rehabilitation of the anthropogenic disturbances and habitat degradation, rehabilitation resulting in the faunal species potentially re-establishing within the area.

- Generation and disposal of waste.

The positive implications of the Bothaville NE Ext A Prospecting Right are:

- Job creation during prospecting operations.
- Training of unskilled labourers prior to commencement of prospecting operations.
- Possible boost in short-term local business opportunities.
- Discovery of economically viable mineral resources.
- Restoration of soil and land use during rehabilitation.
- Rehabilitation of degraded wetland areas (including catchment) to such a degree that functionality of these wetlands is fully restored.

18. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The objectives of the EMPR will be to:

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts.
- Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce impacts (both social and environmental) as far as practically possible.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.

Through implementation of the following proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.

18.1 Planning Phase

Environmental Aspect	Potential impacts	Mitigation Measures
Socio-Economic	Safety and security risks to landowners and lawful occupiers	Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate the landowner's special conditions which would form a legally binding agreement
		All homestead gates must be closed immediately upon entry/exit
		Vehicles used must be in a roadworthy condition. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport
	Interference with existing land uses	The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any loss of revenue due to the prospecting activities
Heritage Resources	Destruction/damage of graves and burial grounds	Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas

Environmental Aspect	Potential impacts	Mitigation Measures
	Destruction/damage of built environment resources	Prospecting activities and machinery should completely avoid historical structures
	Destruction/damage of archaeology and living heritage resources	Prospecting activities and machinery should completely avoid archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources	Conduct a field assessment and protocol for finds prior to commencement of the construction phase

18.2 Construction Phase

Environmental Aspect	Potential impacts	Mitigation Measures
Socio-Economic	Safety and security risks to landowners and lawful occupiers	Ensure construction activities are consistent with occupational and health safety requirements
		Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate the landowner's special conditions which would form a legally binding agreement
		All homestead gates must be closed immediately upon entry/exit
		Vehicles used must be in a roadworthy condition and their loads secured. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport
	Interference with existing land uses	The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any loss of revenue due to the prospecting activities
	Ineffective communication channels leading to community unrest	Ensure that information is communicated in a manner which is understandable and accessible to I&APs
	Friction between local residents/landowners and prospecting personnel	All operations will be carried out under the guidance of an experienced manager with proven skills in public consultation and conflict resolution
		All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area
		There will be a strict requirement to treat local residents with respect and courtesy at all times
	Possible boost in short-term local small business opportunities	Contractors will utilise accommodation in nearby towns instead of staying on site

Environmental Aspect	Potential impacts	Mitigation Measures
	Perceptions and expectations	Adhere to an open and transparent communication procedure with stakeholders at all times
		Ensure that accurate and regular information is communicated to I&APs
		Enhance project benefits and minimise negative impacts through intensive consultation with stakeholders
	Job creation	Where possible, the Applicant and contractors will source local labour. However, the number of jobs would not be substantial and duration thereof would be short lived
	Training of unskilled labourers	Where possible, the Applicant will source local unskilled labourers to train
Groundwater	Localised spillages of oils from machinery leading to groundwater contamination	All construction equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is standing still for some time
		All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site
		Refuelling of vehicles will only be allowed in designated 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
Surface Water	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances	No construction activities will be undertaken within 100 m of the nearby steams without consent from the DWS
		Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water
		Prevent uncontrolled access of vehicles through water resources
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	No construction activities will be undertaken within 100 m of the nearby steams without consent from the DWS
		Demarcate prospecting footprint and mark wetland areas as restricted
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off site
		The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are

Environmental Aspect	Potential impacts	Mitigation Measures
		cleaned-up and discarded correctly
		Establish action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems
		Ensure that hygienic and functioning temporary ablution facilities are present on site
		Ensure that all ablution facilities on site be cleaned regularly
		Monitor all ablution facilities daily to ensure that no leaks exist
		Establish an area suitable for such ablution facilities outside of the recommended buffer zone
		Store all relevant waste material in bunded areas outside the recommended buffer zones
		Laydown yards, camps and storage areas must be beyond the 15 m buffer zone
		All chemicals and toxicants to be used for the construction must be stored outside the recommended buffer zone and in a bunded area
		No dumping of construction material on site may take place
		All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported
Heritage Resources	Destruction/damage of graves and burial grounds	Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas
	Destruction/damage of built environment resources	Prospecting activities and machinery should completely avoid historical structures
	Destruction/damage of archaeology and living heritage resources	Prospecting activities and machinery should completely avoid archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources	Conduct a field assessment and protocol for finds prior to commencement of the construction phase
Biodiversity (Flora and Fauna)	Loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a CBA1 area)	It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon (including temporarily demarcating the defined project area) and preventing movement of workers into surrounding natural areas

Environmental Aspect	Potential impacts	Mitigation Measures
		Any areas of natural, indigenous vegetation should be declared as ‘‘No-Go’’ areas during the construction phase and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public
		A qualified suitably qualified specialist must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians)
		If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action
		During vegetation clearance, methods should be employed to minimise potential harm to fauna species. Clearing has to take place in a phased and slow manner, commencing from the interior of the site progressing outwards towards the boundary to maximise potential for mobile species to move to adjacent areas
		Construction activities and vehicles could cause spillages of lubricants, fuels and construction material. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the application area
		Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery
	Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance, poaching (due to increased human presence) and/or direct mortalities	Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the prospecting footprint by a suitably qualified Ecology Specialist trained in the handling and relocation of animals
Air Quality	Possible increase in dust generation as a result of drilling and operation of heavy machinery	Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities
		A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles	All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions

Environmental Aspect	Potential impacts	Mitigation Measures
	and operation of machinery/equipment	and limit air pollution
Visual	Scaring of the landscape as a result of the clearance of vegetation	Ensure that areas stripped of vegetation are kept to a minimum
	Visual intrusion as a result of the movement of heavy machinery and the establishment of the required infrastructure	Movement of vehicles shall be restricted to outside of peak hours to minimise the visual impacts on the residents
		Materials transported on public roads must be covered
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity	All construction vehicles and machinery must be maintained in good working order
		When working or travelling past noise sensitive receptors, no unnecessary hooting or noise should occur
Soil, Land Use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages	Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of
		Machinery to be used for the operation will be of good working conditions
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion	The time in which soils are exposed during construction activities should remain as short as possible
		Due to the sensitivity of the soil layer and the associated risk of erosion, construction should occur only in dry season in order to prevent run-off and erosion
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the provincial roads and farm tracks around the prospecting area	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads
		The number of construction vehicles and trips shall be kept to a minimum
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices	Waste shall not be buried or burned on site
		No dumping shall be allowed near or on site
		All general waste shall be disposed of at the nearest licensed landfill site

18.3 Operational Phase

Environmental Aspect	Potential impacts	Mitigation Measures
Socio-Economic	Safety and security risks to landowners and lawful occupiers	Ensure invasive prospecting activities are consistent with occupational health and safety requirements

Environmental Aspect	Potential impacts	Mitigation Measures
		Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowners. This formal agreement should additionally stipulate the landowner's special conditions which should form a legally binding agreement
		All homestead gates must be closed immediately upon entry/exit
		Vehicles used must be in a roadworthy condition and their loads secured. Speed limits must be adhered to and all local, provincial and national regulations with regards to road safety and transport
	Interference with existing land uses	Avoid farm lands actively used for farming
		Ensure that negotiations on compensation are undertaken before invasive activities can commence. This will include any other conditions that the landowner may deem necessary for the prospecting operation
		Use sites that are unused and that are in the degraded state
	Perceptions and expectations	Adhere to an open and transparent communication procedure with stakeholders at all times
		Ensure that accurate and regular information is communicated to I&APs
		Enhance project benefits and minimise negative impacts through intensive consultation with stakeholders
	Job creation	Where possible, the Applicant and contractors will source local labour. However, the number of jobs would not be substantial and duration thereof would be short lived
	Discovery of economically viable mineral resources	No mitigation measures are proposed for this impact
	Training of unskilled labourers	Where possible, the Applicant will source local unskilled labourers to train
Groundwater	Pollution of groundwater due to spillage of hydrocarbons from vehicles and machinery during drilling	Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes
		Drip trays must be placed under vehicles
		During refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks

Environmental Aspect	Potential impacts	Mitigation Measures
	Storage of hydrocarbons and chemicals may impact on groundwater as a result of spillages and uncontrolled release	Drip trays must be placed under vehicles and machinery
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users	Ensure that the land owner's borehole yields are monitored during the drilling operation
		Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated
Surface Water	Contamination of surface water due to spillage of oils, fuels and chemicals	It is proposed that the following condition for Environmental Authorisation be set from a groundwater perspective: o No development should take place within 100 m of the rivers and streams
Heritage Resources	Destruction/damage of graves and burial grounds	Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas
	Destruction/damage of built environment resources	Prospecting activities and machinery should completely avoid the historical farmhouses
	Destruction/damage of archaeology and living heritage resources	Prospecting activities and machinery should completely avoid archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources	Conduct a field assessment and protocol for finds prior to commencement of prospecting activities
Biodiversity (Flora and Fauna)	Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species	As far as possible, the proposed prospecting should be placed in areas that have already been disturbed, and no further loss of primary or secondary vegetation should be permitted
		The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on flora.
		Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste
		Drilling should completely avoid trees, where possible (especially any protected tree species)
		Any areas of natural, indigenous vegetation should be declared as''No-Go'' areas during the operational phase and all efforts must be made to prevent access to these areas from construction workers, machinery,

Environmental Aspect	Potential impacts	Mitigation Measures
		domestic animals and the general public
	Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to on-going anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the prospecting footprint at all times
		Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the prospecting footprint by a suitably qualified ECO trained in the handling and relocation of animals
		No trapping, killing, poaching, snaring or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals
		The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna
	Continued encroachment and displacement of an indigenous and EN vegetation community as well as a CBA1 area by alien invasive plant species and on-going erosion.	As far as possible, the proposed prospecting (including access routes) should be placed in areas that have already been disturbed, and no further loss of primary or secondary vegetation should be permitted
		The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on flora.
		Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste
		Drilling activities should completely avoid trees, where possible (especially any protected tree species)
		Any areas of natural, indigenous vegetation should be declared as ‘‘No-Go’’ areas during the operational phase and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public
	Potential leaks, discharges, litter, pollutant from development into the surrounding environment. Thus harming fauna and flora species	Vehicles could cause spillages of lubricants and fuels. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	Ensure that the drilling and supporting aspects avoid the wetland and buffer areas
		Rip all compacted areas within the drilling footprint areas
		Re-vegetate the ripped areas with indigenous grass

Environmental Aspect	Potential impacts	Mitigation Measures
		species
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off site
		The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly
		Establish action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems
		Ensure that hygienic and functioning temporary ablution facilities are present on site
		Ensure that all ablution facilities on site be cleaned regularly Monitor all ablution facilities daily to ensure that no leaks occur
		Establish an area suitable for such ablution facilities outside of the recommended buffer zone
		Store all relevant waste material in bunded areas outside the recommended buffer zones
		Laydown yards, camps and storage areas must be beyond the 15 m buffer zone
		All chemicals and toxicants to be used for the construction must be stored outside the recommended buffer zone and in a bunded area
		No dumping of construction material on site may take place
		All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported
Air Quality	The prospecting operation will require vehicular movement which may result in possible increase in dust generation	Dust suppression must be conducted during the operational phase of the project
		Correct speed will be maintained at the proposed project site
		A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment	Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes

Environmental Aspect	Potential impacts	Mitigation Measures
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties	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
Noise	The use of vehicles and machinery may generate noise in the immediate vicinity	All vehicles and machinery must be maintained in good working order
		When working or travelling past noise sensitive receptors, no unnecessary hooting or noise should occur
Vibrations	Impact of drilling ground vibration resulting in possible damage to infrastructure	Drill sites shall be situated as far from private property as is possible
		Affected property owners shall be notified of any drilling activities before commencement of the activities
		Should there be damage to private property as a result of drilling activities, property owners shall be appropriately compensated
Soil, Land Use and Land Capability	Top soils removal, storage and replacement during drilling will result in the disruption of the soil profile	Ensure that topsoil is properly stored, away from the streams and drainage areas
	Soil contamination due to spillage of hydrocarbons	Drip trays must be placed under vehicles
		Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of
		Drilling fluids (mud) must be contained in the steel sumps and any spills or leaks must be cleaned up

18.4 Decommissioning Phase

Environmental Aspect	Potential impacts	Mitigation Measures
Heritage Resources	Destruction/damage of graves and burial grounds	Prospecting activities and machinery should completely avoid graves and burial grounds as they are 'No-Go'-Areas
	Destruction/damage of built environment resources	Prospecting activities and machinery should completely avoid the historical structures
	Destruction/damage of archaeology and living heritage resources	Prospecting activities and machinery should completely avoid archaeology and living heritage resources
Palaeontological Resources	Destruction/damage of palaeontological resources	Prospecting activities and machinery should completely avoid palaeontological resources
Biodiversity (Flora and Fauna)	Continued encroachment and displacement of an indigenous and Endangered vegetation community	It is recommended that the prospecting footprint be demarcated during the decommissioning phase so that only the demarcated areas are impacted upon.

Environmental Aspect	Potential impacts	Mitigation Measures
	by alien invasive plant species	Demarcation will also prevent movement of workers into surrounding natural areas
		Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste
		Any areas of natural, indigenous vegetation should be declared as ''No-Go'' areas during the decommissioning phase
	Continued displacement of the faunal community (including threatened or protected species) due to on-going anthropogenic disturbances and habitat degradation (litter, road mortalities and/or poaching)	All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the prospecting footprint areas at all times
		The duration of the decommissioning phase should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna and flora
Wetlands	Degradation or partial loss of wetlands caused by the prospecting and supporting activities	Ensure that the drilling and supporting aspects avoid the wetland and buffer areas
		Rip all compacted areas within the drilling footprint areas
		Re-vegetate the ripped areas with indigenous grass species
	Degradation of wetland areas due to spills and leaks, failing ablution facilities and pollution from domestic waste and stored chemicals	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off site
		The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly
		Establish action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems
		Ensure that hygienic and functioning temporary ablution facilities are present on site
		Ensure that all ablution facilities on site be cleaned regularly
		Monitor all ablution facilities daily to ensure that no leaks take pace
		Establish an area suitable for such ablution facilities outside of the recommended buffer zone
		Store all relevant waste material in bunded areas outside the recommended buffer zones

Environmental Aspect	Potential impacts	Mitigation Measures
		Laydown yards, camps and storage areas must be beyond the 15 m buffer zone
		All chemicals and toxicants to be used for the decommission must be stored outside the recommended buffer zone and in a bunded area
		No dumping of decommissioning material on site may take place
		All waste generated on site during decommissioning must be adequately managed. Separation and recycling of different waste materials should be supported
Air Quality	Removal of equipment and the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds	Dust suppression must be conducted during the decommissioning phase of the project whenever excessive dust is generated from the unpaved road
Noise	Noise will be generated during the removal of equipment on site. This noise is not expected to exceed occupational noise limits and will be short lived	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

18.5 Rehabilitation and Closure Phase

Environmental Aspect	Potential impacts	Mitigation Measures
Heritage Resources	Destruction/damage of graves and burial grounds	Monitor demarcated heritage sites
	Destruction/damage of built environment resources	Monitor demarcated heritage sites
	Destruction/damage of archaeology and living heritage resources	Monitor demarcated heritage sites
Palaeontological Resources	Destruction/damage of palaeontological resources	Monitor demarcated palaentological sites
Biodiversity (Flora and Fauna)	Encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species and potential re-establishment of natural species that were removed. The nature of the erosion will depend on the amount of successful vegetation establishment	Areas that were denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species
		Rehabilitation must include re-filling or capping of drillholes, and the area must be re-vegetated with plant and grass species which are endemic to this

Environmental Aspect	Potential impacts	Mitigation Measures
		vegetation type
	Displacement of the faunal community (including threatened or protected species) due to rehabilitation of the anthropogenic disturbances and habitat degradation, rehabilitation resulting in the faunal species potentially re-establishing within the area	All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the prospecting footprint at all times
		Any larger fauna species noted during rehabilitation should be given the opportunity to move away
Wetlands	Rehabilitating degraded wetland areas (including catchment) to such a degree that functionality of these wetlands is fully restored	Store all excavated material in safe storage yards outside of the recommended buffer zones
		Backfill the relevant material to such an extent that a heap of excess soil is available on top of the drilled cavity. This will ensure that the cavity is continuously filled during subsidence
Air Quality	Rehabilitation the prospecting sites will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation	All vehicles utilising public gravel roads must adhere to speed limits.
		Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes
		Dust suppression must be conducted during the rehabilitation and closure phases of the project whenever excessive dust is generated
Noise	Noise will be generated during the rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived	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
Soil, Land Use and Land Capability	The removal of the campsite equipment and the rehabilitation of the drilling sites 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	Ensure that the rehabilitation work is done in such a manner that the soil is protected from probable spillages
		All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility.
	Compaction of soil due to vehicles/machinery utilised during	Avoid having vehicles repeatedly travel on the same tracks

Environmental Aspect	Potential impacts	Mitigation Measures
	site rehabilitation	Reduce traffic
Environmental Pollution	Generation and disposal of waste	All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities e.g. sewage treatment plant or solid waste disposal site

19. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

In authorising the Bothaville NE Ext A Prospecting Right project, the following conditions should form part of the Environmental Authorisation:

- The terms and conditions for access to site between the applicant and affected landowners must be finalised prior to commencement of invasive prospecting activities.
- Stakeholder engagement will continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. These issues will then be addressed through a grievance mechanism.
- The Applicant must appoint a suitably qualified Environmental Control Officer (ECO) to oversee the invasive prospecting activities and monitor compliance with the EMPR and relevant legislation.
- A 100 m buffer zone around watercourses must be regarded as a 'no- go areas' for invasive prospecting activities.
- A 100 m buffer zone around existing structures (such as dwellings; cultivated fields, gravesites, any fences, etc.) must be regarded as 'no- go areas' for invasive prospecting activities unless permission is granted by the relevant authority and/or landowner.
- The Applicant should adhere to the conditions of the EA, EMPR and specialist reports (where relevant) for this project.
- Rehabilitation and closure must be undertaken as part of the closure plan.

20. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The following assumptions, uncertainties, and gaps in knowledge are applicable to this BAR:

- As per the scope of work, the fieldwork component of the assessment comprised of one assessment only, which was conducted during the dry season. During this period the majority of floral species are not flowering, and this presents a major limitation to the identification of plant species within the project area.
- This study has not assessed any temporal trends for the respective seasons.
- The assessment was based on the results of a single dry season survey only, and information provided should be interpreted accordingly.
- Field assessments were completed to assess as much of the site as possible with focus on the proposed directly impacted areas (prospecting sites).
- Taking into account the on-site seasonal conditions, a conservative approach was adopted in assessing the ecological integrity and functioning of the wetland systems.
- Only wetlands that were likely to be impacted upon by proposed development activities were assessed in the field. Wetlands situated within a 500 m radius of the sites but not in a position within the

landscape to be measurably affected by the developments were not considered as part of this assessment.

- Assumptions have been made that potential wetland areas identified over desktop studies are characterised by wetland conditions and have therefore been deemed to be wetland areas.
- The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side.
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such there is a moderately high level of confidence in the information provided.

21. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

The option of not approving the activities will result in a significant loss of valuable information regarding the mineral status present on the identified farm properties. In addition, should economically viable mineral resources be present and the Applicant does not have the opportunity to prospect, the opportunity to mine these reserves will be lost which will in turn result in a loss of employment opportunities and GDP for the country from exports of the minerals the Applicant has applied to prospect for.

According to the impact assessment undertaken for the proposed project, the impacts of the project are considered to be of Medium to Low significance. The significance of the impacts can be reduced to Low if the mitigation measures are implemented.

Based on the above, it is therefore the opinion of the EAP that this activity should be authorised with conditions attached.

22. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Environmental Authorisation is required for the duration of the linked Prospecting Right Amendment.

23. 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 BAR and the EMPR.

24. FINANCIAL PROVISION

The Regulations pertaining to the Financial Provision for Prospecting, Mining or Production Operations promulgated under Section 44(A)(e), (f), (g), (h) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act 107 of 1998) (20 November 2015) have been considered and this is anticipated to result in an increase in the rehabilitation costs estimated using the above mentioned quantum.

The amount that is required to both manage and rehabilitate the environment in respect of rehabilitation is reflected in the quantum of financial provision in Section 35 (Part B) of this report.

25. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information has been requested by the Competent Authority.

COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24(3)(A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) THE BAR REPORT MUST INCLUDE THE:

26.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The potential impacts on the socio-economic conditions have the potential to include:

- Safety and security risks to landowners and lawful occupiers:
    - The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities. However the impact will be minimal as people on-site will be limited to the Applicant, drilling contractor, specialists, Environmental Control Officer and geologists for the topographical and geophysical surveys.
- Interference with existing land uses:
    - Access to the application area for the topographical and geophysical survey will be required which may interrupt the existing land uses, such as livestock grazing, residential developments and game activities. However, this impact will be minimal as no heavy equipment will be brought on-site and it is of short duration.
- Ineffective communication channels leading to community unrest:
    - There may be cases wherein affected landowners and I&APs speak in a language that the EAP does not comprehend and vice versa. However, this impact will be minimal as individuals who can speak and understand those specific languages will be sourced in order to break communication barriers.
- Possible boost in short-term local small business opportunities:
    - The possible use of local guest houses/accommodating during invasive prospecting activities will result in a boost in short-term local business opportunities.
- Perception and expectations:
    - The proposed Prospecting Right may create interest, particularly in the potential for employment and concerns over damage to natural resources. As such, perceptions and expectations must be managed through on-going, open and transparent communication with affected stakeholders, communities and landowners.
- Job creation:
    - Where possible, the applicant and contractors will source local labour. This will enable the use of the local labour force and as such create employment for the locals. Due to the technical skills required to undertake prospecting, the number of jobs would not be substantial and duration thereof would be short lived.
- Training of unskilled labourers:
    - Prior to commencement of invasive prospecting activities, labourers sourced will receive training on aspects such as employee health and safety on-site, action plans on-site in the event of spills, leaks and other impacts to soils and aquatic systems etc.
- Discovery of economically viable mineral resources:

- Should prospecting prove successful and a resource quantified, it would indicate a potential in the form of mining. Mining will contribute greatly for local economic stimulation through direct employment, future business opportunities, royalties and tax revenues.

The consultation process will allow directly affected parties to raise their concerns. Further to this, it must be noted that I&APs, including directly affected parties such as landowners, had the opportunity to review and comment on the draft BAR and EMPR. The results of the public consultation are included in this final BAR and EMPR, which is submitted to the Department of Mineral Resources for adjudication.

26.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

Notice of the proposed PR Application has been uploaded onto the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS).

27. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

There are no other matters required in terms of Section 24(4)(A) and (B) of the Act.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME

28. INTRODUCTION

28.1 Details of the EAP

The details and expertise of the EAP are detailed in Sections1.2 and 1.3 above as required.

28.2 Description of the Aspects of the Activity

A description of the aspects of the activity covered by the EMPR below is included in Section 2 above.

29. IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

29.1 Determination of Closure Objectives

The vision, and consequent objective and targets for rehabilitation, decommissioning and closure, aim to reflect the local environmental and socio-economic context of the project, and to represent both the corporate requirements and the stakeholder expectations.

The receiving environment within which the prospecting activities will be undertaken include the following key land uses:

- Wetlands
- Cultivated fields
- Grassland

Concerns raised by the stakeholders consulted during the public participation process for the basic assessment have been taken into consideration and are included in this BAR and EMPR, which is submitted to the DMR.

In practice the post closure land use will depend on the pre-prospecting land use applicable to the specific location of the invasive prospecting activities. Considering that the exact locations of the planned prospecting activities have been identified and assessed, it can be concluded that the closure plan will sufficiently address the objectives for the preferred alternative. However, this EMPR aims to address the key closure objectives which are likely to remain consistent for the majority of the prospecting activities.

The EMPR includes a monitoring and a rehabilitation plan. The plan shall outline the closure objectives which are aimed at reinstating the landform, land use and vegetation units to the same as before prospecting operations take place, unless a specific and reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for a Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with the following specific objectives:

1. Eliminate any safety risks associated with drillholes and sump through adequate drillhole capping and backfilling.
2. Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills.
3. Re-vegetation. This involves either reseeding or allowing natural succession depending on the area, climate etc.

4. Storm water management and erosion control. Management of storm-water and prevention of erosion during rehabilitation (e.g. cut off drains, berms etc. and erosion control where required).
5. Monitoring and maintenance of rehabilitated areas forming part of site closure to ensure the long-term effectiveness and sustainability of measures implemented.
6. Successful closure (obtain closure certificate).

29.2 Volume and Rate of Water Use Required for the Operation

The rates and volumes of water to be used are not available at this stage. The water that will be utilised for prospecting activities will be sourced on agreement from an existing authorised water user which could be either the landowner or local municipality. No water will be abstracted in terms of section 21 (a) of the National Water Act, 1998 (Act 36 of 1998).

29.3 Has a Water Use License Been Applied For?

No invasive prospecting activity will occur within identified watercourses. No Water Use License has been applied for as part of this this Prospecting Right application. It is not anticipated that abstraction related water uses may be applicable. However, should abstraction related to water uses be applicable, it is recommended that this be confirmed with the Department of Water and Sanitation (DWS) prior to commencement of the invasive prospecting activities that require water. Should any of the National Water Act (NWA) Section 21 water uses become applicable, then the Applicant will need to apply for the relevant water uses from the DWS prior to undertaking such activities.

29.4 Impacts to be Mitigated in their Respective Phases

Table 28: Impacts to be mitigated.

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Site clearance	• Construction • Operation	• Up to 0.72 ha • Short term and localised	• During vegetation clearance, methods should be employed to minimise potential harm to fauna species. Clearing has to take place in a phased and slow manner, commencing from the interior of the site progressing outwards towards the boundary to maximise potential for mobile species to move to adjacent areas • Utilise local labour if possible • Prior to and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the machinery • The duration of the prospecting should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna and flora • All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the drilling footprint at all times • As far as possible, the proposed prospecting (including access routes) should be placed in areas that have already been disturbed, and no further loss of primary or secondary vegetation should be permitted • Minimise dust generation • Limit vehicle access • Implement alien vegetation management	• NEMA • MPRDA • NEMBA • NEMAQA • Dust Regulations • NWA • DWAF Best Practice Guidelines • NHRA	• Throughout construction and operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			• On-going identification of risks and impacts • Emergency preparedness • Monitoring and review • No trapping, killing or poisoning of any wildlife is to be allowed on site		
Site access	• Construction • Operation	• 9 510.03 ha • Short term and localised	• All employees and visitors to the site must undergo a site induction which shall include basic environmental awareness and site specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures). This induction should be presented or otherwise facilitated by the Contractor's Environmental Officer wherever possible	• NEMA • OSH • MHSA	• Throughout construction and operation
Establishment of site infrastructure	• Construction • Operation	• Up to 0.72 ha • Short term and localised	• Minimise physical footprint of construction • Ensure construction is consistent with occupational health and safety requirements • Minimise vegetation clearance • Minimise waste and control waste disposal • Demarcate drill sites with security access control and warning signs • Ensure adequate containment of waste to prevent pollution • Minimise dust generation • Limit vehicle access to approved access roads • Prepare contingency plans for spillage and fire risks • Any areas of natural, indigenous vegetation should	• NEMA • MPRDA • NEMBA • NEMAQA • Dust Regulations NWA • DWAF Best Practice Guidelines	• Throughout construction and operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			be declared as ‘‘No-Go’’ areas during the construction and operational phases and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public • A qualified Ecology Specialist must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians) • All livestock (including cattle, pigs, goats, domestic dogs and cats) must be kept out of the drilling footprint at all times • If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action		
Storage of construction vehicle	• Construction • Operation	• Up to 0.72 ha • Short term and localised	• Any equipment that may leak and does not have to be transported regularly must be placed on watertight drip trays to catch any potential spillages of pollutants. The drip trays must be of an adequate size • Drip trays must be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility • Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils	• NWA • DWAF Best Practice Guidelines	• Throughout construction and operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Transportation/ access to and from the drill sites	• Construction • Operation	• Up to 0.72 ha • Short term and localised	• Where possible, the drill sites should be situated along existing access roads to reduce the requirement for additional access roads • Any new temporary access routes to the drill sites should result in minimal disturbance to existing vegetation • Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate the landowner's special conditions which would form a legally binding agreement • All property gates must be closed immediately upon entry/exit • Under no circumstances may the contractor damage any property gates, fences, etc • On site vehicles must be limited to approved access routes and areas on the site so as to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic (where relevant) • All construction and vehicles using public roads must be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport • All measures should be implemented to minimise potential of dust generation	• NEMA • NEMBA • CARA • NEMAQA • Dust Regulations • Road Traffic Act	• Throughout construction and operation
Storage of	• Construction	• Up to 0.72 ha	• All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored	• NWA	• Throughout construction and

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
hazardous substances	• Operation	• Short term and localised	and disposed of in a safe and responsible manner to prevent pollution of the environment and harm to people or animals. Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill in a way that does not pose any danger of pollution even during times of high rainfall • Hazardous substances must be confined to specific and secured areas, and stored at all times within bunded areas • Adequate spill prevention and cleanup procedures should be developed and implemented during prospecting • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA	• NEMWA • DWAF Best Practice Guidelines • NEMA	operation
Waste management	• Construction • Operation	• Short term and localised	• All general waste shall be disposed of at the nearest licensed landfill site • Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site • Waste shall not be buried or burnt on site	• DWAF Minimum requirements for waste disposal • NEMWA	• Throughout construction and operation
Drilling of 8 drillholes	• Construction • Operation	• Up to 0.72 ha • Short term and localised	• Vegetation clearing for prospecting sites should be kept to a minimum in order to reduce the disturbance footprint • Ensure that the drilling and supporting aspects avoid the wetland and buffer areas	• SANS 10103 • ECA Noise Regulations • NEMAQA	• Throughout construction, operation and decommissioning

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			• Compaction of soil must be avoided as far as possible and the use of heavy machinery must be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils • All measures should be implemented to minimise the potential of dust generation • Local residents should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. These works should not take place at night or on weekends • Noise attenuation on engines must be adequate and the noisy activities must be restricted as far as is possible to times and locations whereby the potential for noise nuisance is reduced • When working near a potential sensitive area, the contractor must limit the number of simultaneous activities to the minimum • Ensure proper storage of fuels • On site vehicles must be limited to approved access routes and areas on the site so as to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic • Workforce should be kept within defined boundaries and to agreed access routes • No invasive prospecting activities are to be undertaken within 100 m of a watercourse • No ablution or site laydown areas are to be	• Dust Regulations • NWA • NEMBA • OHS and MHSA • NEMWA	

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			situated within 100 m of a watercourse • Workers must be easily identifiable by clothing and ID badges. Workers should carry with them, at all times, a letter from the applicant stating their employment, title, role and manager contact details		
Re-fuelling	• Construction • Operation	• Short term and localised	• Refuelling may only take place within demarcated areas that are subject to appropriate spill prevention and containment measures refuelling and transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimise the potential for leakage and to prevent spillage onto the soil • Drip trays should be utilised in relevant locations (inlets, outlets, points of leakage, etc.) during transfer so as to prevent such spillage or leakage. Any accidental spillages must be contained and cleaned up promptly	• NWA • DWAF BPG	• Throughout construction and operation
Maintenance and repair	• Construction • Operation	• Short term and localised	• Trucks, machinery and equipment must be regularly serviced to ensure they are in proper working condition and to reduce the risk of leaks. All leaks must be cleaned up immediately using spill kits or as per the emergency response plan. For large spills a hazardous materials specialist shall be utilised • Accidental hydrocarbon spillages must be reported immediately, and the affected soil should be removed, and rehabilitated or if this is not possible, disposed of at a suitably licensed waste disposal facility	• NWA • DWAF BPG • NEMA	• Throughout construction and operation
Drillhole closure	• Decommissioning • Closure	• Short term and localised	• Where groundwater is encountered during drilling, all affected prospecting drillholes that will not be	• NWA • DWAF BPG	• Throughout decommissioning

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers • Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that: o Concrete shall not be mixed directly on the ground o The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing of visible signs into the ground is not acceptable) • All excess aggregate shall also be removed	• NHRA	and closure
Removal of surface infrastructure	• Decommissioning	• Short term and localised	• All infrastructure, equipment, and other items used during prospecting will be removed from the site • Compaction of soil must be avoided as far as possible. The use of heavy machinery must be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils	• MPRDA • Rehab Plan	• Throughout decommissioning
Removal of waste	• Decommissioning	• Short term and localised	• Any excess or waste material or chemicals must be removed from the site and must preferably be recycled (e.g. oil and other hydrocarbon waste products). Any waste materials or chemicals that cannot be recycled must be disposed of at a suitably licensed waste facility	• NWA • DWAF BPG • NEMWA	• Throughout decommissioning

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Rehabilitation	• Rehabilitation	• All disturbed areas	• Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed • Sites must be restored to the original condition with vegetation cover (where applicable) equalling the surrounding vegetation cover • All debris and contaminated soils must be removed and suitably disposed of • Contours and natural surrounding must be reformed • Natural drainage patterns must be restored • All surface infrastructure on site must be removed • Temporary access routes/roads must be suitably rehabilitated • Sites must be monitored by the ECO (including relevant specialist's inputs, if necessary) for adequate rehabilitation until the desired rehabilitation objectives have been achieved • Rehabilitation must include re-filling or capping of drillholes, and the area must be re-vegetated with plant and grass species which are endemic to this vegetation type	• MPRDA • Rehab Plan • NEMA	• Throughout rehabilitation
Consultation	• Planning • Construction • Operation	• Medium term	• Stakeholder engagement will continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. The Applicant shall attend applicable community meetings with the affected communities. Any issues raised will then be addressed through a grievance mechanism	• NEMA	• Throughout planning, construction and operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Monitoring	• Post operational	• All rehabilitated areas	• The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority. The monitoring activities during this period will include but not be limited to: o Biodiversity monitoring o Re-vegetation of disturbed areas where required. Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management	• MPRDA • Rehab Plan	• Throughout post-operation

29.5 Impact Management Actions and Outcomes

Table 29: Impact management actions and outcomes.

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Site clearance	• Interference with existing land uses • Safety and security risks to landowners and lawful occupiers • Friction between landowner and workers • Possible increase in dust generation • Loss and fragmentation of the vegetation community • Scaring of landscape • Displacement of faunal community • Localised spillages from machinery leading to groundwater contamination • Potential deterioration in water quality due to the potential accidental spillages of hazardous substances • Soil erosion • Noise generation • Destruction/damage of built environment resources • Damage/destruction of graves in the area • Destruction/damage of palaeontological resources • Degradation of wetlands caused by site clearance	• Visual • Soil, land use and land capability • Air quality • Surface water • Groundwater • Noise • Biodiversity • Socio-economic • Heritage • Palaeontological • Wetlands	• Construction • Operation	• Avoid and control through implementation of EMPR mitigation measures (e.g. vehicle maintenance, dust suppression)	• NEMA • NEMBA • CARA • Threatened Protected Species (TOPS) Regulations • NEMAQA • Dust Regulations • NWA • DWAF best Practice Guidelines • NHRA

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Storage of construction vehicles	• Contamination of surface water and groundwater to due leakage of hydrocarbons • Soil contamination • Visual intrusion as a result of the construction vehicles stored on site • Potential leaks into surrounding environment. Thus harming flora and fauna species • Compaction of soil • Degradation of wetlands due to spills and leaks	• Surface water • Groundwater • Soils • Visual • Wetlands	• Construction • Operation	• Avoid through implementation of EMPR mitigation measures (e.g. place drip-trays under vehicles to prevent contamination due to hydrocarbon spillage)	• Threatened Protected Species (TOPS) Regulations • NWA • DWAF best Practice Guidelines • NEMBA • NEMA
Transportation to and from the drill sites	• Increase in traffic volumes • Loss and fragmentation of the vegetation community • Dust generation • Compaction of soil	• Soils • Biodiversity • Air quality • Traffic	• Construction • Operation	• Avoid through implementation of EMPR mitigation measures (e.g. speed limit enforcement, dust suppression)	• Threatened Protected Species (TOPS) Regulations • NEMBA • NEMAQA • Dust Regulations • NWA • DWAF best Practice Guidelines
Storage of hazardous substances	• Storage of hydrocarbons and chemicals may impact on groundwater as a result of spillages and uncontrolled release • Contamination of surface water due to spillage of oils, fuels and chemicals	• Surface water • Groundwater • Wetlands	• Construction • Operation	• Avoid through implementation of EMPR mitigation measures (e.g. placing drip trays	• NEMA • NWA • DWAF best Practice

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	• Degradation of wetlands due to spills and leaks			to prevent spillage, delineating a 100 m buffer from water courses)	Guidelines
Waste management	• Generation and disposal of waste	• Environmental pollution	• Construction • Operation • Decommissioning	• Avoid through implementation of EMPR mitigation measures (e.g. collect waste and dispose at a registered waste disposal facility)	• DWAF minimum requirement for waste disposal • NEMWA
Drilling of 8 drillholes	• Interference with existing land uses • Safety and security risks to landowner s and lawful occupiers • Discovery of economically viable mineral resources • Job creation • Contamination of soil, groundwater and surface water due to spillage of hazardous substances • Dust generation • Noise • Encroachment and displacement of Endangered vegetation community • Displacement and fragmentation of faunal community • Visual intrusion as a result of the drill rigs	• Socio-economic • Groundwater • Surface water • Soil, land use and land capability • Air quality • Noise • Biodiversity • Visual	• Operation	• Avoid through implementation of EMPR mitigation measures (e.g. ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures)	• SANS10103 • ECA Noise Regulations • NEMAQA • Dust Regulations • NWA • Threatened Protected Species (TOPS) Regulations • NEMA

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	and machinery on site				
Refuelling	• Potential hydrocarbon spills that could pollute soil or surface and/or groundwater resources	• Soils • Surface water • Groundwater	• Construction • Operation	• Avoid through implementation of EMPR mitigation measures (e.g. during refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks)	• NWA • DWAF best Practice Guidelines • NEMA
Maintenance and repair	• Potential hydrocarbon spills that could pollute soils, surface water and groundwater resources	• Soils • Surface water • Groundwater	• Construction • Operation	• Control through implementation of EMPR mitigation measures (e.g. utilise drip trays to prevent spills or leaks)	• NWA • DWAF best Practice Guidelines • NEMA
Drillhole closure	• Potential pollution of habitats with cement residue that may be exposed to run-off • Groundwater contamination	• Environmental pollution • Groundwater	• Decommissioning and closure	• Control through implementation of EMPR mitigation measures	• NWA • NEMBA
Removal of surface infrastructure	• Compaction of soil • Dust generation due to movement of vehicles • Noise generated during removal or equipment • Encroachment an displacement of an indigenous and Endangered vegetation by alien invasive species	• Soils • Air quality • Noise • Biodiversity	• Decommissioning	• Control through implementation of EMPR mitigation measures (e.g. any areas of natural, indigenous vegetation should be declared as ‘‘No-Go’’ areas	• MPRDA in accordance with Rehabilitation Plan

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	• Displacement of the faunal community due to continued anthropogenic impacts			during the decommissioning phase)	
Rehabilitation	• Compaction of soil due to vehicles and machinery utilised • Dust generation • Noise • Destruction/damage of graves and burial grounds • Destruction/damage of built environment resources • Destruction/damage of palaeontological resources • Introduction of alien invasive species • Displacement of faunal community • Generation and disposal of waste	• Soils, land use and land capability • Air quality • Noise • Heritage • Palaeontological • Biodiversity • Environmental pollution	• Rehabilitation and closure	• Control through implementation of EMPR mitigation measures (e.g. waste collection and disposal of waste at a registered waste disposal site)	• MPRDA in accordance with Rehabilitation Plan • NHRA
Monitoring of rehabilitated sites	• Soil compaction • Soil contamination • Soil erosion • Safety and security risks to landowners and lawful occupiers	• Soils, land use and land capability • Socio-economic	• Post-operation	• Control through implementation of EMPR mitigation measures	• MPRDA and Regulations

30. FINANCIAL PROVISION

The requirement for final rehabilitation, decommissioning and closure stems primarily from the legislative requirements of the MPRDA and NEMA. On 20th of November 2015 the Minister promulgated the Financial Provisioning Regulations under the NEMA. The Regulations aim to regulate the determination of financial provision as contemplated in the NEMA for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. These regulations provide for, inter alia:

- Determination of financial provision: An Applicant or holder of a right or permit must determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, prospecting, mining or production operations, as contemplated in the Act and to the satisfaction of the Minister responsible for mineral resources.
- Scope of the financial provision: Rehabilitation and remediation; decommissioning and closure activities at the end of operations; and remediation and management of latent or residual impacts.
- Regulation 6: Method for determining financial provision – An applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:
  - Annual rehabilitation – annual rehabilitation plan.
  - Final rehabilitation, decommission and closure at end of life of operations – rehabilitation, decommissioning and closure plan.
  - Remediation of latent defects.
- Regulation 10: An applicant must-
  - Ensure that a determination is made of the financial provision and the plans contemplated in regulation 6 are submitted as part of the information submitted for consideration by the Minister responsible for mineral resources of an application for environmental authorisation, the associated environmental management programme and the associated right or permit in terms of the Mineral and Petroleum Resources Development Act, 2002.
  - Provide proof of payment or arrangements to provide the financial provision prior to commencing with any prospecting, prospecting, mining or production operations.
- Regulation 11: Requires annual review, assessment and adjustment of the financial provision. The review of the adequacy of the financial provision including the proof of payment must be independently audited (annually) and included in the audit of the EMPR as required by the EIA Regulations.

Appendix 4 of the Financial Provisioning Regulations provides the minimum content of a final rehabilitation, decommissioning and closure plan (FRDCP).

30.1 Other Guidelines

The following additional guidelines which relate to financial provisioning and closure have been published in the South African context:

- Best Practice Guideline G5: Water Management Aspects for Mine Closure: This guideline was prepared by the DWS and aims to provide a logical and clear process that can be applied by mines and the competent authorities to enable proper mine closure planning that meets the requirements of the relevant authorities. This guideline is aimed primarily at larger scale mines and does not specifically address closure issues related to closure of prospecting activities. However certain principles related to closure and water management are relevant. The following technical factors which should be considered during closure, and which are likely to relate to prospecting activities, have been considered:
  - Land use plan: directly interlinked with water management issues insofar as water is required to support the intended land use- in this regard the surrounding communities and the land uses implemented rely on available ground and surface water to be sustained. Management of water quality and quantity has been identified as an aspect and is covered in the BAR and EMPR.
  - Public participation and consultation: consultation is fundamental to closure and there is a need for full involvement of stakeholders in the development of the final closure plans, and in the agreement of closure objectives. This report has been made available through the Basic Assessment public participation process for comment by relevant stakeholders.
- Guideline for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine: The objectives of the guideline include the need to improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of mining activities. Whilst this guideline predates the recent NEMA Financial Provisioning Regulations, it does contain certain principles and concepts that remain valid and have been considered in the Financial Provision.

31. DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER THE REGULATION

Considering the relatively limited impact of the proposed prospecting activities, the closure objectives are aimed at re-instating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting.

This shall be achieved with a number of specific objectives:

1. Eliminate any safety risks associated with drillholes and sump through adequate drillhole capping and backfilling.
2. Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills.
3. Re-vegetation. This involves either reseeding or allowing natural succession depending on the area, climate etc.
4. Storm water management and erosion control. Management of storm-water and prevention of erosion during rehabilitation (e.g. cut off drains, berms etc. and erosion control where required).
5. Monitoring and maintenance of rehabilitated areas forming part of site closure to ensure the long-term effectiveness and sustainability of measures implemented.
6. Successful closure (obtain closure certificate).

32. CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES

The PPP is a requirement of several pieces of the South African legislation and aims to ensure that all relevant I&APs are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP, which forms part of the Prospecting Right application needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with national legislation.
- Establish and manage relationships with key stakeholder groups.
- Encourage involvement and participation in the environmental study and authorisation/ approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project.
- Explain the environmental authorisations required.
- Explain the environmental studies already completed and yet to be undertaken (where applicable).
- Determine and record issues, concerns, suggestions and objections to the project.
- Provide opportunity for input and gathering of local knowledge.
- Establish and formalise lines of communication between the I&APs and the project team.
- Identify all significant issues for the project.
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximise and/or promote positive environmental impacts associated with the project.

Landowners and I&APs have been consulted and provided an opportunity to comment on this Basic Assessment Report, EMPR including all decommissioning, closure and rehabilitation plans.

33. REHABILITATION PLAN

33.1 Integrated Rehabilitation and Closure Plan

The main aim in developing this rehabilitation plan is to mitigate the impacts caused by the prospecting activities and to restore land back to a satisfactory standard. It is best practice to develop the rehabilitation plan as early as possible so as to ensure the optimal management of rehabilitation issues that may arise. It is important that the project's closure plan is defined and understood before starting the process and is complementary to the rehabilitation goals. Rehabilitation and closure objectives need to be tailored to the project and be aligned with the EMPR.

The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the application area.
- Re-establishment of the pre-developed land capability to allow for a suitable post-prospecting land use.
- Prevent soil, surface water and groundwater contamination.
- Comply with the relevant local and national regulatory requirements.
- Maintain and monitor the rehabilitated areas.

Successful rehabilitation must be sustainable, requires an understanding of the basic baseline environment and project management to ensure that the rehabilitation program is a success.

It is noted that an application for environmental authorisation must be submitted for closure in accordance with Listing Notice 1 Activity 22:

The decommissioning of any activity requiring –

I. a closure certificate in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) or
II. a prospecting right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.

33.2 Phase 1: Making Safe

Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that:

- Concrete shall not be mixed directly on the ground.
- The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (washing of visible signs into the ground is not acceptable).
- All excess aggregate shall also be removed.

33.3 Phase 2: Landform Design, Erosion Control and Re-vegetation

Landform, erosion control and re-vegetation is an important part of the rehabilitation process. Landform and land use are closely interrelated, and the landform should be returned as closely as possible to the original landform. Community expectations, compatibility with local land use practices and regional infrastructure, or the need to replace natural ecosystems and faunal habitats all support returning the land as closely as possible to its original appearance and productive capacity.

This requires the following:

- Shape, level and de-compact the final landscape after removing all the project infrastructure, dress with topsoil and, where necessary, vegetate with indigenous species. Commission specialists to assist in planning re-vegetation and the management of environmental impact, as required.
- Remove access roads with no beneficial re-use potential by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Natural drainage patterns are to be reinstated as closely as possible.
- Shape all channels and drains to smooth slopes and integrate into the natural drainage pattern.
- Construct contour banks and energy dissipating structures to protect disturbed areas from erosion prior to stabilisation.
- Promote re-vegetation through the encouragement of the natural process of secondary succession.
- Natural re-vegetation is dependent on de-compaction of sub-soils and adequate replacement of the accumulated reserves of topsoil, so as to encourage the establishment of pioneer vegetation.
- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary.

33.4 Phase 3: Monitoring and Maintenance

The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority.

The monitoring activities during this period will include but not be limited to:

- Biodiversity monitoring.
- Re-vegetation of disturbed areas where required.

Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post-closure monitoring and management.

33.5 Post-Closure Monitoring and Maintenance

Prior to decommissioning and rehabilitation activities, a monitoring programme shall be developed and submitted to the relevant authority for approval, as a part of the Final Rehabilitation Plan. The programme is to include proposed monitoring during and after the closure of the drill sites and related activities.

It is recommended that the post-closure monitoring include the following:

- Confirmation that any waste, wastewater or other pollutants that is generated as a result of decommissioning will be managed appropriately, as per the detailed requirements set out in the Final Rehabilitation Plan.
- Confirmation that all de-contaminated sites are free of residual pollution after decommissioning.
- Confirmation that acceptable cover has been achieved in areas where natural vegetation is being re-established. ‘Acceptable cover’ means re-establishment of pioneer grass communities over the disturbed areas at a density similar to surrounding undisturbed areas, non-eroding and free of invasive alien plants.
- Confirmation that the drill site is safe and is not resulting in a pollution hazard.

Annual environmental reports will be submitted to the Designated Authority and other relevant Departments for at least one year post-decommissioning. The frequency and duration of this reporting period may be increased to include longer term monitoring, at intervals to be agreed with the designated authority.

The monitoring reports shall include a list of any remedial action necessary to ensure that infrastructure that has not been removed remains safe and pollution free and that rehabilitation of project sites are in a stable, weed and free condition.

34. EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES

The rehabilitation plan is compatible with the closure objectives in that is seeks to ensure that negative impacts on the receiving environment that could not be prevented or mitigated during prospecting are rehabilitated. The use of indigenous species during re-vegetation will ensure that ecosystem restoration is initiated and prevent invasion by alien species. The appropriate disposal of waste will ensure that land is usable, in alignment with surrounding land uses and that no hazardous materials are left on-site post-prospecting.

35. CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE

Table 30 details the quantum for financial provision for the Final Rehabilitation, Decommissioning and Closure Plan.

Table 30: Quantum for financial provision.

CALCULATION OF THE QUANTUM							
Prospecting Right Applicant: White Rivers Exploration (Pty) Ltd					**Project name:**	Bothaville NE Ext A	
					Date:	Apr-19	
No.	**Description**	**Unit**	**A** **Quantity**	**B** **Master rate**	**C** **Multiplication factor**	**D** **Weighting factor 1**	**E=A*B*C*D** **Amount (ZAR)**
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m^3	0	R 13.38	1	1	R 0.00
2 (A)	Demolition of steel buildings and structures	m^2	0	R 184.76	1	1	R 0.00
2 (B)	Demolition of reinforced concrete buildings and structures	m^2	0	R 272.30	1	1	R 0.00
3	Rehabilitation of access roads	m^2	0	R 33.05	1	1	R 0.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	R 320.91	1	1	R 0.00
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	R 175.05	1	1	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	R 370.69	1	1	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	0	R 193 714.14	1	1	R 0.00
7	Sealing of shafts adits and inclines	m^3	0	R 99.19	1	1	R 0.00
8 (A)	Rehabilitation of overburden and spoils	ha	0	R 129 142.75	1	1	R 0.00
8 (B)	Rehabilitation of processing waste deposits and evaporationponds (non-polluting potential)	ha	0	R 160 844.97	1	1	R 0.00
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	R 467 170.04	1	1	R 0.00
9	Rehabilitation of subsided areas	ha	0	R 108 137.61	1	1	R 0.00
10	General surface rehabilitation:	ha	0.72	R 102 302.84	1	1	R 73 658.04
	Sealing and capping 8 boreholes	m	8	R 120.00	1	1	R 960.00
	Earthworks: backfilling excavations, reshaping and topsoil replacement	m^3	0	R 11.00	1	1	R 0.00
	Removal and disposal of waste	Per site	8	R 3 000.00	1	1	R 24 000.00
	Re-vegetation (apply fertilizer and seed)	ha	0.72	R 21 000.00	1	1	R 15 120.00
11	River diversions	ha	0	R 102 302.84	1	1	R 0.00
12	Fencing	m	0	R 116.69	1	1	R 0.00
13	Water management	ha	0	R 38 898.42	1	1	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0.72	R 13 614.45	1	1	R 6 807.22
15 (A)	Specialist study	Sum	0			1	R 0.00
15 (B)	Specialist study	Sum	0			1	R 0.00
							R 120 545.26
					Weighting Factor 2	1.1	
					Sub Total 1		**R 120 545.26**
					1. Preliminary and General	12%	R 14 465.43
					2. Contingency	10%	R 12 054.53
					Sub Total 2		**R 147 065.22**
					VAT - 15%		R 22 059.78
					Grand Total		**R 169 125.01**

ENVIRONMENTAL SENSITIVITY	Medium	(High = H, Medium = M, Low = L)
RISK CLASS	C	(A, B, C)
WEIGHTING FACTOR 1	Flat	(Flat; Undulating; Rugged)
WEIGHTING FACTOR 2	Remote	(Urban; Peri-urban; Remote)

36. CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED

According to Regulation 8 pertaining to the financial provision for prospecting, exploration, mining or production operations (GN 1147), an applicant or holder of a right or permit must make financial provision by one or a combination of the following:

- Financial guarantee from a bank registered in terms of the Banks Act, 1990 (Act 94 of 1990) or from a financial institution registered by the Financial Services Board as an insurer or underwriter;
- Deposit into an account administered by the Minister responsible for mineral resources; or;
- Contribution to a trust fund established in terms of applicable legislation.

The Creasy Group of companies has committed to finance the prospecting costs. This group is a long standing investor into the South African minerals industry.

37. MECHANISMS FOR MONITORING COMPLIANCE

Table 31: Mechanisms for monitoring compliance.

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities	Monitoring and reporting frequency and time periods for implementation
Desktop studies	• None	• None	• None	• None
Locate and acquire all available gold (and gold byproducts) and coal, geological and geophysical data relevant to prospect	• None	• None	• None	• None
Data QA/QC, digitization and compilation	• None	• None	• None	• None
Field visit	• None	• None	• None	• None
Data synthesis and development of provisional geological model	• None	• None	• None	• None
Possibility of geophysical orientation and regional surveys	• All impacts identified in the EMPR	• Site inspections and checklists • Complaints register	• ECO • Contractor's environmental representative	• Once-off site visit and reporting
Based on geological model, key boreholes previously drilled in the area will be situated and negotiations with the owners undertaken to obtain access to the core for reclogging and, if necessary, resampling	• None	• None	• None	• None

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities	Monitoring and reporting frequency and time periods for implementation
Site clearance	• All impacts identified in the EMPR	• Document control • Site inspections and checklists • Report review and development of corrective action plans	• ECO • Contractor's environmental representative • Environmental specialist • Senior environmental management	• Annual site visit • Annual environmental audit report
Drilling of 8 drillholes to a depth of 700 m	• All impacts identified in the EMPR	• Document control • Site inspections and checklists • Report review and development of corrective action plans • Demarcation of sensitive areas	• ECO • Contractor's environmental representative • Environmental specialist • Senior environmental management	• Annual site visit • Annual environmental audit report
Finalisation of 3D geological model	• None	• None	• None	• None
Environmental screening	• All impacts identified in the EMPR	• Complaints register • Site inspections and checklists	• ECO • Contractor's environmental representative	• Monthly inspections and checklists
Temporary general waste storage	• All impacts identified in the EMPR	• Complaints register • Site inspections and checklists	• ECO • Contractor's environmental representative	• Daily inspections and checklists
Temporary hazardous waste storage	• All impacts identified in the EMPR	• Complaints register • Site inspections and checklists	• ECO • Contractor's environmental representative	• Daily inspections and checklists

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities	Monitoring and reporting frequency and time periods for implementation
Undertaking decommissioning and rehabilitation as per the rehabilitation plan	• Alien vegetation management • Noise (if any complaints are registered by the residents) • Air quality (if any complaints are registered by the residents)	• Site inspections and checklists • Report review and development of corrective action plans	• ECO • Contractor's environmental representative • Environmental specialist • Senior environmental management	• Annual site visit • Annual environmental audit report
Monitoring of rehabilitation efforts	• All impacts identified in the EMPR	• Complaints register • Site inspections and checklists	• ECO • Independent environmental auditor	• Continually monitor for a period of one (1) year
Resource estimation and concept study	• None	• None	• None	• None

38. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ ENVIRONMENTAL AUDIT REPORT

The result of environmental monitoring and compliance to the approved EMPR will be undertaken every year and submitted to the DMR in the form of a Performance Assessment/ Environmental Audit Report. Included in the report will be the following relevant information:

- The period when the assessment/audit was conducted.
- The scope of the assessment.
- The procedures used for conducting the assessment.
- Interpreted information gained from monitoring the EMPR.
- Evaluation criteria used during the assessment.
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMPR and how it can be rectified.
- Annually updated layout plans.

Any emergency or unforeseen impacts will be reported immediately to the DMR and other relevant government departments.

39. ENVIRONMENTAL AWARENESS PLAN AND TRAINING

Training and Environmental Awareness is an integral part of a complete EMPR. The overall aim of the training will be to ensure that all site staff are informed of their relevant requirements and obligations pertaining to the relevant authorisations, licences, permits and the approved EMPR and protection of the environment.

The applicant and contractor must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner, and are capable of complying with the relevant environmental requirements.

To obtain buy-in from staff, individual employees need to be involved in:

- Identifying the relevant risks.
- Understanding the nature of risks.
- Devising risk controls.
- Given incentive to implement the controls in terms of legal obligations.

The applicant shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. All training must be formally recorded and attendance registers retained.

The environmental training should, as a minimum, include the following:

- General background and definition of the environment.
- The environmental impacts, actual or potential, of their work activities.
- Compliance with mitigation measures proposed for sensitive areas.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving compliance with the environmental policy and procedures and with the requirement of the applicant’s environmental management systems, including emergency preparedness and response requirements.

- The potential consequences (legal and/or other) of departure from specified operating procedures.
- The mitigation measures required to be implemented when carrying out their work activities.
- All operational risks must be identified and processes established to mitigate such risk, proactively. Thus, the applicant needs to inform the employees of any environmental risks that may result from their work, and how these risks must be dealt with in order to avoid pollution and/or degradation of the environment.
- In the case of new staff (including contract labour) the contractor/applicant shall keep a record of adequate environmental induction training, the importance of compliance with all environmental policies.

39.1 Manner In Which Employees Will Be Informed Of Environmental Risks

Environmental awareness could be fostered by an induction course for all personnel on-site, before commencing site visits. Personnel should also be alerted to particular environmental concerns associated with their tasks for the area in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by personnel.

The environmental awareness training programme will include the following:

1. Occupational Health and Safety Training (OHS).
2. Environmental Awareness Training EMPR management actions.

Environmental awareness training will focus on the following specific aspects and be undertaken in “Tool box talk“ topics prior to site access:

1. Waste collection and disposal.
2. EMPR management options and application.

39.2 Manner In Which Risks Will Be Dealt With To Avoid Pollution Or Degradation

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed prospecting activities taking place are provided below:

- Contain potential pollutants and contaminants (where possible) at source.
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates.
- Ensure the timeous clean-up of any spills.
- Implement a waste management system for all waste stream present on-site.
- Investigate any I&AP claims of pollution or contamination as a result of prospecting activities.
- Implement the impact management objectives, outcomes and actions, as described above.

It is of critical importance that the broad measures to control or remedy any causes of pollution or environmental degradation are applied during onsite prospecting activities.

40. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information was requested or is deemed necessary.

41. UNDERTAKING

The EAP herewith confirms:

(a) The correctness of the information provided in the reports.

(b) The inclusion of comments and inputs from stakeholders and I&APs.

(c) The inclusion of inputs and recommendations from the specialist reports, where relevant.

(d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the Environmental Assessment Practitioner:

Shango Solutions

Name of company (if applicable):

April 2019

Date:

The Applicant herewith confirms:

(a) The person whose name is stated below is the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application.

(b) The applicant undertakes to execute the Environmental Management Programme as proposed.

Signature of the applicant / Signature on behalf of the applicant:

White Rivers Exploration (Pty) Ltd

Name of company:

April 2019

Date:

42. REFERENCES

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