



WRE VENTERSBURG CONSOLIDATED PROSPECTING RIGHT PROJECT

BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Submitted in support of the Prospecting Right and Environmental Authorisation Application

Prepared on Behalf of:

**WESTERN ALLEN RIDGE GOLD MINES (PTY) LTD
(Subsidiary of White Rivers Exploration (Pty) Ltd)**

**DMR REFERENCE NUMBER:
FS 30/5/1/1/3/2/1/1/10489 EM**

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WRE VENTERSBURG CONSOLIDATED PROSPECTING RIGHT PROJECT

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Compiled by: Ms Nangamso Zizo Siwendu
Environmental Consultant, Shango Solutions
Cell: 072 669 6250
E-mail: zizo@shango.co.za

Reviewed by: Dr Jochen Schweitzer
Principal Consultant, Shango Solutions
Cell: 082 448 2303
E-mail: jochen@shango.co.za

Ms Stefanie Weise
Principal Consultant, Shango Solutions
Cell: 081 549 5009
E-mail: stefanie@shango.co.za

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EXECUTIVE SUMMARY

Western Allen Ridge Gold Mines (Pty) Ltd (Western Allen Ridge) submitted an application for a Prospecting Right and an Environmental Authorisation in order to prospect for the following commodities:

- Silver
- Gold
- Coal
- Cobalt
- Copper
- Diamond (Alluvial)
- Iron
- Manganese
- Molybdenum
- Nickel
- Lead
- Platinum Group Metals
- Rare Earths
- Sulphur
- Uranium
- Tungsten
- Zinc

The application for the Prospecting Right was accepted by the Department of Mineral Resources – Free State Province on the 24th November 2017. The proposed project will be known as WRE Ventersburg Consolidated Prospecting Right and it will aim to explore and quantify the potential mineral resources. In order to undertake prospecting activities, Western Allen Ridge require a Prospecting Right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002). Western Allen Ridge is also required to obtain an Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) which involves the submission of a Basic Assessment Report and Environmental Management Programme. Shango Solutions have been appointed by Western Allen Ridge Gold Mines (Pty) Ltd as the Environmental Assessment Practitioner to assist in complying with these requirements.

Purpose of this Document

This document has been compiled in support of the Prospecting Right and Environmental Authorisation application and aims to assess any impacts associated with prospecting activities as detailed in the Prospecting Work Programme. It is important that Interested and Affected Parties are 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 is being undertaken for this application and this document will be available to Interested and Affected Parties for review and comment for a period of 30 days before it is finalised to include the results of the consultation for submission to the Competent Authority (Department of Mineral Resources) for their decision-making.

Project Location

The area of interest occupies a total of approximately 7 943.07 hectares and it is located approximately 14 km north-northeast of the Ventersburg town in the Free State Province of South Africa. The proposed prospecting area is located in the Kroonstad, Ventersburg and Hennenman Magisterial Districts. Fifty-three (53) farm portions extend over the application area.

Proposed Description

Invasive and non-invasive prospecting activities will be undertaken as part of the proposed Prospecting Work Programme. The Prospecting Work Programme will be based on a phased approach over approximately five (5) years. Continuation of the prospecting activities will be dependent on the successful completion of tasks constituting an orderly geological investigation. The first three years of the proposed five year prospecting programme will be non-invasive geophysical surveys (desktop studies, data acquisition and synthesis and geological modelling).

During the remaining two years, drilling will take place. Diamond core drilling will be to a depth of 1500 – 2000 m, and all accompanying equipment will be restricted to six (6) sites of approximately 900 m² each. 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 and drilling will be performed by recovering core samples.

Upon completion of the drilling programme, logging and sampling will be performed to capture the core information into a database. Based on the logging and sampling of the core, a 3D geological model will be updated and finalised for use during resource estimation. Utilising the finalised geological model together with historical assay results and any results from re-sampling, a resource estimate will be performed.

Prospecting Targets

The main targets for prospecting are the potentially gold bearing conglomerates (reefs) of the Central Rand Group within the Witwatersrand Supergroup. These are overlain by the younger Karoo Supergroup sandstones and shales which may contain coal. Post-Karoo intrusions are common. Recent sand deposits cover most of the present day surface.

Environmental Specialist Studies

A comprehensive assessment was undertaken in support of the WRE Ventersburg Consolidated Prospecting Right application. Three specialist studies were undertaken, namely:

- Heritage and Palaeontology Assessment.
- Fauna and Flora Assessment.
- Wetland 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 application area comprises undulating plains which are predominantly utilised for dryland agriculture. The area falls in the Vaal Water Management Area, which includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo Rivers. The Vaal Water Management Area comprises 12 tertiary catchment areas and application area is specifically situated in the Quaternary Catchment C42J.

According to Mucina and Rutherford (2006) the dominant vegetation types present on-site are the Vaal-Vet Sandy Grassland (Gh6), Central Free State Grassland (Gh10) and the Highveld Salt Pans (AZi10). The Vaal-Vet Sandy Grassland which covers the majority of the site is **Endangered** and is considered a **Protected** Ecosystem in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA, 2004): National List of Ecosystems That Are Threatened and In Need of Protection. The Central Free State covers a small portion of application area and it is **Vulnerable**. The Highveld Salt Pans is **Least threatened**. No endangered or protected animal species were encountered within the application area. Two heritage features were identified within the application area.

Faunal Assessment

The natural habitat of the study area has been largely transformed through agriculture, specifically crop production. The largest portion of the application area is more or less homogenous from a dominant habitat point of view. Given this homogeneity, one would not expect a large diversity of native animals to still occur in the area. Certain animals, such as the Blue crane (*Anthropoides paradiseus*), may inhabit croplands where natural short grasslands are unavailable. Others, such as small rodents, are attracted to the abundance of food provided by the

crop cultivars. These are not arguments that the croplands should be conserved, but rather that they may determine the abundance of animals on the site and play a role in species occurrence.

The most important natural elements that were observed are the natural drainage lines/seasonal tributaries, small pockets of natural grassland and agricultural field margins. The drainage lines may facilitate the creation of seasonal, stagnant pools which are important resources in frog and dragonfly/damselfly reproduction. Additionally, the small remnants of natural grassland and field margins have been proven to be important in harbouring native animal diversity. These two landscape elements (should) contain most of the natural vegetation and therefore most of the faunal diversity. Although trees are sparsely distributed throughout the site they remain an important structural component of the ecosystem and are important especially for the occurrence of birds.

The occurrence of rocks/boulders and termite mounds is generally low, but where present these landscape elements may provide shelter, food and reproductive opportunities to a great diversity of animals (including all the animal groups considered in this study) and their disturbance should therefore be avoided as much as possible. Where literature allowed, a species was listed with regards to the number of sightings for that species near the relevant locality (i.e. Ventersburg).

Flora Assessment

Four plant species of conservation significance were recorded within the application area. Two of these species recorded are listed as Declining Red Data species, and all four species are listed as provincially protected. No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species (TOPS), nor any protected trees as listed by the National Forest Act, were recorded in the study area during the time of the Biodiversity study. Three broad vegetation units (VUs), two based on floristic differences of different topographical positions and natural habitat types, and one based on anthropogenic transformation, were recorded in the study area. The VUs are as follow:

- Vegetation Unit 1 (VU1): Natural grassland.
- Vegetation Unit 2 (VU2): Wetlands.
- Vegetation Unit 3 (VU3): Transformed areas.

A sensitivity rating of High was attributed to VU1 (Natural grasslands) and VU2 (Wetlands). VU1 still has a relatively natural character albeit somewhat degraded due to overgrazing, fragmentation and the edge effects of other neighbouring transformed habitats. The portions of VU1 that still persist in the study area form part of the **Endangered** and **Protected** Vaal-Vet Sandy Grassland ecosystem. VU2 has High sensitivity due to its important function as water drainage and storage habitat for surrounding ecosystems and the faunal assemblages that depend on it, as well as its relevant connectivity with VU1 habitats along its mostly linear distribution. VU3, on the other hand, is attributed a Low sensitivity due to its totally transformed nature and the large amount of alien weeds and invaders occurring in that habitat. A buffer zone was delineated for the highly sensitive area where one of the drill sites currently falls just inside a highly sensitive area. It was strongly suggested that this particular proposed drill site be moved about 65 m northwest from its currently proposed position. In this regard, this proposed drill site was moved as per the Ecology specialist's recommendation.

Wetland Assessment

The study area falls in the Vaal Water Management Area (WMA 5), which includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo rivers. The Vaal Water Management Area includes 12 tertiary catchment areas. The application area is specifically situated in Quaternary Catchment C42J.

Within the application area, two non-perennial streams (Rietspruit and Kromspruit) drain north-west and south-west. A third, unnamed non-perennial stream drains into the Rietspruit north of the Kromspruit. East of the study area, the Enslinspruit drains northwards. Further south of the study area, the Slootspruit drains north-westwards into the Rietspruit.

The wetlands in the application area consist of a variety of types, namely: un-channelled and channelled valley bottom wetlands that are associated with the various streams. In some areas of the streams, there are associated floodplain wetlands. There are also a number of natural pans or depressions where water accumulates during the wet season. Further, there are a number of man-made dams in the area, most of which are associated with the natural streams and drainage lines.

Vegetation assemblages in the study area consist of water and moisture-loving plants. The wetland vegetation is generally poor in terms of ecological veld condition due to decades of over utilisation by livestock.

Five soil forms were identified in the establishment of wetland boundaries within the application area. These soil forms are Katspruit, Kroonstad, Bloemdal, Sepane and Rensburg. Along the course of the Rietspruit and the unnamed drainage line just to its south, Katspruit, Kroonstad and Sepane soil forms were the most prevalent. Soil forms that were mostly recorded along the course of the Kromspruit are Katspruit, Sepane and Rensburg. Soil forms associated with pans and depressions mostly include Katspruit, Kroonstad, Bloemdal and Rensburg.

The wetlands in the application area are moderately to highly modified with some loss of natural habitats. These wetlands are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of the floodplains is not usually sensitive to flow and habitat modifications. The wetlands play a small role in moderating the quantity and quality of water of major rivers of the Vaal Management Area.

A sensitivity rating of High is attributed to the wetlands in the application area. This is mainly due to their important function as water drainage and storage habitat for surrounding ecosystems and the faunal and floral assemblages that depend on it, as well as the relevant connectivity with terrestrial habitats along their mostly linear distribution. Any significant damage to the linear drainage lines, which mostly contain the wetlands of the application area, will have a significant impact on similar habitats downstream, further enhances the sensitive nature of these habitats.

Heritage and Palaeontological Assessment

A Heritage Impact Assessment (inclusive of a Palaeontology study) was undertaken over the application area. A field survey was conducted on foot and a vehicle was used to gain access to (i) the farm properties within the application area and (ii) the proposed six drillhole locations. The foot survey that was undertaken identified two heritage sites within the application area. However, these two heritage sites are located away from the proposed six drillhole locations. The sites include:

- A family burial site with one grave.
- A provincial graded barn house utilised as a guesthouse.

The burial site belonged to the De Beer family who were the previous owners of the farm. The burial ground is sectioned off with a fence. The size of the area fenced off area suggests the possibility of more graves which may not have been marked.

The provincial graded historical structure is documented as a European styled barn of high local significance. The barn is described to bear resemblance to features such as a Mansard Roof, which is defined as a covering with a steep lower part and a not flatter upper part on all four sides. Within South Africa, there exist two or three similar structures. The site has been incorporated into the tourism economy of the area and is more commonly referred

to as the Barn Guesthouse. Currently, the Barn Guesthouse is utilised as site offices for the ongoing road construction activities along the N1 Highway. It is highly likely that other such structures, farmhouses and complexes of significant value exist. However, they are yet to be documented and graded on the National Inventory.

The two heritage sites identified within the application area are considered as High sensitive heritage features. However, these two sites will not be impacted by the proposed invasive prospecting activities as they are located outside the areas where the proposed drilling activities will take place. The grave site is located 350 metres away from the nearest drillhole site and the historical building is located about 2 kilometres away from the nearest drillhole site. As part of the consultation process, landowners and Interested and Affected Parties were asked to indicate if they are aware of heritage features with the application. Mr Erasmus Ferreira, owner of Portion 0 of the Farm Kromspruit 476 indicated the presence of a cemetery on the farm. This cemetery on Mr Ferreira's farm is considered a High sensitive feature.

According to the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS) Fossil Sensitivity Map of the underlying application area, a large portion south of the application area is incorrectly depicted as a moderate fossil sensitivity. The application area is covered by Aeolian sands of the Quaternary age which has been extensively farmed and ploughed over the period of 150-200 years.

Environmental Impact Assessment

Based on the impact assessment conducted by the various specialists, a Basic Assessment was undertaken to identify all the potential risks and impacts associated with each phase of the prospecting. Each of the identified risks and impacts for these phases were assessed following the impact assessment methodology described in the body of the report. The assessment criteria include the nature, extent, duration, magnitude/intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources. Based on the assessment, it was determined that all identified impacts can be reduced to medium and low significance provided that all recommended mitigation measures are implemented correctly.

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

- Safety and security risks to landowners and lawful occupiers.
- Interference with land use.
- Sense of place.
- Perceptions and expectations.
- Damage to road infrastructure.
- Clearance of vegetation.
- Soil compaction.
- Soil pollution/contamination.
- Hydrocarbon spills/contamination.
- Contamination of groundwater (water quantity and quality).
- Fugitive Emissions (dust).
- Noise.
- Erosion and sedimentation.
- Disturbance/damage/destruction of heritage features, archaeological finds and palaeontological material.
- Deterioration/disruption of services and existing infrastructure.
- Habitat fragmentation and edge effect.
- Loss of habitat for fauna and flora species.
- Loss of species of conservation significance.
- Introduction of alien species.
- Loss of indigenous fauna and flora diversity associated with wetlands.
- Degradation and/or destruction of wetland habitats.
- Groundwater contamination from surface spills.

- Soil stability.
- Disturbance to communities in the vicinity.
- Generation and disposal of waste.

In terms of site sensitivities, the most sensitive features which will require protection on-site may be summarised as follows:

- Critical biodiversity areas.
- Ecologically sensitive areas.
- Heritage sites (including graveyards and historical structures).
- Watercourses, wetlands and dams.

In terms of positive impacts, job creation during prospecting operations and the identification of mineral deposits within the application area provide an opportunity for a potential viable economic activity in the form of mining. Mining will contribute greatly for local economic stimulation through direct employment, future business opportunities, royalties and tax revenues. The environmental impacts associated with the proposed prospecting activities are expected to be localised and of low significance, if mitigation measures are implemented.

The three specialists (Biodiversity (Flora and Fauna, Wetlands and Heritage and Palaeontology) have recommended mitigation measures and proposed suitable monitoring programmes to eliminate and/or reduce environmental impacts. These mitigation measures and monitoring programmes have been included as commitment in the Environmental Management Programme.

Environmental Management Programme Mitigation Measures

The Environmental Management Programme has identified appropriate mechanisms for avoidance and mitigation of negative impacts. 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.

Some of the key mitigation measures which have been identified to promote sound environmental and social performance are as follows:

Safety and security risks to landowners and lawful occupiers

- 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 landowner. This formal agreement should additionally stipulate landowners 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 as well as local, provincial and national regulations with regards to road safety and transport.

Interference with land use

- 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.

Sense of place

- The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any damages due to the prospecting activities.

Deterioration/disruption of services and existing infrastructure

- Ensure that service detection or identification is undertaken prior to the commencement of invasive prospecting activities.
- All invasive prospecting work cannot be undertaken within 100 metres of any existing infrastructure such as dwellings, cultivated fields, Eskom transmission/distribution lines, Telkom lines, roads, graveyards and any fences unless permission is received from the relevant landowner/lawful occupier.
- Roads to be constructed for the purpose of prospecting activities must be rehabilitated.

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 Interested and Affected Parties.
- Ensure that information is communicated in a manner which is understandable and accessible to Interested and Affected Parties.
- 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 minerals

- None required.

Fugitive emissions (dust)

- All vehicles utilising public gravel roads must adhere to the speed limits.
- By minimising the removal of vegetation and topsoil in affected areas, the potential for dusty conditions this will be minimised.
- Prospecting activities (including drill sites) must be located 100 metres away from farm dwellings.

Noise

- All construction vehicles and machinery must be maintained in good working order.
- When working or traveling past noise sensitive receptors, no unnecessary hooting or noise should occur.

Disturbance/damage/destruction of cultural and heritage features, archaeological sites and palaeontological material

- All heritage structures must be suitably identified prior to invasive prospecting works proceeding and suitably demarcated and avoided.
- No prospecting must be undertaken within 100 metres from heritage features and archaeological sites.
- Should heritage sites be identified on-site during invasive prospecting activities, all prospecting activities must stop and a Heritage specialist should be notified.

Clearance of vegetation

- Minimise clearing to areas that are required for invasive works. Where possible, cut vegetation instead of clearing to minimise soil disturbance.
- Where possible, locate drill sites close to existing access roads to minimise the extent of vegetation disturbance caused by temporary access roads.

- Rehabilitate all disturbed areas following invasive prospecting activities to the conditions that existed prior to prospecting.

Habitat loss/destruction of fauna and flora species

- Undertake prospecting activities in previously disturbed places and/or habitats with a lower sensitivity score.
- Rehabilitate disturbed areas as soon as possible.
- Control alien plants.

Habitat fragmentation and edge effect

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.

Loss of species of conservation significance

- A pre-commencement survey of the identified site must be undertaken by a suitably qualified specialist to ensure that no Red List Data or protected flora and fauna will be directly impacted upon.
- Search and rescue of species of concern.
- Obtain permits for any protected species found on-site.
- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.

Introduction of alien species

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.
- Manage alien plants within close proximity to exploration activities.

Degradation and/or destruction of wetland habitats

- Destruction of natural wetland vegetation must be avoided at all cost.
- Special attention should be paid to alien and invasive control within the whole study area. Alien and invasive vegetation control should take place throughout all development phases to prevent loss of habitat of indigenous fauna and flora.
- Movement of vehicles and construction workers in wetlands and buffer zones should be strictly prohibited.
- No harvesting of plants or animals should be allowed.
- Any specimens of protected plant species known to occur in the wetlands and the delineated buffer zone and may potentially be impacted by the prospecting activities, are to be fenced off for the duration of the activity.
- If at any point prospecting activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats.
- Red Data listed and protected species as well as sensitive habitats related to wetlands should be strictly monitored.

- Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the construction, operational and decommissioning phases.

Spillage of oils, fuels and chemicals

- The placement of drip trays under the drilling rigs should be implemented and recorded to minimise the contamination with waste oil from the drilling rig.
- Oil recovered from the drilling rigs should be collected, stored and disposed of by accredited vendors for recycling.
- Drilling fluids should be biodegradable and should be kept in a surface container. Proper rehabilitation and off site removal of excess fluids should take place.

Groundwater contamination from surface spills

- It is proposed that the following conditions for Environmental Authorisation is set from a groundwater perspective:
 - No development should take place within 100 metres m of the rivers and streams.
 - No drillholes should be drilled in the immediate vicinity of any existing private water boreholes that are in use. If this cannot be avoided, the landowner should be provided with an alternative water borehole or water resource.

Erosion and sedimentation

- Clearing of vegetation or topsoil must be minimised as far as possible.
- The appointed Environmental Control Officer must continually monitor the activities for erosion/sedimentation and ensure that suitable mitigation measures are implemented where necessary (e.g.: hay bales, silt traps, etc.).
- A suitably qualified specialist must monitor that no drilling is undertaken on or within 100 metres from the edge of a watercourse and within 1:100 years of a flood line.
- All disturbed areas must be suitably rehabilitated on completion of the works to ensure that no erosion occurs..

Soil compaction

- All areas that are compacted as a result of prospecting activities must be assessed by the Environmental Control Officer and where necessary, scarifying must take place to loosen the soil.

Hydrocarbon spills

- Drip trays must be placed under vehicles.
- Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of.
- During refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks.
- Spill clean-up equipment must be available on-site at all times.
- In the event of large spills, this must be reported to the authorities and a specialist spill contractor immediately sought to assist with the clean-up.

Contamination of groundwater (water quality and quantity)

- Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes.
- Pre- and post- drilling water sampling to be undertaken on nearby water resources.

- Ensure that all mitigation measures as stipulated in the Environmental Management Programme relating to the diamond core drilling are adhered to.
- Rehabilitate disturbed areas as soon as possible.

Soil instability

- Reinststate the topography to match the surroundings.
- Reinststate vegetation cover to match the surroundings.
- Monitor the reinstated areas to ensure that erosion does not occur.
- Any contaminated soils are to be collected and removed from site and suitably disposed of.
- Vegetation regrowth must be monitored to ensure that it matches the surrounding areas.

Soil pollution/contamination

- 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 plastic lining and any spills or leaks must be cleaned up.

Disturbance to communities in the vicinity

- All work must be completed in the shortest time possible.

Generation and disposal of waste

- Any excess or waste material or chemicals, including drilling muds etc. 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.
- All permanent facilities must be removed from site upon closure. This will include the associated equipment, material and waste on-.
- Under no circumstances is any form of waste to be disposed of on-site.

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 for local economic stimulation through direct employment, future business opportunities, royalties and tax revenues.



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

PREPARED BY:



NAME OF APPLICANT: WESTERN ALLEN RIDGE GOLD MINES (PTY) LTD

Tel No: 011 431 1191

Fax No: 011 431 1193

Postal Address: P.O. Box 2591, Cresta

Physical Address: HHK House, Corner Ruth Crescent & Ethel Ave, Northcliff Ext 12

DMR File Reference Number: FS 30/5/1/1/3/2/1/1/10489 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 located 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 the 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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Appendices

Appendix A: Prospecting Work Programme

Appendix B: Details and Experience of EAP

Appendix C: Maps

Appendix D: Public Participation Process

Appendix E: Specialists Reports

Appendix F: Impact Assessment Calculations

Appendix G: Final Rehabilitation, Decommissioning and Closure Plan

Definitions

Abbreviation	Definition
EA	Environmental Authorisation. This constitutes the approval or dismissal of a project as issued by the relevant Competent Authority.
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.
CA	Competent Authority.
DEA	The National Department of Environmental Affairs.
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.
EAR	Environmental Audit Report.
EAP	Environmental Assessment Practitioner.
ECO	Environmental Control Officer.
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.
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.
FP	Financial Provision.
FP Regulations	Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations No. 1147 (effective 20 November 2015).
FRDCP	Final Rehabilitation, Decommissioning and Closure Plan.
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.
Flora	All living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and usually capable of photosynthesis.
GN	Government Notice.
HSE	Health, Safety and Environment.
I&AP	Interested and Affected Parties.
MEC	Member of the Executive Council.
MPDRA	Minerals and Petroleum Development Act, No 28 of 2002.
MP	Mining Permit in terms of the MPRDA.
MR	Mining Right in terms of the MPRDA.
PR	Prospecting Right in terms of the MPRDA.
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.

PART A:

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. INTRODUCTION

Western Allen Ridge Gold Mines (Pty) Ltd (hereafter referred to as Western Allen Ridge, the Applicant) have identified potentially exploitable mineral resources over a number of farms in the Free State Province, South Africa. The minerals of interest include the following:

- Silver
- Gold
- Coal
- Cobalt
- Copper
- Diamond (Alluvial)
- Iron
- Manganese
- Molybdenum
- Nickel
- Lead
- Platinum Group Metals
- Rare Earths
- Sulphur
- Uranium
- Tungsten
- Zinc

Western Allen Ridge submitted an application for a Prospecting Right and an Environmental Authorisation in order to prospect for these commodities. The application for the Prospecting Right was accepted by the Department of Mineral Resources – Free State Province on the 24th November 2017. The proposed project will be known as WRE Ventersburg Consolidated Prospecting Right and it will aim to explore and quantify potential mineral resources. In order to undertake prospecting activities, Western Allen Ridge require a Prospecting Right in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act No.28 of 2002 – as amended). The Applicant is also required to obtain an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998 – as amended) which involves the submission of a Basic Assessment Report (BAR) and Environmental Management Programme Report (EMPR). Shango Solutions have been appointed by Western Allen Ridge as an Environmental Assessment Practitioner (EAP) to compile the BAR (this report) in support of the Prospecting Right Application submitted by Western Allen Ridge.

It is anticipated that the following non-invasive techniques will be utilised during prospecting, based on information presented in the associated Prospecting Work Programme (PWP) (Appendix A).

Non-invasive prospecting activities

Desktop studies

Data acquisition and synthesis

Geological modeling

Logging and sampling

Resource estimation

Invasive prospecting activities

Drilling (6 drillholes)

1.1 Location of the Activity

The application area is approximately 7 943.07 hectares (ha) in extent and is situated 14 kilometres (km) north-northeast of the town of Ventersburg in the Free State Province of South Africa. The prospecting area is located

inthe Kroonstad, Ventersburg and Hennenman Magisterial Districts and extends over fifty-three (53) farm portions. Table 1 indicates the property details within the Prospecting Right application area.

Table 1: Locality details.

Farm name	
	1- Amoedspruit 416 Portion RE
	2- Brakvlei 2442 Portion 0
	3- Brakvlei Oost 2441 Portion 0
	4- Burnett-Holmes 599 Portion RE
	5- Damleegte 323 Portion 0
	6- Dispuut Spruit 272 Portion 0
	7- Eendoorn 2440 Portion 0
	8- Eendracht 259 Portion RE
	9- Eerste Geluk 51 Portion RE
	10- Excelsior 122 Portion 0
	11- Groenkol 2448 Portion 0
	12- Johannesrust 2446 Portion RE
	13- Johannesrust 2446 Portion 1
	14- Johannesrust 2449 Portion 0
	15- Kalkfontein 294 Portion 0
	16- Goedgegund 434 Portion 3
	17- Goedgegund 434 Portion 5
	18- Goedgegund 434 Portion RE
	19- Goedgegund 434 Portion 1
	20- Goedgegund 434 Portion 2
	21- Goedgegund 434 Portion 4
	22- Kleinfontein 210 Portion RE
	23- Kleinfontein 210 Portion 1
	24- Kromspruit 476 Portion 0
	25- La Rochette 231 Portion 0
	26- Lan Kuil 225 Portion RE
	27- Langverwacht 302 Portion RE
	28- Langverwacht 302 Portion 1
	29- Langverwacht 302 Portion 2
	30- Lekkerleven 2445 Portion 0
	31- Moederserf 322 Portion 0
	32- Moidam 102 Portion 0
	33- Mooiplaats 2443 Portion 0
	34- Protest 63 Portion 0

	35- Rietspruit 2450 Portion RE 36- Rietspruit 2450 Portion 1 37- Rondebult 2447 Portion RE 38- Rondebult 2447 Portion 1 39- Rosebank 903 Portion RE 40- Smaldeel 202 Portion RE 41- Smaldeel 414 Portion 0 42- Stillewoning 580 Portion RE 43- Stillewoning 757 Portion 0 44- Twistniet 175 Portion 0 45- Twistniet 565 Portion RE 46- Twistniet 565 Portion 1 47- Twistniet 565 Portion 2 48- Twistniet 565 Portion 3 49- Twistniet 565 Portion 5 50- Twistniet 565 Portion 6 51- Vaderdeel 321 Portion 0 52- Vlakspruit 234 Portion 0 53- Wonderboom 1100 Portion 0		
Application area (Ha)	The application area extends over fifty-three (53) farm portions with a total area of 7 943.07 ha.		
Magisterial district	Kroonstad, Ventersburg and Hennenman Magisterial Districts		
Distance and direction from nearest town	The WRE Ventersburg Consolidated Prospecting Right application area is located 14 km north-northeast of the town of Ventersburg in the Free State Province of South Africa. The application area approximately 25 km south of Kroonstad, 10 km north-northwest of Hennenman and is bisected by the N1 Highway.		
21 digit surveyor general code for each portion	Farm Name:	Portion:	SG Codes:
	1- Amoedspruit 416	RE	F03500000000041600000
	2- Brakvlei 2442	0	F02000000000244200000
	3- Brakvlei Oost 2441	0	F02000000000244100000
	4- Burnett-Holmes 599	0	F03500000000059900000
	5- Damleegte 323	0	F03500000000032300000
	6- Dispuut Spruit 272	0	F03500000000027200000

7- Eendoorn 2440	0	F0200000000024400000
8- Eendracht 259	RE	F0350000000002590000
9- Eerste Geluk 51	RE	F0350000000000510000
10- Excelsior 122	0	F0350000000001220000
11- Groenkol 2448	0	F0200000000024480000
12- Johannesrust 2446	RE	F0200000000024460000
13- Johannesrust 2446	1	F0200000000024460001
14- Johannesrust 2449	0	F0200000000024490000
15- Kalkfontein 294	0	F0350000000002940000
16- Goedgegund 434	3	F0200000000004340003
17- Goedgegund 434	5	F0200000000004340005
18- Goedgegund 434	RE	F0350000000004340000
19- Goedgegund 434	1	F0350000000004340001
20- Goedgegund 434	2	F0350000000004340002
21- Goedgegund 434	4	F0350000000004340004
22- Kleinfontein 210	RE	F0350000000002100000
23- Kleinfontein 210	1	F0350000000002100001
24- Kromspruit 476	0	F0350000000004760000
25- La Rochette 231	0	F0350000000002310000
26- Lan Kuil 225	RE	F0350000000002250000
27- Langverwacht 302	RE	F0350000000003020000
28- Langverwacht 302	1	F0350000000003020001
29- Langverwacht 302	2	F0350000000003020002
30- Lekkerleven 2445	0	F0200000000024450000
31- Moederserf 322	0	F0350000000003220000
32- Mooidam 102	0	F0350000000001020000
33- Mooiplaats 2443	0	F0200000000024430000

	34- Protest 63	0	F0350000000006300000
	35- Rietspruit 2450	RE	F0200000000024500000
	36- Rietspruit 2450	1	F0200000000024500001
	37- Rondebult 2447	RE	F0200000000024470000
	38- Rondebult 2447	1	F0200000000024470001
	39- Rosebank 903	0	F0200000000009030000
	40- Smaldeel 202	RE	F0200000000020200000
	41- Smaldeel 414	0	F0200000000020200000
	42- Stillewoning 580	RE	F0350000000005800000
	43- Stillewoning 757	0	F0350000000004340004
	44- Twistniet 175	0	F0350000000001750000
	45- Twistniet 565	RE	F0350000000005650000
	46- Twistniet 565	1	F0350000000005650001
	47- Twistniet 565	2	F0350000000005650002
	48- Twistniet 565	3	F0350000000005650003
	49- Twistniet 565	5	F0350000000005650005
	50- Twistniet 565	6	F0350000000005650006
	51- Vaderdeel 321	0	F0350000000003210000
	52- Vlakspruit 234	0	F0350000000002340000
	53- Wonderboom 1100	0	F0200000000011000000

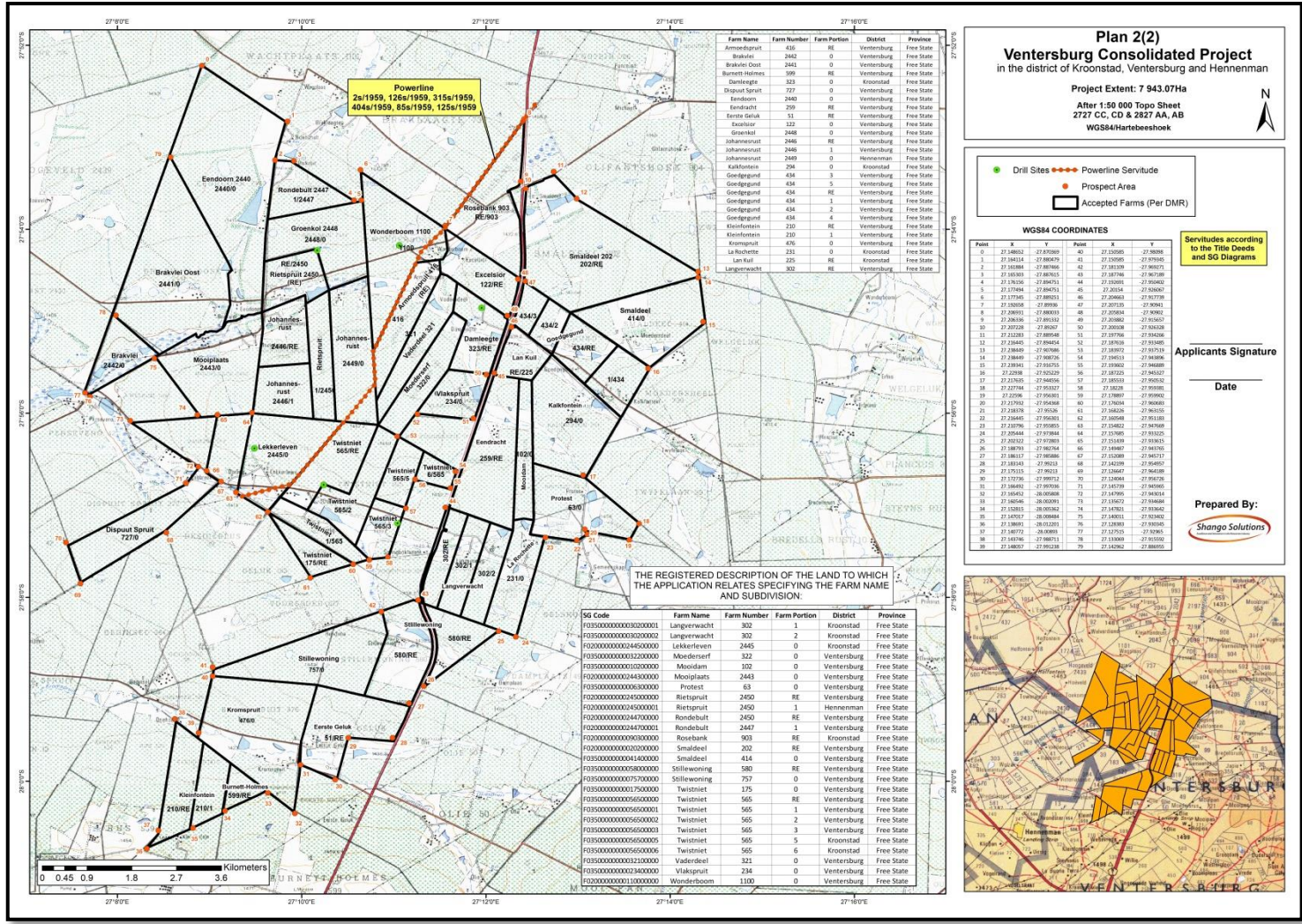


Figure 1: Locality map indicating the farm portions (refer to Appendix C for an enlarged map).

1.2 Details of the EAP

Shango Solutions was appointed by Western Allen Ridge as the Environmental Assessment Practitioner (EAP) to compile this report. The contact details of the Shango Solutions consultant who compiled the report are as follows:

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

1.3 Expertise of the EAP

1.3.1 Qualifications of the EAP

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

- 1) Objective and independent.
- 2) Has expertise in conducting EIAs.
- 3) Comply with the NEMA, the Regulations and all other applicable legislation.
- 4) Takes into account all relevant factors relating to the application.
- 5) Provides full disclosure to the applicant and the relevant environmental authority.

Zizo holds a B.Sc. Honours Degree in Environmental Management. She has extensive 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, 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, 27 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 400 projects, of which the majority were located 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. The project portfolio highlights our cross-sectorial approach and capability.

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.

Zizo's experience lies mainly with environmental assessments for the mining and energy industry, including the compilation of environmental studies in support of Environment Authorisations for Prospecting, Mining, Exploration and Production Rights projects as well as other development projects that require Environmental Authorisation.

The declaration of independence of the EAP and the Curriculum 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 B.

1.3.3 Specialist Consultants

The following specialist consultants provided inputs into this report:

- Ecology Assessment: Environment Research Consulting (ERC).
- Wetland Assessment: Environment Research Consulting (ERC).
- Heritage and Palaeontology: NGT Holdings.

2. DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

Invasive and non-invasive prospecting activities will be undertaken as part of the proposed Prospecting Work Programme. The scope of these activities is as follows:

Phase 1

1.1 Investigate all sources for historical data

[Year 1: 6 months]

Prospecting for gold in the Free State area started in the 1930's resulting in nearly 90 years' worth of exploration in the area. Hence, there exists a significant amount of historical exploration data in the Free State and over the project area. Obtaining and analysing this historical data will allow the fast-tracking of prospecting activities. Heavy mineral sands can also be investigated as a potential resource and as an aid to the development of the geological model.

1.2 Obtain all relevant historical data **[Year 1: 6 months]**

Historical data detailing the position and economic potential of the target horizons will be identified for potential acquisition. The data obtained is anticipated to be in the form of historical drillhole information, cadastral maps, geological maps, geophysical surveys (including existing published gravimetric, radiometric, magnetic, seismic and remote sensing data), as well as any information pertaining to previous exploration or mining will be consulted and integrated. The data will be scrutinised and verified (QA/QC procedure).

Data acquisition will begin with commercial negotiations to allow Western Allen Ridge to gain access to the drillholes for use in the desktop study, geological model and potential resource estimate.

1.3 Desktop study **[Year 1: 6 months]**

A desktop study will be performed utilising all the historical reports obtained during Step 1.2.

Phase 2

2.1 Inventorise, capture and QA/QC all available historical data **[Year 2: 5 months]**

The data located and acquired during Year One will be inventorised in Microsoft Access databases for future information into an electronic format, creating a powerful tool for use in 3 dimensional (3D) geological modelling and efficient resource estimation.

2.2 Data synthesis and database creation **[Year 2: 5 months]**

The above data will be compiled into a geological database, which will be utilised to present the relevant data in useable Geographic Information System (GIS) digital map format. The different data sets will be plotted on a base map of the project and surrounding areas in order to develop a geological model. This model will be used to further refine the exploration programme for the target area.

2.3 Definition of regional geological characteristics **[Year 2: 2 months]**

With the improved geological and geophysical datasets it will be possible to increase the confidence in the basic sedimentological and structural geological models and identify areas where the initial geological model should be created.

Phase 3

3.1 Generate the initial geological model **[Year 3: 6 months]**

Utilising the historical data, a preliminary 3D geological model will be developed. This model will be employed to further refine the exploration programme for the prospect area.

3.2 Location of key historic drillhole core, if available **[Year 3: 6 months]**

Based on the initial geological model, specific key drillholes previously drilled in the area will be identified and negotiations with the owners undertaken to obtain access to the core.

3.3 Re-logging and re-sampling of historical drillholes **[Year 3: 6 months]**

Once access to the historical core is obtained, the core will be re-logged and, if necessary, re-sampled. This activity will allow verification of the historical drillhole logs and consequently increase confidence in the data underpinning the geological model.

Phase 4

4.1 Drilling of 2 diamond drillholes to a depth of 500m **[Year 4: 5 months]**

Depending on the initial geological model established, a diamond drilling programme (Figures 2 and 3) comprising of two drillholes will be undertaken.

Drilling will be conducted in a competent and environmentally responsible manner including rehabilitation of the drill sites to their original state. Plastic lining will be placed underneath the rig motors to prevent oil seepage. It is noted that no drilling fluids other than water for dust suppression, will be utilised in the case of diamond drilling. Environmental rehabilitation measures will be included in the contract with the drilling company and environmental rehabilitation costs will be included in the drilling costs.

4.2 Logging and sampling of drillholes **[Year 4: 4 months]**

Once the holes are drilled, logging and sampling will be performed to capture the drillhole information into the database.

4.3 Refinement of geological model **[Year 4: 3 months]**

The data obtained from the drilling and logging of the holes will be integrated into the geological model to confirm the geology and refine the future drilling targets. The updated geological model will be utilised to site the drillholes planned during the Year 5 drilling programme.

Phase 5

5.1 Drilling of 4 diamond drillholes to a depth of 500m **[Year 5: 7 months]**

Additional four diamond drillholes will be drilled. Should the drilling programme prove to be successful, additional holes will be considered. This will be indicated in the form of a S102 application together with the proposed revised prospecting plan and EMPR.

5.2 Logging and sampling of drillholes **[Year 5: 4 months]**

Once the holes are drilled, logging and sampling will be performed to capture the drillhole information into the database.

5.3 Finalisation of 3D geological model **[Year 5: 4 months]**

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

5.4 Resource estimation **[Year 5: 2 months]**

Utilising the finalised geological model together with historical assay results and any results from re-sampling, a resource estimate will be performed.



Figure 2: A typical drill rig.



Figure 3: Typical diamond drill bits.

2.1 Listed And Specified Activities

The need for Environmental Authorisation for prospecting came into effect after the promulgation of the NEMA 2014 EIA Regulations (as amended) on the 8th December 2014. Prior to this, Prospecting Rights were subjected to the provisions of the MPRDA (2002, amended). In this regard, a Prospecting Right and Environmental Authorisation are required in terms of the MPRDA and NEMA Regulations respectively. The applicable NEMA listed activity anticipated to be triggered by this project is outlined in Table 2.

Table 2: Listed and specified activities.

Name of activity	Aerial extent of activity (ha or m ²)	Listed activity	Applicable listing notice
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.	7 943.07 ha	X	Activity 20 of GN 327 (of 2017)
The project will involve drilling of six (6) diamond core drillholes. 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 6 drillholes would disturb an area covering approximately 5400 m ² or 0.54 ha	0.54 ha	X	Activity 20 of GN 327 (of 2017)
The clearance of an area of 5400 m ² or more of indigenous vegetation	0.54 ha	X	Activity 12(b) of GN 324 (of 2017)
Desktop studies and acquisition of historical data	N/A	N/A	N/A
Data inventory and capturing	N/A	N/A	N/A
Data synthesis and database creation	N/A	N/A	N/A

2.2 Description Of Activities To Be Undertaken

Due to the abundance of historical data available for the proposed prospecting area, no invasive work will be undertaken on the affected portions (Table 3). The type of minerals to be prospected for consist of the following: silver, gold, coal, cobalt, copper, diamond (alluvial), iron, manganese, molybdenum, nickel, lead, platinum group

metals, rare earths, sulphur, uranium, tungsten and zinc.

Table 3: Planned invasive and non-invasive activities.

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
1	Non-invasive Prospecting	Qualified geologists (B.Sc. (Hons.) a minimum qualification)	6 months	Establishment of historical data inventory	Month 12	Principal Geologist
	Investigate possible sources for historical data			Database of historical data		
	Obtain relevant historical data		6 months	Characterisation of geological features on the project area and surrounds		
2	Non-invasive Prospecting	Qualified geologists (B.Sc. Hons. a minimum qualification)	12 months	Complete, detailed database of historic exploration activities and results	Month 24	Senior Geologist
	Inventorise, capture and QA/QC historical data					
	Data synthesis and database creation			Regional and local geological understanding to optimise modelling		
3	Non-invasive Prospecting	Qualified geologists (B.Sc. Hons. a minimum qualification)	12 months	Initial geological model	Month 36	Principal Geologist
	Generate the initial geological model			Report detailing the availability of the historical drillhole core		
	Location of key historic drillhole core, if available			Resampled core for QA/QC and confidence for		
	Re-log and resampling of historic core					

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
				resource estimation		
4	Invasive Prospecting	Qualified geologists (B.Sc. Hons. a minimum qualification)	4 months	Drillhole core	Month 48	Senior Geologist
	Drilling of 2 diamond drillholes to a depth of 500 m					
	Non-invasive Prospecting		4 months	Geological log and assay results		
	Logging and sampling of new drillholes					
Revise geological model	4 months	Refined geological model				
5	Invasive Prospecting	Qualified geologists (B.Sc. Hons. a minimum qualification)	12 months	Drillhole core	Month 60	Senior Geologist
	Drilling of 4 diamond drillholes to a depth of 500 m					
	Non-invasive Prospecting			Geological log and assay results		
	Logging and sampling of new drillholes					
	Finalisation of 3D geological model	Final geological model				
	Resource estimation	Qualified resource geologist	Resource estimate	Principal Geologist, Resource Geologist		

Activities for each subsequent year are dependent on the outcome of exploration results from the preceding year. Should the proposed exploration activity change, this will be indicated in the form of a Section 102 Amendment Application (of the MPRDA) together with the proposed revised prospecting programme.

2.3 Activities Associated With Planned Prospecting

The activities associated with each phase of prospecting operations are described in Table 4.

Table 4: Activities associated with planned prospecting.

Main activity/action/process	Ancillary activity
Planning	
Site visit	Vehicle and foot traffic on-site
Construction	
General management	Employment Interaction with local community
Site preparation and site establishment	Clearance and preparation of soil stockpile areas Dust suppression Construction of temporary access roads 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
Six (6) diamond drillholes to a depth of 500 m	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
Geophysical survey (if required)	Vehicle and foot traffic on-site
Decommissioning	
General management	Employment Interaction with local community

Main activity/action/process	Ancillary activity
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 all areas 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
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

The application area is predominately natural grasslands and is used for commercial dry land agricultural activities (crop production (maize) and livestock (cattle)). There are existing farm roads. These farm roads will be utilised to access drilling areas and where there are no access roads, new roads will be created. No multiple roads will be created to access a single area. Roads created to gain access to drilling sites will be rehabilitated on completion of the drilling operations to the satisfaction of the relevant landowner.

2.4.2 Water Supply

It is not known if there are any water boreholes located on the site and if access and supply will be granted by landowners. Water sourced from the Local Municipality will be trucked to the drill sites. In order to prevent dust pollution on untarred roads, water bowsers must be utilised when required.

Continuous water supply will be required during drilling. An on-site water storage tanks with a capacity of at least 15 000 litres will be required. Additional water requirements relate to the potable water supply for employees and workers. A temporary 260 litre on-site vertical water storage tank for drinking water is recommended during the drilling operations.

2.4.3 Ablution

Ablution facilities at the drill site will be required and may involve the installation of drum or tank type portable toilets. The toilets should be emptied twice every week 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 and all persons will be accommodated in nearby towns (i.e. Hennenman, Kroonstad and Ventersburg). 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. No fires will be allowed on-site.

2.4.6 Storage of Dangerous Goods

During drilling activities, limited quantities of diesel fuel, oil and lubricants may be stored on-site. The only dangerous good that may be stored is diesel fuel. A maximum amount of 60 m³ 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.
- A water tanker.
- Bakkie/s.
- Geological modelling software.

2.5 Geological Formation And Prospecting Targets

The application area has been selected based predominantly on historical data available for the region, which indicates the potential for economically viable resources to occur. The Free State Goldfield was discovered by geophysical means during the 1930's, when Dr R. Krahmman delineated the edge of the Witwatersrand Basin by mapping magnetic shales of the West Rand Group with a magnetometer. This was followed by extensive diamond exploration drilling, which intersected the auriferous conglomerates of the Central Rand Group (Figure 4). As a result, one of the major goldfields on earth was developed.

Welkom, the largest town in the Free State Goldfield, is situated about 270 km towards the southwest of Johannesburg, about 1 370 metres above mean sea level (MAMSL). The Welkom Goldfield hosted eleven mines in the triangle between Allanridge, Welkom and Virginia. These mines have collectively produced in excess of 9.6 million kilogrammes of gold.

The Central Rand Group of the Witwatersrand Supergroup is present within the proposed Ventersburg Consolidated Prospecting Right, with four potentially economic placer deposits, namely the Basal Reef, Big Pebble Conglomerate, A Reef and the B Reef. The main targets for prospecting are the potentially gold bearing conglomerates (reefs) of the Central Rand Group within the Witwatersrand Supergroup.

The Witwatersrand Supergroup which hosts gold is generally overlain by 500 m of Karoo Supergroup strata, predominantly horizontally bedded sandstones and shales of the Ecca Group. The Ecca Group contains coal at shallow depths which might be exploitable. In addition to gold, the primary prospecting target, silver, uranium, sulphur, diamonds, rare earths and platinum group metals are currently and have been historically, extracted as by-products of gold. Base metals (cobalt, copper, manganese, molybdenum, nickel, lead, tungsten and zinc) could potentially be present in mafic intrusions.

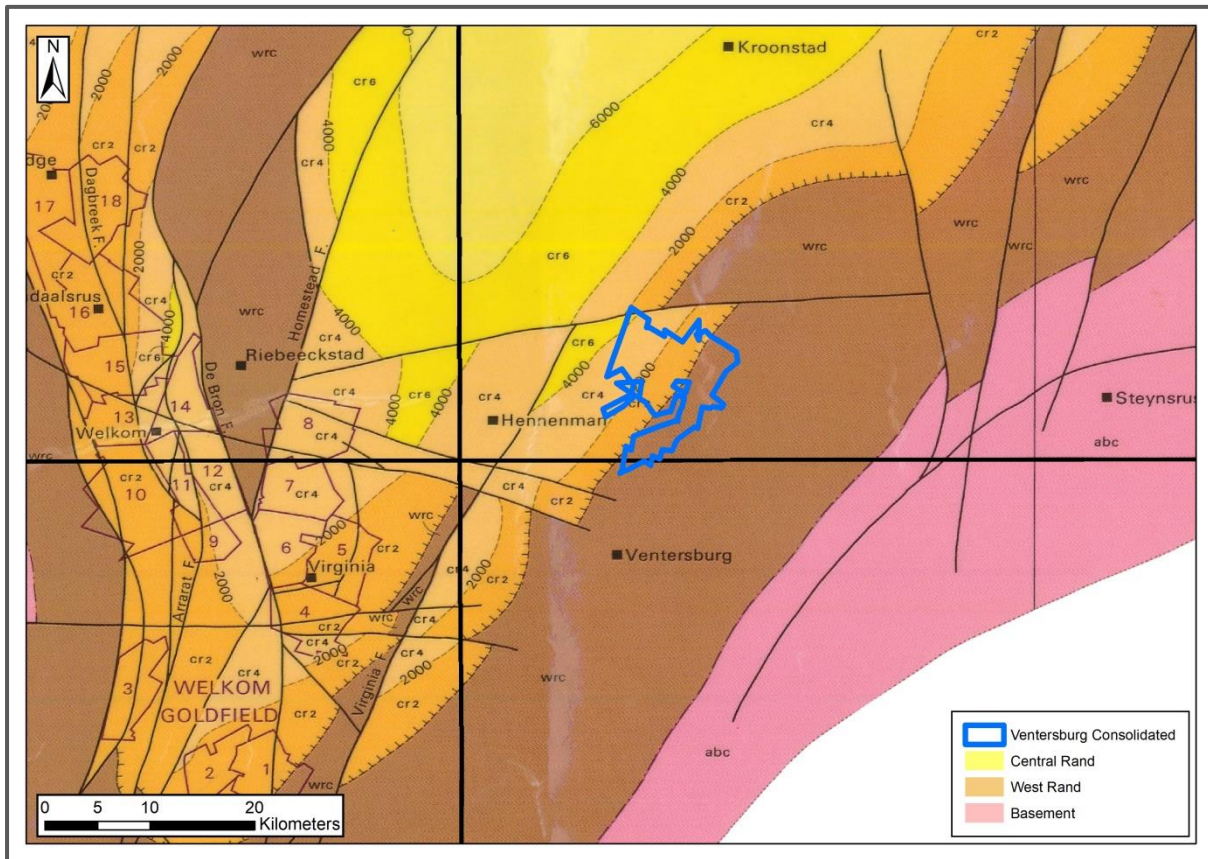


Figure 4: Map of the Witwatersrand Basin (Pretorius, 1964), together with depths to the Central Rand Group.

The main targets for prospecting are the potentially gold bearing conglomerates (reefs) of the Central Rand Group within the Witwatersrand Supergroup. These are overlain by the younger Karoo Supergroup sandstones and shales which may contain coal. Post-Karoo intrusions are common. Recent sand deposits cover most of the present day surface.

3. POLICY AND LEGISLATIVE CONTEXT

The Venterburg Consolidated Prospecting Right application requires authorisation in terms of the following interlinked pieces of legislation:

- The Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act No. 28 of 2002 - amended).
- The National Environmental Management Act, 1998 (NEMA, Act No. 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 5, together with the main legislative requirements mentioned above.

Table 5: 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 Environmental Authorisation under the NEMA.	In terms of the National Environmental Management Act an Application for Environmental Authorisation subject to a Basic Assessment 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 Prospecting Right Application under the MPRDA.	In terms of the Mineral and Petroleum Resources Development Act a Prospecting Right 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 National Water Act, 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 Prospecting Right application.

3.1 Environmental Authorisation Process

3.1.1 Mineral and Petroleum Development Act

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), a Prospecting Right must be issued prior to the commencement of any prospecting activities. As per Section 79(4)(a) and (b) of the MPRDA, the Applicant is required to conduct a Basic Assessment 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 (Act No. 107 of 1998, NEMA) and the National Water Act (Act No. 36 of 1998, NWA).

Several amendments have been made to the MPRDA. 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 Prospecting Right 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 Prospecting Works Programme to establish the presence of economically viable mineral resources. A Prospecting Right 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 Environmental Impact Assessment (EIA) Regulations, the proponent is required to appoint an Environmental Assessment Practitioner (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 on 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 mining operation and its infrastructure. This will occur during the planning, construction, operation and decommissioning and site closure phases.

The Basic Assessment Report (BAR) and the associated Environmental Management Programme Report (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 mines, existing or new, 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, owing 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 is non-hazardous in accordance with the Waste Management and Classification 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 categorization 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 destroy 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 National Water Act, 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

The minerals being prospected for are silver, gold, coal, cobalt, copper, diamond (alluvial), iron, manganese, molybdenum, nickel, lead, platinum group metals, rare earths, sulphur, uranium, tungsten and zinc. The proposed Ventersburg Consolidated Prospecting Right, if granted, will allow Western Allen Ridge to determine if any economically viable resources are present in the application area.

Should prospecting prove successful and a resource quantified, it would indicate a potential viable economic activity in the form of mining that is likely to 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 application area has been selected based predominantly on historical data available for the region, which indicates the potential for economically viable resources to occur. The Central Rand Group of the Witwatersrand Supergroup is present within the proposed Ventersburg Consolidated Prospecting Right, with four potentially economic placer deposits, namely the Basal Reef, Big Pebble Conglomerate, A Reef and the B Reef. The main targets for prospecting are the potentially gold bearing conglomerates (reefs) of the Central Rand Group within the Witwatersrand Supergroup. .

The Witwatersrand Supergroup which hosts gold is generally overlain by 500 m of Karoo Supergroup strata, predominantly horizontally bedded sandstones and shales of the Eccca Group. The Eccca Group contains coal at shallow depths which might be exploitable. In addition to gold, the primary prospecting target, silver, uranium, sulphur, diamonds, rare earths and platinum group metals are currently and have been historically, extracted as by-products of gold. Base metals (cobalt, copper, manganese, molybdenum, nickel, lead, tungsten and zinc) could potentially be present in mafic intrusions.

In addition, there are abundant dry areas within the site where invasive prospecting activities can be undertaken with minimal or no impacts on the surface water.

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

The development footprint is expected to be a fraction (0.54 ha) of the application area size, which is estimated to be 7 943.07 ha. The geology is the primary driver in determining the location for prospecting and mining. As such, no assessment of alternative development scenarios was conducted.

6.1.1 Property

The application area has been selected based on historic and current data available for the region, which indicates the potential for economically viable mineral deposits to occur. The application area is located in the Free State Province. Welkom, the largest town in the Free State Goldfield, is situated about 270 kmtowards the southwest of Johannesburg, about 1 370 MAMSL. The Welkom Goldfield hosted eleven mines in the triangle between Allandridge, Welkom and Virginia. These mines have collectively produced in excess of 9.6 million kilogrammes of gold.

The surface geology of the prospecting area is dominated by thin quaternary sediments, mostly recent sand and gravel in the river valleys. These sediments and intrusives are underlain by rocks of the Witwatersrand and Ventersdorp Supergroups. There are no rock outcrops in the prospecting area.

6.1.2 Type of Activity

Due to the unavailability of extensive historical drillhole datasets, invasive prospecting activities such as drilling, as well as non-invasive activities will be conducted during prospecting. No bulk sampling work will be carried out during this prospecting programme.

6.1.3 Design or Layout

Specific areas within the application area have been identified for drilling in order to minimise land destruction during prospecting. The extent of the application area considered is illustrated below.

6.1.4 Technology Alternatives

The technologies listed in the Prospecting Work Programme have been selected as they are proven effective in the determination of resource viability within the proposed prospecting area. Some of the techniques to be employed during non-invasive prospecting will include desktop studies, data acquisition and synthesis, geological modeling, logging and sampling and resource estimation.

Invasive technology alternatives have also been considered. It is hereby noted that the different phases and timeframes of the prospecting herein envisaged are, by their nature, dependent on the results obtained during the preceding phases of such prospecting. Invasive prospecting activities are dependent on the outcome of the non-invasive prospecting activities. Should the proposed prospecting activity change, this will be indicated in the form of a Section 102 Amendment Application (of the MPRDA) together with the proposed revised prospecting plan.

6.1.5 Operational Aspects

Operational aspects that have been considered for the effective implementation of the Prospecting Work Programme include financial arrangements, appropriate equipment available and the technical skills available. An amount of ZAR 7 528 900 will be required to finance the Prospecting Work Programme. 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.

6.1.6 Option of Not Implementing

If the Prospecting Right is not granted, the potential to identify viable mineral resources could be lost. Historical prospecting and mining activities have taken place in the vicinity of the proposed Prospecting Right area and as such the proposed prospecting activities would represent a continuation of a historic land use. Additionally, it allows for marginal land impacted on by historical prospecting and mining activities to be re-introduced into the economy.

7. PUBLIC PARTICIPATION PROCESS

7.1.1 Public Participation Methodology

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation and aims to ensure that all relevant Interested and Affected Parties (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.

A database/I&AP register was compiled. The list included various stakeholders, authorities, landowners, land occupiers. Notification documents were compiled in English, Afrikaans and Sesotho. The notification documents were distributed on the 26th January 2018. I&APs were provided a period of 30 days to register and comment on the proposed activity and application.

7.1.2 Identification of I&APs

An initial I&AP list was compiled using WinDeed searches to determine the registered landowners of the project affected land parcels. The I&AP database was compiled containing the following categories of stakeholders:

- National, provincial and local government.
- Agricultural sector.
- Organised business.
- Host and adjacent communities.
- Land claimants.
- Other organisations, clubs, communities, and unions.
- Various non-government organisations (NGOs).

7.1.3 List of Authorities Identified and Notified

The following authorities have been identified and notified of the proposed Ventersburg Consolidated Prospecting Right:

- National Department of Mineral Resources.
- National Department of Agriculture, Forestry and Fisheries.
- National Department of Rural Development and Land Reform.
- National Department of Water and Sanitation.
- Nation Department of Transport.
- South African National Roads Agency Ltd (SANRAL).
- South African Heritage Resources Agency (SAHRA) – National.
- Free State Department of Agriculture and Rural Development.
- Free State Department of Cooperative Governance, Traditional Affairs and Human Settlements.
- Free State Department of Economic Development, Tourism, Environmental Affairs and Small Business.
- Free State Department of Police, Roads and Transport.
- Free State Department of Public Works.
- Free State Department of Water and Sanitation.
- Mophaka Local Municipality.
- Fezile Dabi District Municipality.
- Matjhabeng Local Municipality.
- Lejweleputswa District Municipality.

- Eskom.
- Transnet.

7.1.4 List of Key Stakeholders Identified and Notified

The following key stakeholders have been identified and notified of the proposed Ventersburg Consolidated Prospecting Right:

- SECCP of Earthlife Africa.
- Wildlife and Environment Society of South Africa (WESSA).
- Free State Agriculture.
- Northern Free State Mineral Resources Stakeholders Forum.
- Earthlife Africa.
- Birdlife South Africa.
- Agricultural Research Council.
- Endangered Wildlife Trust.

7.1.5 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 Ventersburg Consolidated Prospecting Right:

- Margaretha Jacoba Wagner.
- Aletta Johanna Jubelius.
- Engela Welthagen Erasmus.
- Hanmar Trust.
- Elizabeth Maria Lubbe.
- Waterbron Trust.
- Jacoba Margaretha Pienaar.
- Erasmus Claassen Ferreira.
- Daniel Jacobus Behrens.
- H & B Trust.
- Christina Maria Wilhelmina Ferreira.
- Anna Maria Heyns.
- Eendracht Trust.
- Mooi Toekoms Trust.
- Brakvlei Trust.
- Petrus Albertus van Schalkwyk/ JP Verster Saad Produceersders CC.
- Johannes Anthonie Pelser.
- Luis Johannes Fourie/ Delton Trading CC.
- Johan Lodiwicus Klopper Schutte/ Lonel Boerdery CC.
- Gustavus Wilhelm Roux Familie Trust/ Gustavus Wilhelm Roux.
- Soetamaling Trust.
- Francois Delpport Familie Trust.
- Michiel Ignatius Heyns.
- Wikus Marthinus Joubert.
- Hendrik Dirk Erasmus.
- B Mlambo/ SANRAL/NRA.
- Plancius Investments CC.

7.1.6 Notification of I&APs

Notification documents were prepared in three dominant languages spoken within the application area, namely: English, Afrikaans and Sesotho. All pre-identified I&APs including those that requested to be registered as I&APs during the initial public consultation phase of the Basic Assessment process were notified of the proposed Prospecting Right Application via the following methods:

- Registered letters, e-mails and faxes.
- Background Information Documents.
- Questionnaires.
- Placement of 10 A1 Correx Site Notices at various locations on-site.
- Placements of A3 posters at three (3) local public gathering places in the town of Hennenman (the local Spar Supermarket, local clinic and the Dr Paul Virility Medical Centre).
- Placement of newspaper adverts in the Volksblad (in English and Afrikaans) on the 26th January 2018 and the Free State Sun (in Sesotho) on the 2nd February 2018.

The I&AP database is included in Appendix D. Please also refer to Appendix D for proof of notification sent to I&APs and for proof of correspondence with I&APs.

7.1.7 Description of the Information provided to the Community, Landowners and I&APs

Notification documents sent to all pre-identified I&AP's included the following information:

- The site plan.
- List of activities to be authorised.
- Scale and extent of activities to be authorised.
- Typical impacts of activities to be authorised.
- The duration of the activity.
- Sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land).
- The purpose of the proposed project.
- The prospecting methods to be used.
- Details of the affected properties (including parent farm and portion).
- Details of the MPRDA and NEMA Regulations that must be adhered to.
- The minerals being prospected for.
- Date by which comment, concerns and objections must be forwarded through to both Shango Solutions and the DMR respectively.
- Contact details of the Environmental Assessment Practitioner (EAP).
- Contact details of the DMR and name of the relevant DMR official.

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

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions.
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity.
- To provide information on current land uses and their location within the area under consideration.
- To provide information on the location of environmental features on-site, to make written proposals as to how and to what standard the impacts on-site can be remedied.
- To mitigate the potential impacts on their socio economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied.
- Details of the landowner and information on lawful occupiers.
- Details of any communities existing within the area.
- Details of any Tribal Authorities within the area.
- Details of any other I&AP's that need to be notified.
- Details on any land developments proposed.
- Details of any perceived impacts to the environment that should be considered in the BAR.
- Any specific comments, concerns or objections to the proposed prospecting operation.

I&APs have been provided a period of 30 days, from the 26th January 2018 to the 26th February 2018, to register and comment on the proposed activity and application. Refer to Appendix D for proof of initial notification sent to I&APs. This draft BAR will be made available to I&APs for review and comment for an additional 30 days. Comments obtained during the initial notification period of the BAR process have been included in the summary table below.

7.1.8 Public Participation Open Days/Meetings

During the 30 day draft BAR+EMPR review period, an Open Day will be held to present the findings of the Basic Assessment. The Open Day will take place on the 6th April 2018.

7.1.9 Issues and Responses

The Public Participation Process was initiated on 26th January 2018. I&APs were given until 26th February 2018, a period of 30 days to register for this project. The draft BAR and EMPR will be made available on the 13th March 2018 to the 16th April 2018 and I&APs will be provided opportunity to comment on the draft BAR. All comments or issues received from I&APs during the project registration period have been included in this Basic Assessment Report.

7.1.10 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

7.1.11 Summary of Issues Raised by I&APs

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

Table 6: Summary of issues raised by I&APs.

I&AP	Consulted	Date comments received	Comment received	Response issued
Key Stakeholders				
Landowner/s				
Margaretha Jacoba Wagner	X		No comment received to date.	
Aletta Johanna Jubelius	X		No comment received to date.	
Engela Welthagen Erasmus	X		No comment received to date.	
Hanmar Trust	X		No contact details sourced for this landowner.	
Elizabeth Maria Lubbe	X		No comment received to date.	
Waterbron Trust	X		No contact details sourced for this landowner.	
Jacoba Margaretha Pienaar	X		No comment received to date.	
Erasmus "Rassie" Claassen Ferreira	X	27 February 2018	<p>Vir Aandag : Wie dit aangaan</p> <p>Hierby aangeheg is 2 bladsye i.v.m REGISTRASIE VIR BELANGHEBBENDEEN GEAFFETEERDE PARTYE</p> <p>Ms Ferreira filled in the Interested and Affected Party registration form and gave the following comments:</p> <ul style="list-style-type: none"> • Daar is begrafplaas op plaas (There is a cemetery on the farm) 	<p>Beste Rassie</p> <p>Baie dankie vir u korrespondensie en u aangehegte registrasievorm. U opmerkings is genoteer en sal ingesluit word in die Basiese Evalueeringsverslag van die projek.</p> <p>U sorg betreffende ondergrondse water word aangespreek in die Basiese Evalueeringsverslag.</p> <p>Hierdie verslag sal mettertyd beskikbaar gestel word vir resensies en kommentaar. U sal in kennis</p>

I&AP	Consulted	Date comments received	Comment received	Response issued
			<ul style="list-style-type: none"> Bekamerd oor ondergrondse water wat beïnvloed gaan word, baie, belangrik vir beeste (melkery) (Concerned regarding underground water that will be influenced. Very important for cattle (diary)). 	<p>gestel word van die beskikbaarheid van die verslag.</p> <p>Indien u enige opmerkings of vrae het in verband hiermee, kan u ons altyd kontak.</p> <p>Dear Rassie,</p> <p>Thank you very much for your correspondence and the attached registration form. Your comments are duly noted and will be included in the Basic Assessment Report for this project.</p> <p>Your concern regarding underground water has been addressed in the Basic Assessment Report.</p> <p>The Basic Assessment Report will be made available in due course for review and comment. You will be notified of the availability of the report.</p> <p>Should you have any further comments/questions in this regard, please do not hesitate to contact us.</p>
Daniel Jacobus Behrens	X		No comment received to date.	
H & B Trust	X		No contact details sourced for this landowner.	
Christina Maria Wilhelmina Ferreira	X		No comment received to date.	
Anna Maria Heyns	X		No comment received to date.	
Eendracht Trust	X		No contact details sourced for this landowner.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Mooi Toekoms Trust	X		No contact details sourced for this landowner.	
Pelzaan Familie Trust	X		No contact details sourced for this landowner.	
Brakvlei Trust	X		No contact details sourced for this landowner.	
Petrus Albertus van Schalkwyk / J P Verster Saad Produseerders CC	X		No comment received to date.	
Johannes Anthonie Pelser	X		No comment received to date.	
Luis Johannes Fourie / Delton Trading CC	X		No comment received to date.	
Johan Lodiwicus Klopper Schutte / Lonel Boerdery CC	X		No comment received to date.	
Soetamaling Trust	X		No contact details sourced for this landowner.	
Gustavus Wilhelm Roux / Gustavus Wilhelm Roux Familie Trust	X		No comment received to date.	
Francois Delpont Familie Trust	X		No contact details sourced for this landowner.	
Michiel Ignatius Heyns	X		No comment received to date.	
Wikus Marthinus Joubert	X		No comment received to date.	
Hendrik Dirk Erasmus	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
B Mlambo/ SANRAL/ NRA	X		No comment received to date.	
Plancius Investments CC	X		No contact details sourced for this landowner.	
Lawful Occupier/s				
	X		No comment received to date.	
Local Municipality – Moqhaka Local Municipality				
Executive Mayor(Ms. Motshidisi Koi)	X		No comment received to date.	
Municipal Manager (Mr. Simon Moqwathi)	X		No comment received to date.	
Speaker (Mr. Mpho Chakane)	X		No comment received to date.	
Ward 2 Councillor (Cllr. Selane Tladi)	X		No comment received to date.	
District Municipality – Fezile Dabi District Municipality				
Municipal Manager (Ms. Oumix Oliphant)	X		No comment received to date.	
Local Municipality – Matjhabeng Local Municipality				
Executive Mayor (Mr. Nkosinjani Wilson Speelman)	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Municipal Manager (Mr. Thabiso Tsoaeli)	X		No comment received to date.	
Speaker (Bheke Sthofile)	X		No comment received to date.	
Ward 3 Councillor (Cllr. MP Kopela)	X		No comment received to date.	
District Municipality – Lejweleputswa District Municipality				
Municipal Manager (Ms. Palesa Kaota)	X		No comment received to date.	
Provincial Environmental Authority				
Head of Department	X		No comment received to date.	
Organs of State				
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	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Settlements				
Free State Department of Police, Roads and Transport	X	19 February 2018	<p>Good day Me. Zizo Siwendu.</p> <p>Please find the attached Departmental letter dated 14 February 2018 pertaining to the Application for a prospecting right and environmental authorization on various farms within the Kroonstad, Ventersburg and Hennenman Magisterial districts, in the Free State Province (Ventersburg Consolidated Prospecting Right).</p> <p>Any enquiries pertaining to this matter can be directed to Mr. Hannes Maree at telephone no. 051-409 8275 or e-mail: MareeH@freetrans.gov.za</p> <p>Dear Me. Zizo Siwendu</p> <p>APPLICATION FOR A PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORISATION ON VARIOUS FARMS WITHIN THE KROONSTAD, VENTERSBURG AND HENNINGMAN MAGISTERIAL DISTRICTS, IN THE FREE STATE PROVINCE (VENTERSBURG CONSOLIDATED PROSPECTING RIGHT</p> <ol style="list-style-type: none"> Your letter dated 26 January 2018 pertaining to the above-mentioned matter refers. This Department identified two departmental borrow pits as indicated on your list with various farms that will be affected by your application for a prospecting right , namely borrow pit no. 184/1/6/3 situated on the property Eerste Geluk 	<p>Good day,</p> <p>Thank you very much for the correspondence.</p> <p>Please be advised that this is an application for prospecting, not mining. Although the prospecting application area extends over fifty-three (53) farm portions with a total area of 7 943.07 ha, only 0.54 ha of the total area will be affected by invasive prospecting activities.</p> <p>Invasive prospecting activities will involve drilling of six (6) diamond core drillholes. Drilling will consist of six small holes of several centimetres in depth. 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 6 drillholes would disturb an area covering approximately 5400 m² or 0.54 ha. Drill sites will be rehabilitated after drilling and the holes will be capped by means of concrete (as will be specified in the Environmental Management Programme).</p> <p>The properties that will be affected by the 6 proposed drillholes include:</p> <ol style="list-style-type: none"> Groenkol 2448 (Portion 0) Wonderboom 1100 (Portion R0) Daamleegte 323 (Portion RE) Lekkerleven 2445 (Portion 0)

I&AP	Consulted	Date comments received	Comment received	Response issued
			<p>51 and borrow pit no. 184/1/35/12 situated on the property of Subdivision 3 of Goedgegund 434.</p> <p>3. This Department reserved these two borrow pits in terms of the provisions of section 17(2) of the Free State Roads Ordinance, 1968 (Ordinance no.4 1968), as amended. The material from these borrow pits will be utilised by the Department for road building or road rehabilitation purposes. Usable material for such purposes are limited in the province.</p> <p>4. In view of the existing department borrow pits on the properties listed in paragraph 2, this Department has to the proposed mining activities indicated with Surveyor General code FS0350000000005100000 and F02000000000043400003.</p> <p>5. You are welcome to schedule a meeting with this Department's Director: Road Asset Management System, Mr. W. Van Wyk, to discuss the matter and possible solutions to enable you to proceed with the proposed mining activities on the affected properties.</p> <p>6. Any queries pertaining to this matter can be directed to Mr. H Maree at telephone no. 051-409 8275 or e-mai: MareeH@freetrans.gov.za</p>	<p>5. Twistniet 565 (Portion RE)</p> <p>6. Twistniet 565 (Portion 3)</p> <p>None of the properties indicated by the Department will be affected by the proposed drillholes. Kindly refer to the attached map for the six proposed drillhole locations.</p> <p>May you kindly furnish us with the KMZ file for the borrow pits locations, so we can include this information in the sensitivity map for this project?</p>
Free State Department of Police, Roads and Transport	X	23 February 2018	<p>God day Me. Siwendu.</p> <p>Your email refers. Please find the attached</p>	Dear Danelle,

I&AP	Consulted	Date comments received	Comment received	Response issued
			<p>Departmental letter dated 23 February 2018 pertaining to the above mentioned matter.</p> <p>Any enquiries pertaining to this matter can be directed to Mr. Hannes Maree at telephone no. 051-409 8275 or e-mail: MareeH@freetrans.gov.za</p> <p>Dear Me. Zizo Siwendu</p> <p>APPLICATION FOR A PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORISATION ON VARIOUS FARMS WITHIN THE KROONSTAD, VENTERSBURG AND HENNENMAN MAGISTERIAL DISTRICTS, IN THE FREE STATE PROVINCE (VENTERSBURG CONSOLIDATED PROSPECTING RIGHT</p> <ol style="list-style-type: none"> 1. Your e-mail dated 19 February 2018 pertaining to the above mentioned matter refers. 2. The Department takes cognisance of the contents of your e-mail, as well as that none of the two identified departmental borrow pits will be affected by the proposed prospecting. 3. Please note that the Department cannot provide you with a KMZ file to indicate the locations of the departmental borrow pit no. 184/1/6/3, situated on the property Eerste Geluk 51 and borrow pit no. 184/1/35/12, situated on the property of Subdivision 3 of Goedgegund 434 as the coordinates of these borrow pits are not available. 4. If, however, you request to see the positions of 	<p>Thank you for your correspondence.</p> <p>A site visit will not be necessary. We will label the properties with the identified departmental borrow pits in our sensitivity maps.</p>

I&AP	Consulted	Date comments received	Comment received	Response issued
			<p>the afore-mentioned borrow pits in the field, the necessary arrangements can be made with the relevant Departmental officials.</p> <p>5. Also note that a building line of 95.0 meters, measured from the centre line of the road, is applicable to the provincial roads in terms of the provisions of the Advertising on Roads and Ribbon Development Act, 1940 (Act no. 21 of 1941). You therefore need to apply for a way leave approval should the proposed prospecting be done within the building restriction area. An application form is attached hereto.</p> <p>6. Any enquiries pertaining to this matter can be directed to Mr. H. Maree at telephone no. 051-409 8275 or e-mail: MareeH@freetrans.gov.za</p>	
Free State Department of Public Works Agency Ltd	X		No comment received to date.	
Free State Department of Water and Sanitation	X	27 February 2018	<p>Morning,</p> <p>This email serves to request that the Department of Water and Sanitation be registered as an interested and affected party for the Ventersburg Consolidated Prospecting Right.</p> <p>Kindly send all corresponded by post as follows:</p> <p>Department of Water and Sanitation PO Box 528</p>	<p>Dear Melato,</p> <p>Thank you for your correspondence.</p> <p>Going forward, all correspondence will be sent to Mr Willem Grobler using the contact information you provided.</p>

I&AP	Consulted	Date comments received	Comment received	Response issued
			Bloemfontein 9300 For attention: Mr Willem Grobler	
National Department of Mineral Resources	X		No comment received to date.	
National Department of Agriculture, Forestry and Fisheries	X		No comment received to date.	
The Council for Scientific and Industrial Research (CSIR)	X		No comment received to date.	
SANRAL/ NRA	X	20 February 2018	Good day Ms Siwendu Your application received by this office on the 8th of February 2018 has reference. Could you please send me a clear Locality plan in relation to the National Road so we can finalise our comments on this application.	Dear Jabu, Thank you for your correspondence. As requested, please find herewith attached the locality map (Plan 2(2) as well as the KMZ file for the Ventersburg Consolidated Prospecting Right Project. Should you have any further questions in this regard, please do not hesitate to contact me.
National Department of Rural Development and Land	X		No comment received to date.	

I&AP	Consulted	Date comments received	Comment received	Response issued
Reform				
Catchment Management Agency	X		No contact details sourced for this I&AP.	
Eskom	X		No comment received to date.	
Transnet	X		No comment received to date.	
Other Affected Parties				
Agri Free State	X	29 January 2018	<p>Good day Zizo</p> <p>Kindly find my registration as Interested party attached. I am NOT registering on behalf of commercial farmer land owners and not necessarily all the land owners are our members. I am merely participating as an observer and will participate in the interest of sustainable agriculture and for the resource base on which it depends.</p> <p>I can assist to facilitate meetings via the local Agricultural Associations if needs be – they have meeting halls and facilities available at a reasonable fee.</p> <p>Mr Armour filled in the Interested and Affected Party registration form and gave the following comments:</p> <ul style="list-style-type: none"> Roads expanding reserves- SANRAL-along R 30. 	<p>Dear Jack</p> <p>Thank you for your correspondence and for showing interest on this project.</p> <p>As requested, you have been registered as an Interested and Affected Party and you will be kept informed as the project progresses.</p> <p>We appreciate your offer to assist in facilitating meetings. We will be scheduling a public meeting to present the findings of the basic assessment in due course and will need to book a venue for the meeting.</p>

I&AP	Consulted	Date comments received	Comment received	Response issued
			<ul style="list-style-type: none"> Farmer family and farm-worker grave sites. 	
Wildlife and Environment Society of South Africa	X		No comment received to date.	
Federation for a Sustainable Development	X		No comment received to date.	
SANParks	X		No comment received to date.	
Birdlife South Africa	X	26 January 2018	Simon Gear left Birdlife South Africa's employ on 10 April 2017. Messages sent to this address will not be auto-forwarded, so please send emails to either advocacy@birdlife.org.za or ceo@birdlife.org.za	This correspondence was noted and the relevant documents were sent to the e-mail addresses provided. However, delivery failed.
Agricultural Research Council	X		No comment received to date.	
Endangered Wildlife Trust	X		No comment received to date.	
Registered Interested and Affected Parties				
Cllr. MM. Sebotsa	X	30 January 2018	<p>Cllr. MM Sebotsa completed the Interested and Affected Party registration form. The following comments were raised:</p> <ul style="list-style-type: none"> Cllr. Sebotsa provided contact details of the farmer (Wissels). He mentioned that there are construction works taking place on the N1 route between 	<p>Dear Cllr. MM Sebotsa,</p> <p>Thank you very much for the correspondence and for the completed registration form.</p> <p>With regards to comments raised in the completed registration form, my responses are as follows:</p> <ul style="list-style-type: none"> We greatly appreciate the contact details of the farmer (Wissels). We will include him to

I&AP	Consulted	Date comments received	Comment received	Response issued
			<p>Ventersburg and Kronstad which falls within the application area.</p> <ul style="list-style-type: none"> • He also had an enquiry regarding whether the project is going to benefit the community in terms of job creation. • He requested that the information be extended to the affected communities by placing notices at libraries and shops where people are always found. • He suggested that community meetings be organised so as to inform them about the project. He also went on to emphasise that the community has a high number of unemployed people and that he hopes this project will assist in tackling this issue. 	<p>the project database.</p> <ul style="list-style-type: none"> • Current road construction works along the N1 between Kroonstad and Ventersburg are noted. • The majority of the proposed scope of work as detailed in the Prospecting Work Programme accompanying this Prospecting Right and Environmental Authorisation application requires technical skills and the work will be performed by qualified Geologists. There will be an opportunity for the employment of local, unskilled labourers during invasive prospecting operations (drilling) such as clearance of vegetation and rehabilitation of disturbed sites (revegetation). Due to the limited scope and short duration of the proposed prospecting operations, it is unlikely that the proposed prospecting operations will have any significant impact on employment opportunities as only a limited number of unskilled labourers will be required for the duration of the project. • The public participation process for this project was initiated on the 26th January 2018. 10 x A2 Correx board site notices (in English, Afrikaans and Sesotho) were placed within and around the application area. Background Information Documents were distributed to affected and surrounding landowners. English and Afrikaans notification

I&AP	Consulted	Date comments received	Comment received	Response issued
				<p>adverts were placed in the Volksblad newspaper and the Sesotho advert was placed in the Free State Sun newspaper. A3 site notices (in English, Afrikaans and Sesotho) were placed at the local Spar supermarket, at the local clinic and at the Dr Paul Virility Medical Centre in the town of Ventersburg. The public participation process is on-going and will continue throughout the Basic Assessment process. The public participation process is open to any member of the public who is interested or affected and wish to participate.</p> <ul style="list-style-type: none"> As the ward councillor within the application area, we look forward to working with you on this project.

8. ENVIRONMENTAL ATTRIBUTES AND ASSOCIATED ALTERNATIVES

8.1.1 Baseline Receiving Environment

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

8.1.1.1 Socio-Economic

The application area is located in the Free State Province approximately 14 km north-northeast of Ventersburg. The town is described as a maize/crop farming community. The proposed prospecting area can be found in the Moqhaka Local Municipality (Ward 2), which is part of the Fezi Dabi District Municipality and the Matjhabeng Local Municipality (Ward 3), which forms part of the Lejweleputswa District Municipality (Figure 5).

The Moqhaka Local Municipality is situated in the southern part of the Fezile Dabi District Municipality in the Free State Province. The project application area is located within an area of extreme agricultural significance. Apart from the dominant role agriculture plays in the region, no other significant economic activity exists (IDP, 2017-2022). The Municipality has a population of 154 732 people.

Matjhabeng Local Municipality is situated in the Lejweleputswa District Municipality in the Free State Province. The Matjhabeng Local Municipality represents the hub of mining activity in the Free State Province (IDP, 2017-2022). The Municipality has a population of 42 8843 people. The rural areas of Municipality cover an area of approximately 2 500 farms.

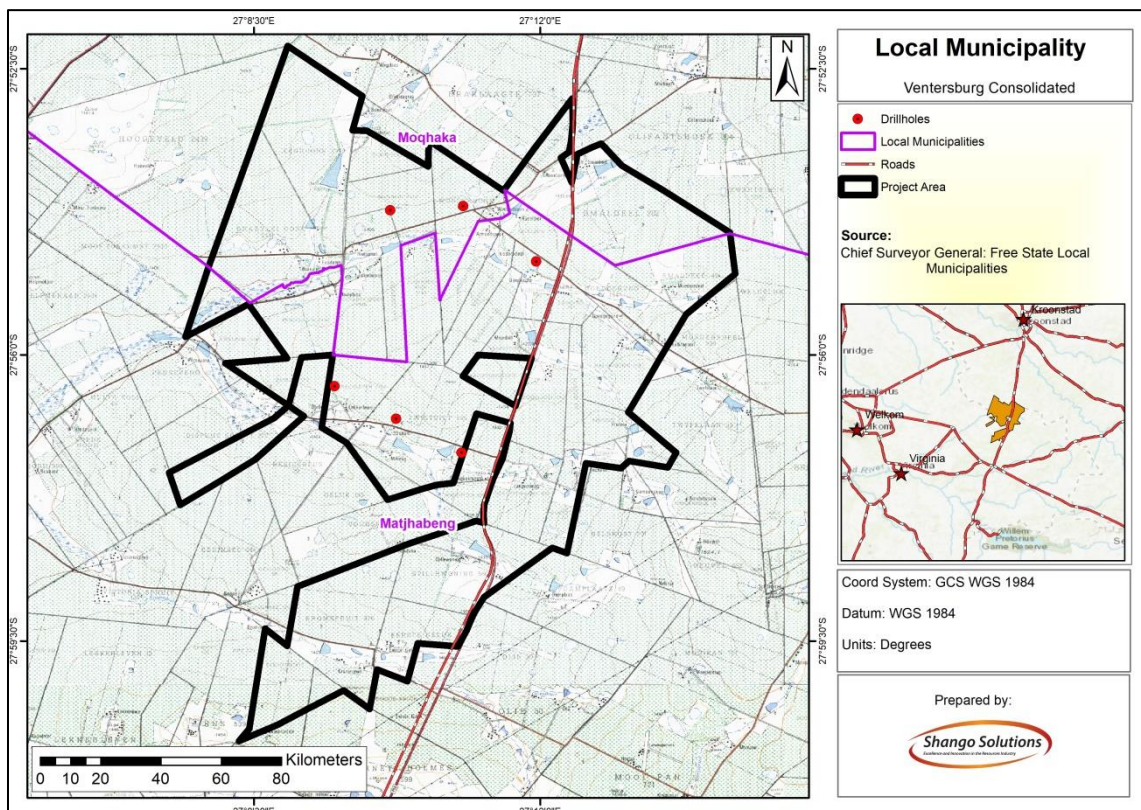


Figure 5: Affected local municipalities (refer to Appendix C for an enlarged map).

8.1.1.2 Geology

The Free State Goldfield was discovered by geophysical means during the 1930's, when Dr. R Krahnemann delineated the edge of the Witwatersrand Basin by mapping magnetic shales of the West Rand Group with a magnetometer. This was followed by extensive diamond exploration drilling, which intersected the auriferous conglomerates of the Central Rand Group. As a result, one of the major goldfields on Earth was developed.

Mining in the Free State Goldfield concentrated on the extraction of the Basal, Steyn, Saaiplaas and Leader reefs of the Central Rand Group. Several other ore bodies were extracted, also belonging to the Kimberley and Elsburg formations. Formations are generally marked by angular, erosional unconformities, which are onlapping towards the edge of the Witwatersrand Basin. Major structural displacements, several hundreds of metres in magnitude, are encountered in the Free State Goldfield. Faulting, but also folding, predominantly occurred during extrusion of the Ventersdorp Supergroup flood basalts.

The surface geology of the area is dominated by thin Quaternary sediments. The main targets for prospecting are the conglomerates (reefs) of the Central Rand Group within the Witwatersrand Supergroup. These are overlain by 500m of Karoo Supergroup strata, predominantly horizontally bedded sandstones and shales of the Eccia Group. The Eccia Group contains coal at shallow depths which might be exploitable (Figure 6).

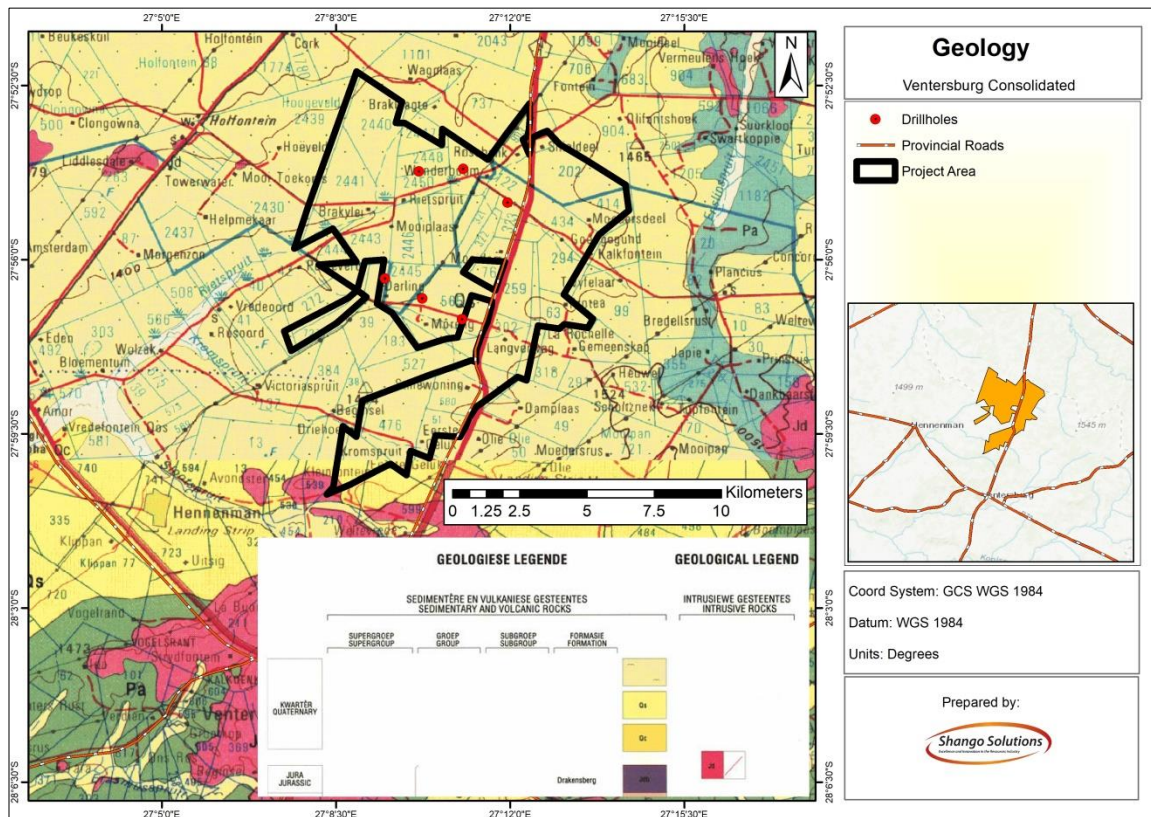


Figure 6: Geology of the application area (refer to Appendix C for an enlarged map).

8.1.1.3 Topography

The topography of the application area comprises of plains varying in altitude between 1 000 and 1 500 MAMSL.

8.1.1.4 Soils

Soil reflects the influence of geology, topography and climate over time and is an important indicator of agricultural potential. The dominant soil type is Bd, closely followed by Bc, Ae, and Ba. These soils are mainly

red and yellow apedal soils. They range from moderate to high fertility status with large variability in texture, and are mostly classified as sandy loam to sandy clay loams. The Bd, Bc, and Ba types contain a greyish subsoil layer where iron and manganese accumulate in mottles caused by a seasonally fluctuating water table. These mottles eventually harden to form concretions which cause restricted water infiltration (AGIS, 2015).

8.1.1.5 Land Uses and Land Capability

Land use within the project application area consists mainly of cultivated commercial dryland agriculture. Other land uses within the application area include wetlands, grassland for cattle farming as well as woodland open bush for wildlife (Figure 7). SANRAL, and Transnet servitudes as well as Eskom powerlines have been identified within the application area. The predominant land uses within the application area are:

- Wetlands.
- Cultivated Fields (high and medium).
- Grassland.
- Woodland/Open Bush.

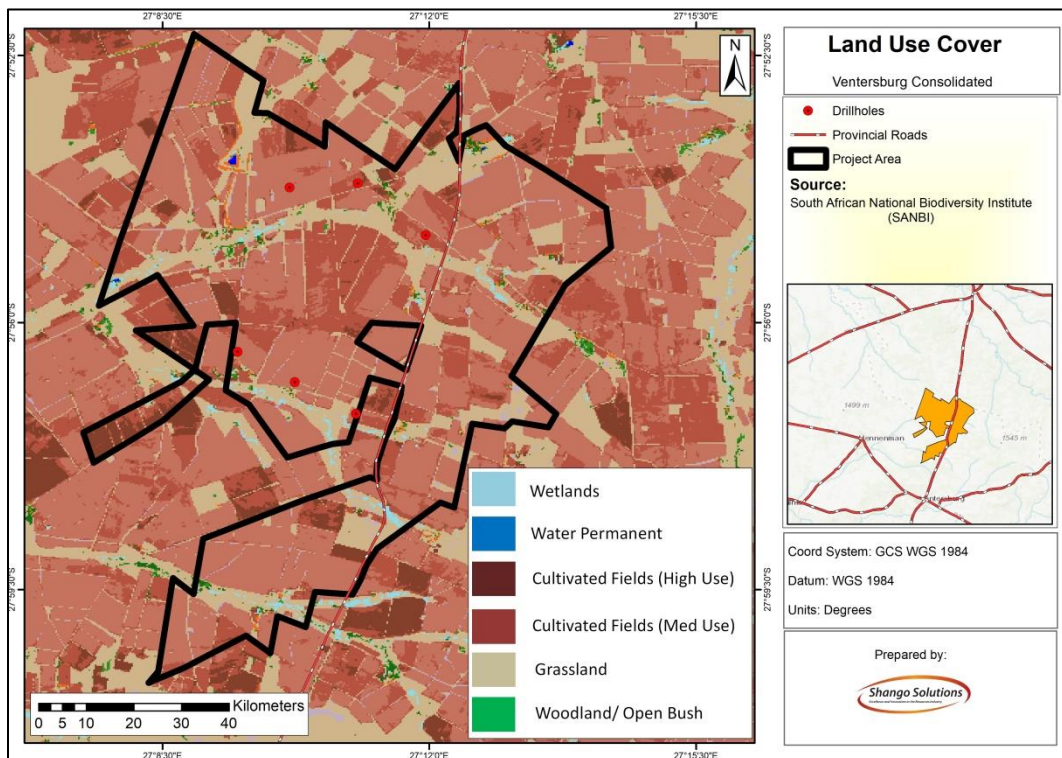


Figure 7: Current land uses (refer to Appendix C for an enlarged map).

8.1.1.6 Climate

The climate of the area is characterised by mild to hot summers with rainfall (November to March) and extremely cold winter temperatures.

8.1.1.7 Culture and Heritage Assessment

A Heritage Impact Assessment (inclusive of a Palaeontology study) was undertaken over the application area. Please refer to Appendix E for the Heritage Specialist Report. The survey was conducted on foot and a vehicle was used to gain access to (i) the farm properties within the application area and (ii) the proposed six drillhole locations.

According to literature review (NGT, 2018), the application area was first occupied by hunter-gatherers from the Early, Middle and Later Stone Age periods, succeeded by the occurrence of Khoekhoen pastoralists who occupied the landscape from around 2 000 years ago. Iron Age farmers who share lineage to modern day Sotho and Tswana people of South Africa later occupied the area. The 19th Century bore witness to the exploitation of the land by the Griqua and White colonial farmers through practices of trade, farming and hunting. Land occupation by indigenous people was eradicated around the mid-19th Century and the area was incorporated into what was then known as the Orange Free State Republic. The 1870s and the 1880s marked an important part in history making reference to the first and second Anglo-Boer war brought about by the diamond rush at Kimberly and the gold rush along the Witwatersrand post British colonisation. The occurrence of racial segregation and marginalisation of the native South African populace around 1910, resulted in many locals being forced to engage in labour intensive work in small towns, live in reserves or pursue an occupation as a farmworker in the Free State (Wiltshire, 2018).

The application area does not contain Heritage Impact Assessments which draw specific focus to the archaeological resources of the area. Archaeological resources may have been previously lost to disturbances caused by the practice of crop (maize) and Livestock (cattle) farming in the area extending over generations. However, areas along the banks and floodplains of the Rietspruit (which passes through the application area) as well as other smaller tributaries may contain portions of mildly disturbed archaeological sites. A vast number of archaeological sites pertaining to Iron Age settlements, stone walled structures, fairly recent burial grounds and graves as well as cultural landscapes can be encountered through surveying on foot (Wiltshire, 2018).

Heritage Study

The foot survey that was undertaken identified two heritage sites within the application area (Figure 8). However, these two heritage sites are located away from the proposed six drillhole locations. The sites include:

- A family burial site with one grave.
- A Provincial graded barn house utilised as a guesthouse.

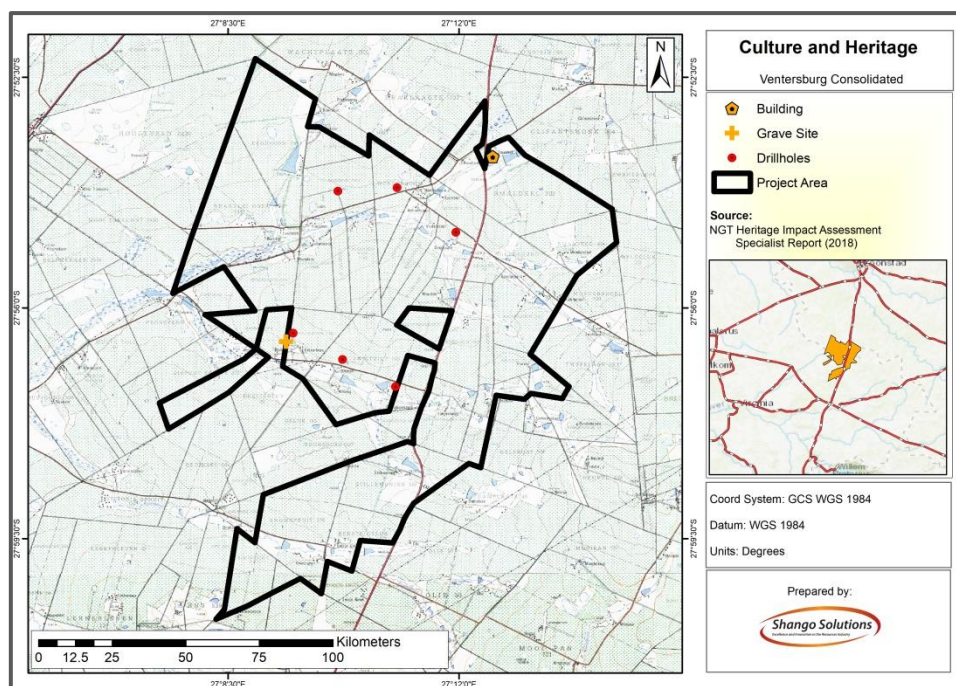


Figure 8: Culture and heritage sites within the application area (refer to Appendix C for an enlarged map).

The burial site is located on the farm Lekkerleven 2445, Portion 0 and it belongs to the De Beer family who were the previous owners of the farm (Figure 9). A typical grave orientation is observed i.e. east-west orientation (with the head pointing west and the feet facing east). The burial ground is sectioned off with a fence. The size of the area fenced off suggests the possibility of more graves which may not have been marked. The grave has a granite headstone and a cement dressing with white pebbles covering the top. Each corner of the grave contains a plinth.



Figure 9: Images depicting family burial site (source: NGT, 2018).

A previous Heritage Impact Assessment study conducted in the area and as indicated by Dreyer (2005) notes the presence of a historical structure (reference Id 34894) within the application area (Figure 10). The structure is documented as a European styled Barn of high local significance. The barn is described to bear resemblance to features such as a Mansard Roof, which is defined as “a covering that has a steep lower part and a flatter upper part on all four sides” (Wiltshire 2018). Within South Africa, there exist two or three similar structures.

The site has been incorporated into the tourism economy of the area and is more commonly referred to as the Barn Guesthouse. Currently, the Barn Guesthouse is utilised as site offices for the ongoing road construction activities along the N1 Highway. It is highly likely that other such structures, farmhouses and complexes of significant value exist. However, they are yet to be documented and graded on the National Inventory. The site falls outside the area of the proposed drillhole sites associated with the prospecting right application.



Figure 10: Images depicting historical Barn from different directions (source: NGT, 2018).

The areas for the proposed drilling activities are largely utilised for commercial crop production. As such, the proposed six drillhole sites are located on transformed land with very little possibility of the presence of archaeological finds or heritage resources (tables 7 to 12).

Table 7: Drillhole 1 location.

Site name	DH 1
Associated farm name	Lekkerleven 2445, Portion 0
Location/GPS coordinates	S27.158126 E-27.939697
Description of site and surrounding area	
This site falls within in active plough filed. However, the field was not ploughed this year which suggests the practice of rotational cropping.. A family burial site was identified in the vicinity of the farm. However, the grave is located approximately 350 m from the proposed drillhole site.	

Table 8: Drillhole 2 location.

Site name	DH 2
Associated farm name	Twistniet 565, Portion 2
Location/GPS coordinates	S27.170654 E-27.946316
Description of site and surrounding area	
The drill point site falls within the typical grassland biome setting. A cluster of acacia trees have been identified to the north of the site (Figure 11). A number of termite mounds were noted as well as a random scatter of cattle excrements. No archaeological or heritage related resources were identified.	



Figure 11: Images depicting the general landscape setting for DH 2 (source: NGT, 2018).

Table 9: Drillhole 3 location.

Site name	DH 3
Associated farm name	Delport and Mojolefa/Twistniet 565, Portion 3
Location/GPS coordinates	S27.18401 E-27.95325
Description of site and surrounding area	
This drillhole site is covered in grass and weeds (Figure 12). This land is indicative of rotational cultivation practices (it has been previously ploughed) and is fenced off. Opposite (north) of the drill site, a maize plough field is located. The location of the proposed drilling extends over both the active and the inactive plough fields. No archaeological resources were identified.	



Figure 12: Images depicting the general landscape setting of DH 3 (source: NGT, 2018).

Table 10: Drillhole 4 location.

Site name	DH 4
Associated farm name	Farm Rietspruit 2450 (Portion RE)
Location/GPS coordinates	S27.158126 E-27.939697
Description of site and surrounding area	
This site is located within an active maize plough field (Figure 13). Some challenges were experienced with regards to gaining access to the exact GPS coordinates for the proposed drillhole location. No archaeological and heritage resource have been identified due to the fact that the land is transformed through active and ongoing agricultural activities.	



Figure 13: Images depicting the general landscape setting of DH 4 (source: NGT, 2018).

Table 11: Drillhole 5 location.

Site name	DH 5
Associated farm name	Wonderboom 1100 (Portion 0)
Location/GPS coordinates	S27° 54.535' E27° 11.159'
Description of site and surrounding area	
This site has an extensive vegetation cover of thatch grass and sweet grass which are generally water loving species. A dam has been identified east of the site (Figure 14). Thatch grass often grows in areas that have moist soils and also where the land has been previously disturbed which suggests the absence of heritage resources. No archaeological resources were identified.	



Figure 14: Images depicting general landscape setting of DH 5 (source: NGT, 2018).

Table 12: Drillhole 6 location.

Site name:	DH 6
Associated farm name	Damleegte 323
Location/GPS coordinates	S27.199224 E-27.914239
Description of site and surrounding area	
This site falls within an old plough field (Figure 15). Evidence points to use of the land to grow maize and sunflowers and that the land might have been ploughed a year or two ago. Cattle tracks were also observed. No archaeological resources were identified.	



Figure 15: Images depicting the general landscape setting of drillhole 6 site and cattle tracks identified on-site (source: NGT, 2018)

Heritage Sensitivity

The two heritage sites identified within the application area are considered as High sensitive heritage features (Figure 16). However, these two sites will not be impacted by the proposed prospecting activities as they are located outside the areas for the proposed drilling activities. The grave site located 350 m away from the nearest drillhole site and the historical building is located about 2 km respectively. As part of the consultation process, landowners and I&APs were asked to indicate if they are aware of heritage features within the application. Mr Erasmus Ferreira, owner of Portion 0 of the Farm Kromspruit 476 indicated the presence of a cemetery on the farm. Although not displayed on the map below because the position was not provided, this cemetery is considered a High sensitive feature.

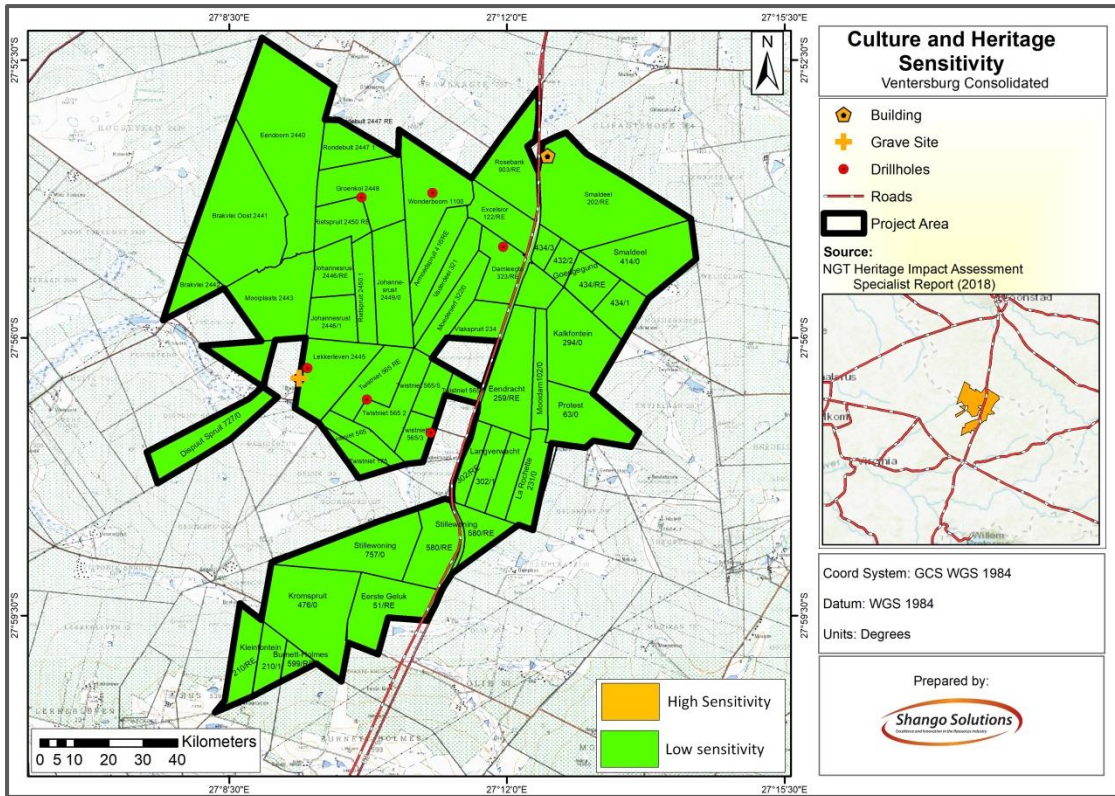


Figure 16: Culture and Heritage sensitivity map (refer to Appendix C for an enlarged map).

Palaeontological Impact Study and Sensitivity

A Palaeontological study was conducted by Dr DJ de Ruiter in 2006 on a site situated just 27 km southwest of the study area boundary in close proximity to the town of Virginia. The study aimed at drawing comparisons between the fossils retrieved from the Pliocene locality belonging to a site near Virginia with the hominid fossils from World Heritage Area sites for the study of palaeoecology and palaeoclimatology. The Kroonstad quarry which is located 20 km towards the northern boundary of the proposed project footprint contains material of the middle Permian fossil bivalves as well as trace fossils which have been preserved in sandstone of the lower Beaufort or Ecca Group (Wiltshire, 2018).

According to the South African Heritage Resources Agency’s (SAHRA) website, South African Heritage Information System (SAHRIS) Fossil Sensitivity Map (Figure 17), the application area is incorrectly depicted as a moderate fossil sensitivity (green colour). The application area is covered by Aeolian sands of the Quaternary age which has been extensively farmed and ploughed over the period of 150-200 years (Wiltshire, 2018). As such, the application should be depicted as a low fossil sensitivity (blue colour).

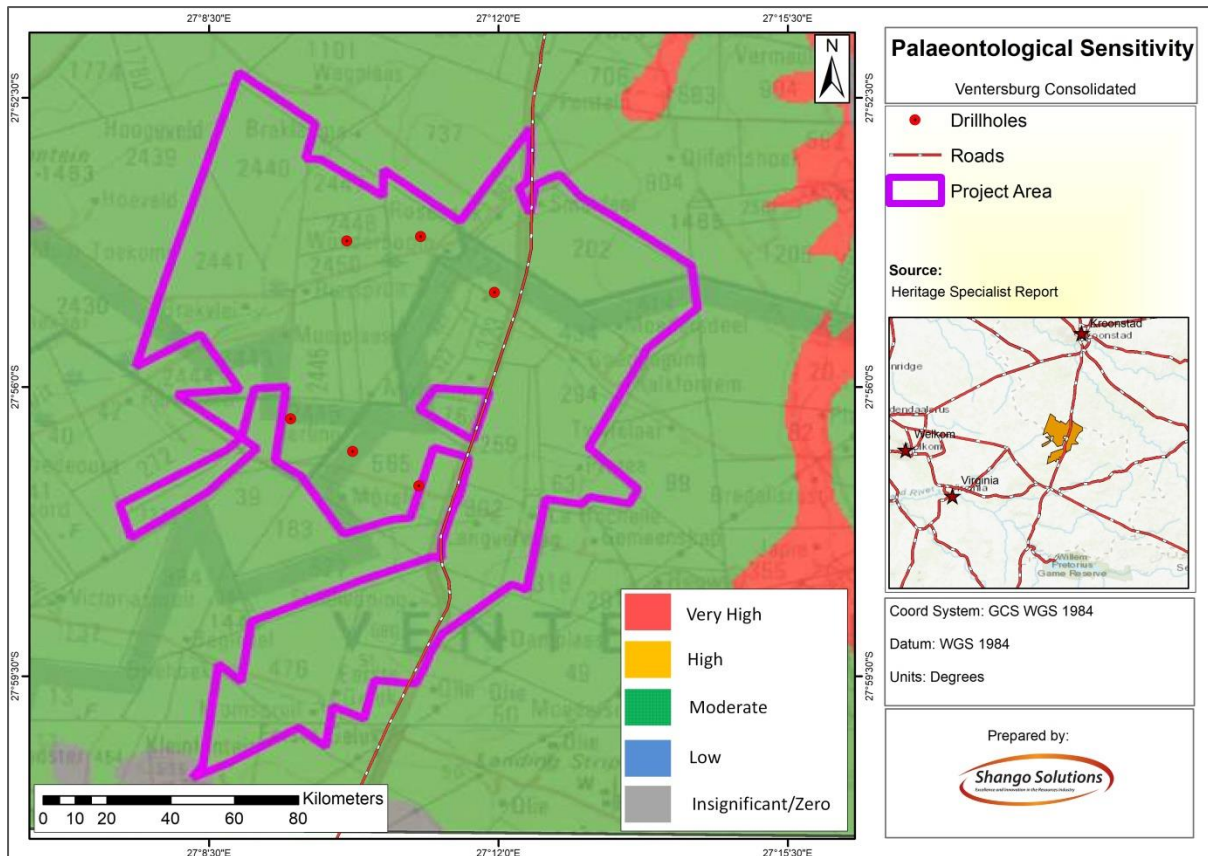


Figure 17: Map depicting the sensitivity of the underlying geology in relation to the occurrence of fossils (refer to Appendix C for an enlarged map).

Notice of the application for a Prospecting Right and Environmental Authorisation has been uploaded to the SAHRIS website. No comment has been provided by SAHRA at this stage.

8.1.1.8 Wetland Assessment

The application area falls within the Vaal Water Management Area (WMA 5), specifically in the C42J Quaternary Catchment. According to the South African Mine Water Atlas, this catchment is of moderate ecological sensitivity. The Vaal Water Management Area includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo rivers.

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 Gauteng, 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, 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 Water Management Area is highly altered by catchment development with agriculture and mining being the main activities. The major mined commodity is gold (Free State Goldfields). The Water Company (Sedibeng Water) in Bothaville is the main supplier of bulk water in the Free State Goldfields. Catchment development has led to deterioration in the water quality of the water

resources in the system, 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 being experienced.

A Wetland Assessment (Appendix D) was undertaken by Environment Research Consulting (ERC) and below is a summary of the specialist findings.

Surface Hydrology

The application area falls in the Vaal Water Management Area (Figure 18), which includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo Rivers.

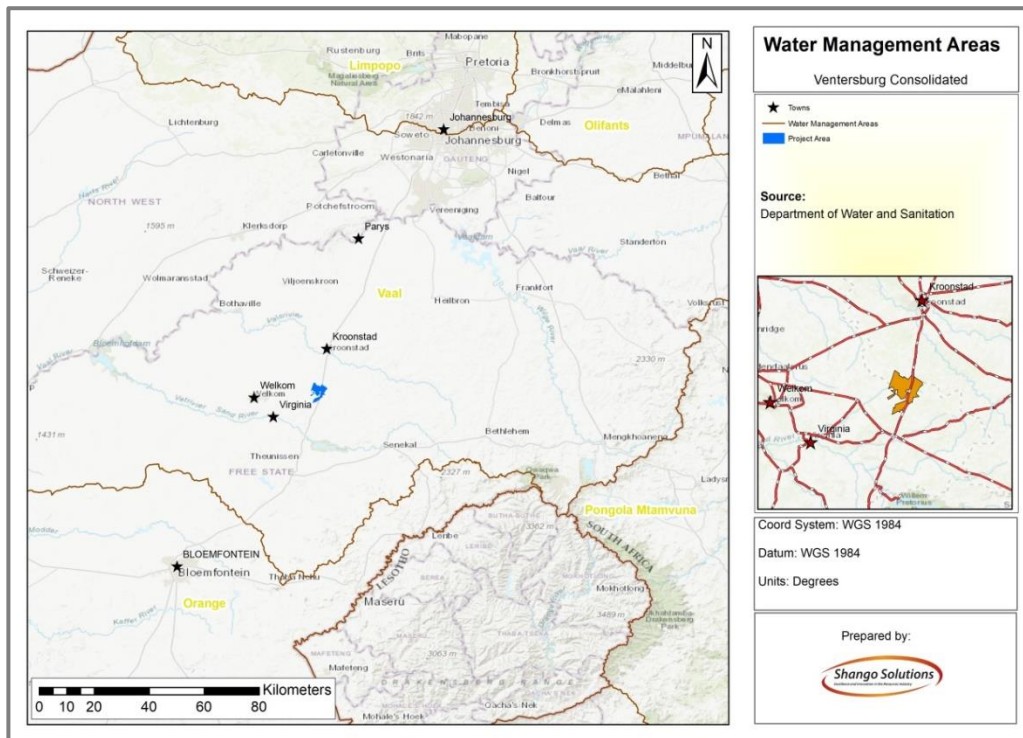


Figure 18: Water Management Areas of central and northern South Africa (refer to Appendix C for an enlarged map).

The Vaal Water Management Area comprises 12 tertiary catchment areas and application area is specifically situated in the Quaternary Catchment C42J (Figure 19).

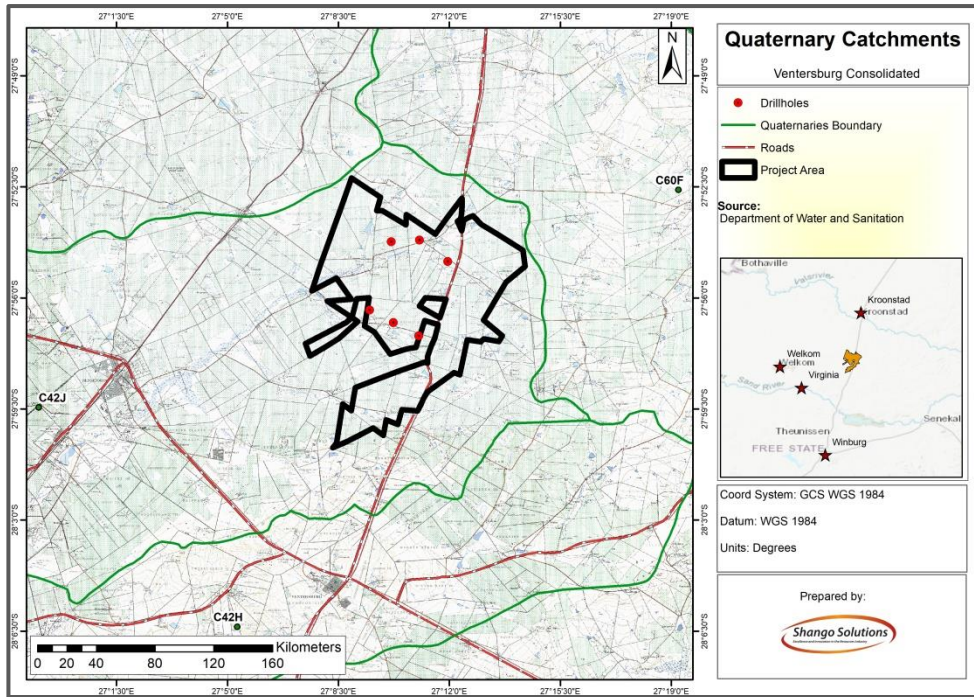


Figure 19: Quaternary Catchment Areas of the study and surroundings (refer to Appendix C for an enlarged map).

Within the study area, two non-perennial streams (Rietspruit and Kromspruit) drain north-west and south-west. A third, unnamed non-perennial stream drains into the Rietspruit north of the Kromspruit. East of the study area, the Enslinspruit drains northwards. Further south of the study area, the Slootspruit drains north-westwards into the Rietspruit (Figure 20).

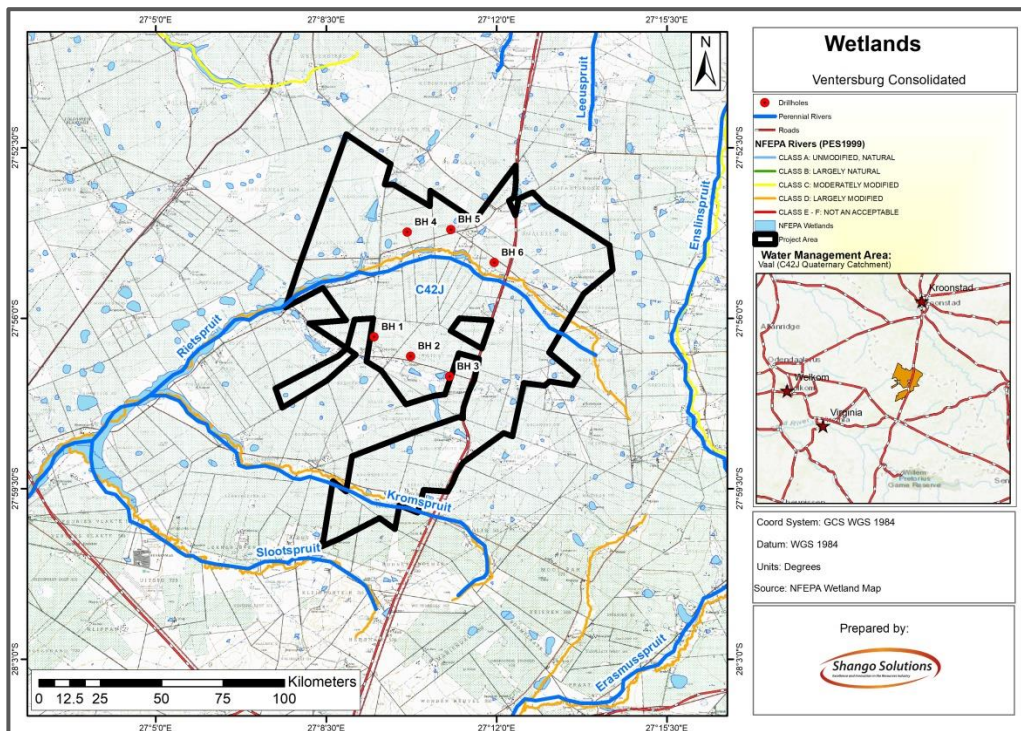


Figure 20: Image depicting the wetlands and other drainage lines recorded in the study area and beyond (refer to Appendix C for an enlarged map).

The wetlands in the application area consist of a variety of types, namely: un-channelled and channelled valley bottom wetlands that are associated with the various streams. In some areas of the streams, there are associated floodplain wetlands. There are also a number of natural pans or depressions where water accumulates during the wet season. Further, there are a number of man-made dams in the area, most of which are associated with the natural streams and drainage lines.

Wetland Vegetation

Vegetation assemblages in the study area which are associated with natural drainage lines and streams (Figures 21 and 22) and small natural pans/depressions (Figure 23) and man-made dams (Figures 24 and 25) consist of water and moisture-loving plants. The wetland vegetation is generally poor in terms of ecological veld condition due to decades of over utilisation by livestock.



Figure 21: A section of the Kromspruit with typical wetland vegetation in and along a channelled wetland with a floodplain (source: ERC, 2018).



Figure 22: A section of a small northern tributary of the Rietspruit with typical wetland vegetation in an un-channelled wetland (source: ERC, 2018).



Figure 23: A small, isolated, natural pan/depression filled with water from recent rains (source: ERC, 2018).



Figure 24: A large man-made dam situated at the confluence of three tributaries along the course of the unnamed non-perennial drainage line north of the Kromspruit (source: ERC, 2018).



Figure 25: A dammed section of the Rietspruit above an area where a district road crosses the natural drainage line (source: ERC, 2018).

Wetland Soils

Five soil forms were generally encountered in the establishment of wetland boundaries in the study area. These are Katspruit, Kroonstad, Bloemdal, Sepane and Rensburg. Along the course of the Rietspruit and the un-named drainage line just to its south, Katspruit (Figure 26), Kroonstad (Figure 27) and Sepane (Figure 28) soil forms were the most prevalent. Soil forms that were mostly recorded along the course of the Kromspruit are Katspruit, Sepane and Rensburg (Figure 29).



Figure 26: Katspruit soil form photographed in the permanent zone of a wetland just upstream of the man-made dam in the un-named drainage line (source: ERC, 2018).



Figure 27: Kroonstad soil form in a seasonal zone of the Rietspruit (source: ERC, 2018).



Figure 28: Sepane soil form in the temporal zone in the un-named drainage line (source: ERC, 2018).



Figure 29: A Rensburg soil form in an eroded temporary zone along the Kromspruit (source: ERC, 2018).

Wetland Delineation and NEMA 32 Metre Buffer Zone

Accessible parts of all wetlands in the application area were investigated and delineated. Where such areas were not accessible during the time of this study, portions of the stream courses and other wetlands were delineated by means of extrapolating the results obtained from the field data to neighbouring areas. An image is presented where the proposed six drillhole sites are currently positioned (Figure 30) in relation to the delineated wetlands.

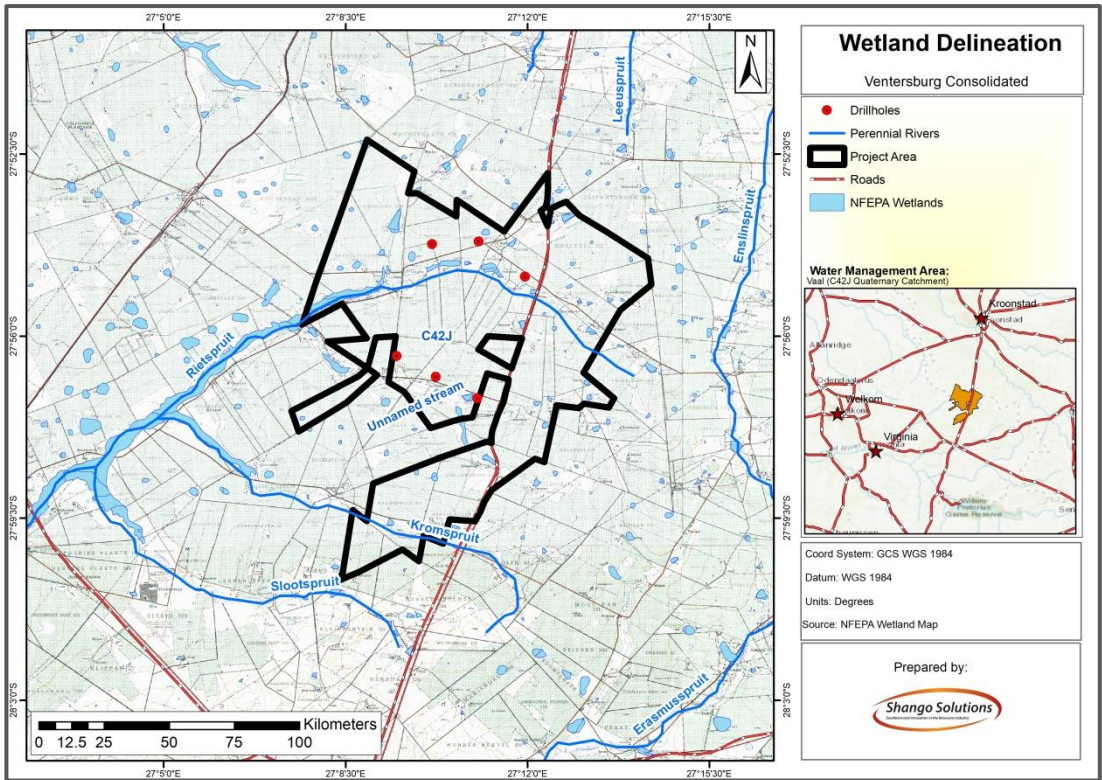


Figure 30: Delineated wetlands relative to the proposed positions of six drillhole sites (refer to Appendix C for an enlarged map).

Buffer zones of 32 m from the edge of the wetlands, as prescribed in Government Notice (GN) 327 (of 2017) of the NEMA 2014 EIA Regulations (as amended) were delineated and mapped (Figure 31).

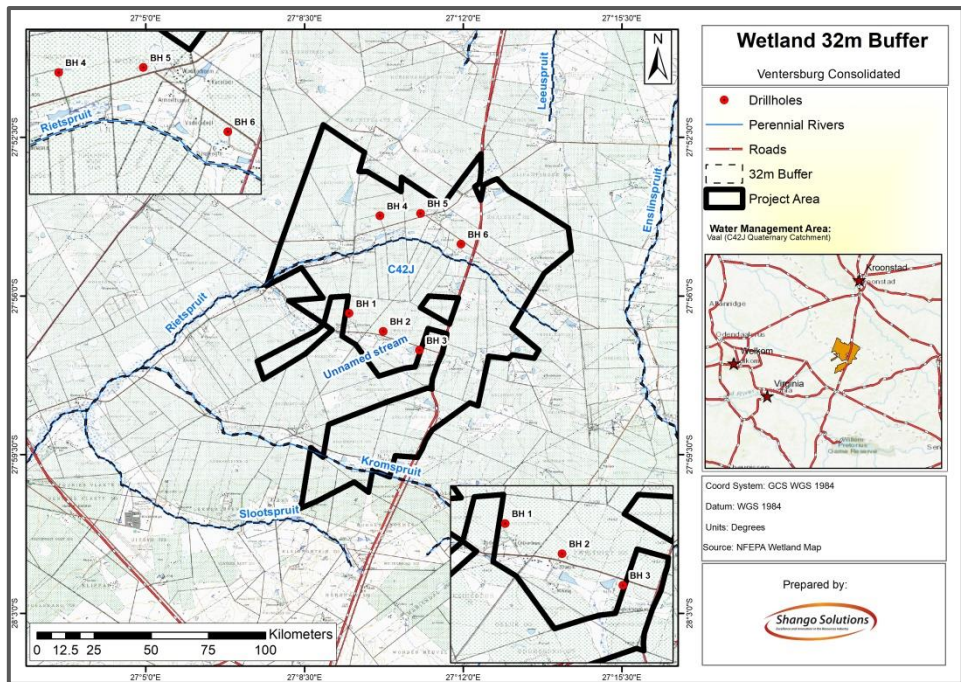


Figure 31: Wetland 32 m buffer zones in relation to the proposed six drillhole sites (refer to Appendix C for an enlarged map).

Present Ecological Status (PES)

The Present Ecological Status (PES) Method (DWAF, 1999) was utilised in an attempt to establish the integrity of the wetlands in the study area and was based on the modified Habitat Integrity approach developed by Kleynhans (1999) (Table 13).

Table 13: Category's assigned to the scores achieved in the wetland habitat assessment.

Category	Mean	Score Category Description
WITHIN GENERALLY ACCEPTABLE RANGE		
A	>4	Unmodified or approximated natural condition.
B	>3 and ≤4	Largely natural with few modifications, but with some loss of natural habitats.
C	>2 and ≤3	Moderately modified, but with some loss of natural habitats.
D	2	Largely modified. A large loss of natural habitats and basic ecosystem functions has occurred.
OUTSIDE GENERALLY ACCEPTABLE RANGE		
E	>0 and <2	Seriously modified. The losses of natural habitats and basic ecosystem functions are extensive.
F	0	Critically modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat.

The wetlands in the application area are moderately to highly modified with some loss of natural habitats (Table 14). They are considered to be ecologically important and sensitive on a provincial or local scale. These wetlands play a small role in moderating the quantity and quality of water of major rivers.

Table 14: Broad PES values and categories of the wetlands in the study area.

Wetland segment	Mean PES Value	PES Category
Wetlands of streams	3.5 – 2.9	B or C
Pans/depressions	3.1 – 2.0	B, C or D
Man-made dams	2.8 – 1.7	C, D or E

Wetland Habitat Sensitivity

A sensitivity rating of High is attributed to the wetlands in the study area (Figure 32). This is mainly due to their important function as water drainage and storage habitat for surrounding ecosystems and the faunal and floral assemblages that depend on it, as well as the relevant connectivity with terrestrial habitats along their mostly linear distribution. Any significant damage to the linear drainage lines, which mostly contain the wetlands of the study area, will have a significant impact on similar habitats downstream, further enhances the sensitive nature of these habitats.

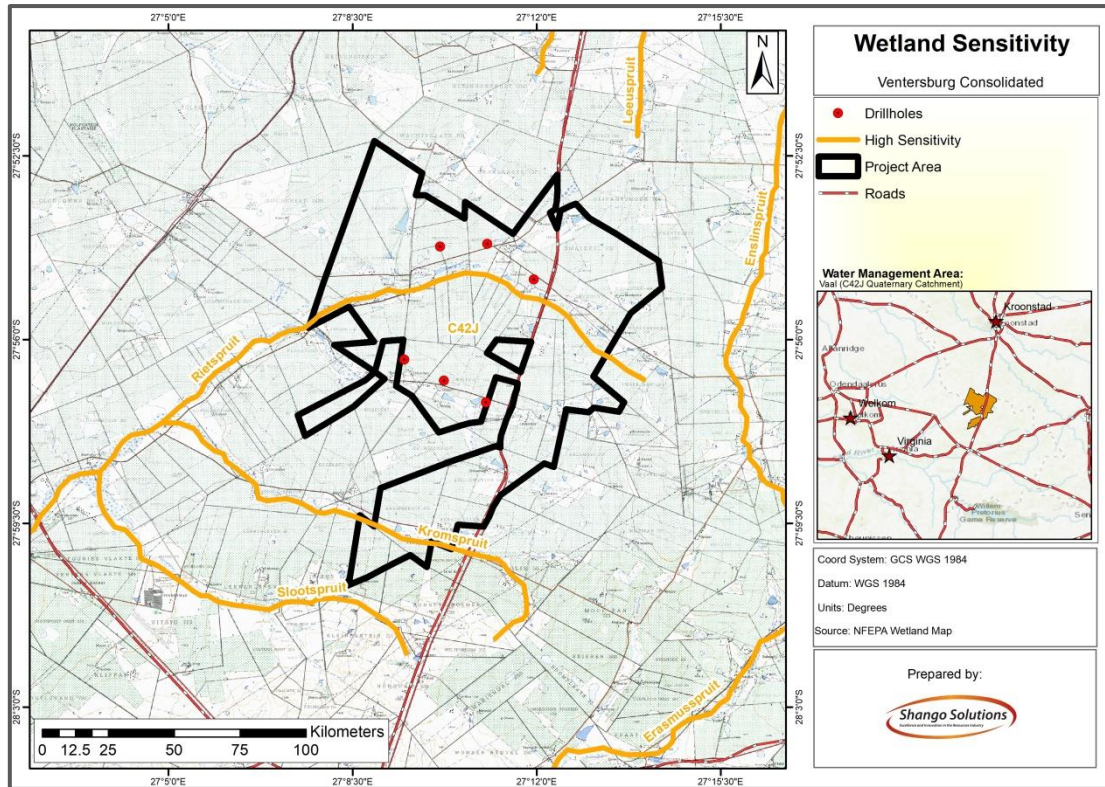


Figure 32: Wetland sensitivity in relation to the proposed six drillhole sites (refer to Appendix C for an enlarged map).

8.1.1.9 Biodiversity Assessment

Biodiversity refers to the variety of different species in a region and the variety of ecosystems and functions such as energy flow and matter cycling needed for the survival of those species (Miller and Spoolman, 2012). Conservation could be defined as the practical application of ecology and refers to the mechanisms and tools needed to achieve conservation goals, such as the protection of biodiversity.

The Biodiversity specialist study (Appendix E) was undertaken by Environment Research Consulting (ERC) and the report presents the findings of the floristic diversity assessment of which the fieldwork was conducted on-site on 18 – 20 January 2018. The biodiversity study discussed the following components:

- Faunal Assessment.
- Flora Assessment.
- Threatened or Protected Plant Species.

Faunal Assessment

The faunal assessment was conducted mainly on a desktop level, which was supported by on-site observations. No faunal trapping or any other quantitative field species data capturing was conducted. The main focus of the faunal assessment was to include every species with the slightest chance of occurring within the site in the species lists. The characteristics of the site and the prominent features surrounding it play a key role in whether an animal would theoretically inhabit the study area. In assessing species occurrence, their approximate distribution and habitat requirements were considered. Therefore, only animal groups for which distribution data are available were considered in this assessment. Table 15 summarises the diversity of fauna that is expected to occur in the study area.

Table 15: Animal groups considered in this study along with the total number of species possibly occurring in or near the study area.

Animal group	Total species
Mammals	52
Reptiles	35
Birds	79
Frogs	14
Butterflies	63
Dragonflies/damselflies	35
Spiders	57
Scorpions	1

From satellite imagery (taken in 2016; earth.google.com), as well as on-site observations, it is clear that the natural habitat of the study area has been largely transformed through agriculture, specifically crop production. It is therefore evident that the largest portion of the study area is more or less homogenous from a dominant habitat point of view. Given this homogeneity, one would not expect a large diversity of native animals to still occur in the area. Certain animals, such as the Blue crane (*Anthropoides paradiseus*), may inhabit croplands where natural short grasslands are unavailable (Allan, 1995). Others, such as small rodents, are attracted to the abundance of food provided by the crop cultivars (Stenseth et al, 2003). These are not arguments that the croplands should be conserved, but rather that they may determine the abundance of animals on the site and play a role in species occurrence.

The most important natural elements that were observed are the natural drainage lines/seasonal tributaries, small pockets of natural grassland and agricultural field margins. The drainage lines may facilitate the creation of seasonal, stagnant pools which are important resources in frog and dragonfly/damselfly reproduction. Additionally, the small remnants of natural grassland and field margins have been proven to be important in harbouring native animal diversity (Dennis and Fry, 1992; Vickery et al, 2002). These two landscape elements should contain most of the natural vegetation and therefore most of the faunal diversity. It is strongly advised that they be protected from initial disturbance. Although trees are sparsely distributed throughout the site they remain an important structural component of the ecosystem and are relevant especially for the occurrence of birds.

The occurrence of rocks/boulders and termite mounds is generally low, but where present, these landscape elements may provide shelter, food and reproductive opportunities to a great diversity of animals (including all the animal groups considered in this study) and their disturbance should therefore be avoided as much as possible.

Regarding the faunal species lists, it is important to note that distribution maps are often constructed with limited ecological knowledge available for the species under question and are thus not consistently reliable in predicting a species occurrence (Hernandez et al, 2006; Newbold, 2010). Where literature allowed, a species was listed with regards to the number of sightings for that species near the relevant locality (i.e. Ventersburg). Furthermore, some uncertainty remains regarding the conservation priority for a great deal of southern African species as not all have been assessed and may classify as "Not listed" or "Data deficient". No official assessment has been conducted on the conservation status of South African arachnids to date. Therefore, where information was available the commonality of each arachnid species was reported.

Faunal of conservation significance

It is not expected that all the animals with protected statuses (indicated in faunal species lists – Appendix A of the Biodiversity Specialist Report) will occur in the study area, but given its surface area and the remnant areas of natural vegetation the possibility of their occurrence cannot be totally excluded.

No official conservation assessment has been conducted to determine the protected status of South African spiders (*Arachnida: Araneae*) or scorpions (*Arachnida: Scorpiones*). However, according to the findings of this study there are 17 spider species endemic to South Africa and considered to be scarce that could possibly occur on or near the relevant locality. The distribution of only 1 scorpion species overlaps with the locality (Leeming, 2003). Table 16 presents the numbers of protected species per animal group that may occur in the study area.

Table 16: Animal groups considered in this study along with the number of species with formal protected statuses.

Animal group	Number of protected species
Mammals	6
Reptiles	2
Birds	5
Frogs	1
Butterflies	0
Dragonflies / damselflies	0

Flora Assessment

The application area falls within three vegetation types. These three vegetation types are Vaal-Vet Sandy Grassland, Central Free State Grassland and Highveld Salt Pans (Figure 33). The vegetation types are discussed in more detail below.

Vaal-Vet Sandy Grassland (Gh 10)

Vaal-Vet Sandy Grassland within the grassland biome is the most dominant vegetation unit in the project application area and it can be found in the North West and Free State Provinces. The vegetation unit can be found at an altitude of 1260 - 1360 MAMSL. Vaal-Vet Sandy Grassland supports mainly low tussock grasslands with an abundant karroid element. The dominance of *Themeda triandra* is an important feature of this vegetation unit.

Important taxa include:

- Graminoids: *Antheophora 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), *Berleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespitium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*.
- Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*.

- Succulent Herbs: *Tripteris aghillana* var. *integrifolia*.
- Low Shrubs: *Felicia muricata* (d), *Pentzia globosa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *H. Paronychioides*, *Ziziphus zeyheriana*.

Vaal-Vet Sandy Grassland is considered **Endangered** and is a **Protected** ecosystem under the National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004). Only 0.3 % of this vegetation unit is statutorily conserved within the Bloemhof Dam, Faan Meintjies, Sandveld, Schoonspruit, Soetdoring, and Wolwespruit Nature Reserves. A loss in the vegetation type is generally associated with transformed land for cultivation, for commercial crops and grazing for cattle and sheep. Historically Gh10 covered the largest portion of the study area, but was virtually totally destroyed due to crop cultivation and other agricultural activities.

Central Free State Grassland (Gh 6)

Central Free State Grassland, also within the grassland, is found in the Free State Province and also marginally in the Gauteng Province. Other major settlements located within this unit include Kroonstad, Ventersburg, Steynsrus, Winburg, Lindley and Edenville. The vegetation unit can be found at an altitude of 1 300 –1 640 MAMSL. The Central Free State Grassland supports mainly short grassland. In natural condition the dominant grassland type is *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. *Dwarf karoo* bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia Karoo* encroachment.

Important taxa include:

- Graminods: *Aristida adscensionis* (d), *A. congesta* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *Panicum coloratum* (d), *Setaria sphaceolata* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Agrostis lachnantha*, *Andropogon appendiculatus*, *Aristida bipartita*, *A. canescens*, *Cymbopogon pospischilii*, *Cynodon transvaalensis*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis lehmanniana*, *E. micrantha*, *E. obtusa*, *E. racemosa*, *E. trichophora*, *Heteropogon contortus*, *Microchloa caffra*, *Setaria incrassata*, *Sporobolus discosporus*.
- Herbs: *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteoalbum*, *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*.

Central Free State Grassland is considered **Vulnerable** according to Mucina and Rutherford (2006). Of the 24% conservation target, only small portions are subject to statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) as well as some protection in private nature reserves. Almost a quarter of the area has been transformed either for cultivation or by building of dams (Allemanskraal, Erfenis, Groothoek, Koppies, Kroonstad, Lace Mine, Rustfontein and Weltevrede). No serious infestation by alien flora has been observed, but encroachment of *Dwarf Karoo* shrubs becomes a problem in the degraded southern parts of this vegetation unit.

Highveld Salt Pans (AZi 10)

Highveld Salt Pans within the inland azonal vegetation is distributed in the Northern Cape, Eastern Cape, North-West, Free State and Gauteng provinces: Pans scattered on broad Grassland/Karoo and Grassland/Savanna interface roughly between Mafikeng/Koster in the north and Britstown/Middelburg in the south. The highest concentrations of pans are found around Dealesville, Bultfontein, Wesselsbron, Delareyville and Petrusburg. The vegetation unit can be found at an altitude of 1 000-1 600 MAMSL.

Depressions in plateau landscape contain temporary (and less frequently also permanent) water bodies. Central parts of the pans often seasonally inundated and sometimes covered by floating macrophyte vegetation. In addition, vegetation cover can develop on drained bottoms of the pans forming typical concentric zonation patterns. Along the pan edges, open to sparse grassy dwarf shrubland may develop, especially when the pan is under heavy grazing pressure.

The bottoms of the pans are usually formed by shales of the Ecca Group giving rise to vertic clays. The environment of the pans undergoes dramatic changes from freshwater systems during the wet season to saline systems as the dry season progresses and evaporation intensifies. Wind erosion is of particular significance during the dry season, when the playa basin is dry and marginal vegetation is short and sparse. Important taxa include:

- Low Shrubs: *Atriplex vestita*, *Felicia filifolia*, *F. muricata*, *Nenax microphylla*, *Nestlera conferta*, *Pentzia globosa*, *P. incana*.
- Succulent Shrubs: *Salsola glabrescens* (d), *Lycium cinereum*, *Malephora herrei*, *Suaeda fruticosa*, *Titanopsis hugoschlechteri*.
- Megagraminoids: *Cyperus congestus*, *Phragmites australis*, *Typha latifolia*.
- Graminoids: *Chloris virgata* (d), *Cynodon dactylon* (d), *C. transvaalensis* (d), *Cyperus laevigatus* (d), *C. marginatus* (d), *Diplachne fusca* (d), *Eragrostis bicolor* (d), *E. chloromelas* (d), *E. plana* (d), *Hemarthria altissima* (d), *Juncus rigidus* (d), *Panicum coloratum* (d), *P. laevifolium* (d), *P. schinzii* (d), *Setaria incrassata* (d), *Andropogon eucomus*, *Aristida adscensionis*, *Brachiaria marlothii*, *Cyperus longus*, *C. rigidifolius*, *Echinochloa holubii*, *Eleocharis palustris*, *Enneapogon desvauxii*, *Eragrostis curvula*, *E. micrantha*, *E. obtusa*, *E. stapfii*, *Fuirena coerulescens*, *F. pubescens*, *Juncus exsertus*, *Scirpoides dioecus*, *Sporobolus albicans*, *S. fimbriatus*, *S. ioclados*, *S. tenellus*, *Tragus berteronianus*, *T. racemosus*.
- Herbs: *Alternanthera sessilis*, *Amaranthus praetermissus*, *Aponogeton rehmannii*, *Atriplex suberecta*, *Chenopodium mucronatum*, *Gnaphalium declinatum*, *Mollugo cerviana*, *Phyla nodiflora*, *Platycarpha parvifolia*, *Pterodiscus speciosus*, *Senecio reptans*.
- Succulent Herb: *Zygophyllum simplex*.

Biogeographically Important Taxon (Highveld endemic) include:

- Herb: *Rorippa fluviatilis* var. *caledonica*.
- Endemic Taxon Herb: *Gnaphalium simii*.

Highveld Salt Pans are considered **Least Threatened** according to Mucina and Rutherford (2006). Of the 24% conservation target, only very small portions are statutorily conserved in the Vaalbos National Park and in the Bloemhof Dam, Soetdoring, Willem Pretorius, Barberspan (a Ramsar site) and S.A. Lombard Nature Reserves. About 4% have been transformed so far, but threats by agriculture, road building, mining and urbanisation are still increasing. Alien plants such as *Atriplex semibaccata*, *Conyza albida*, *Flaveria bidentis*, *Salsola kali*,

Schkuhria pinnata, *Sonchus oleraceus*, *Spergularia rubra*, *Tagetes minuta*, *Verbena brasiliensis* and *Xanthium* have been recorded in these salt pans.

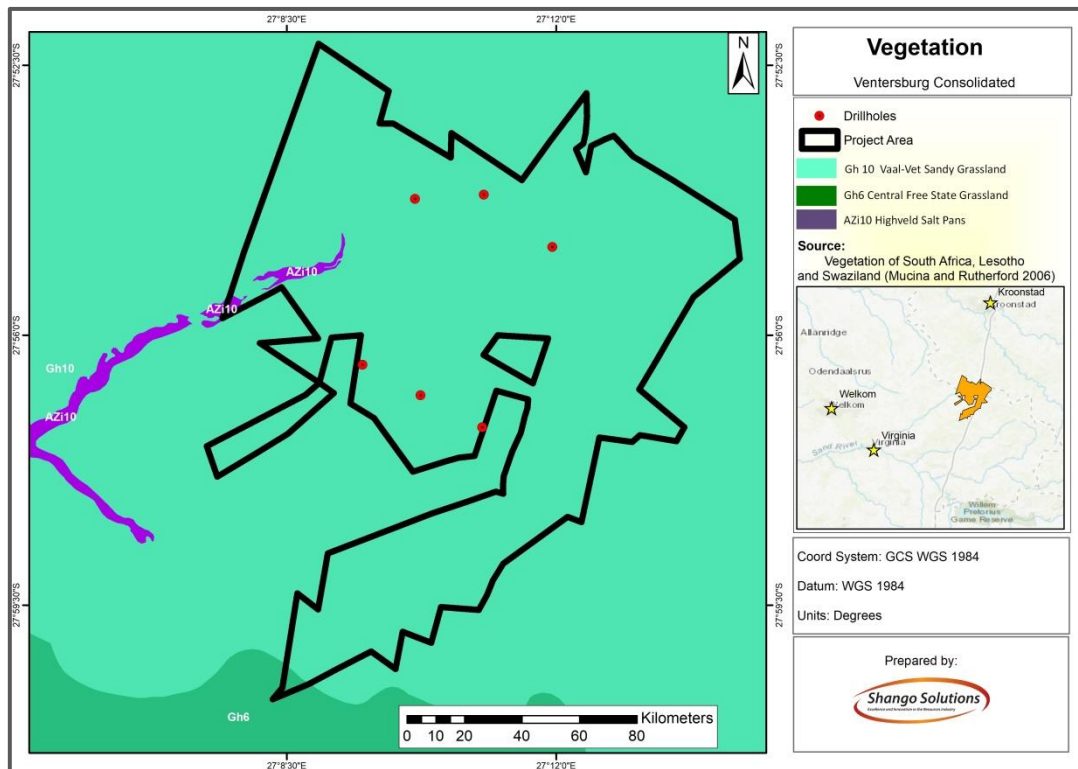


Figure 33: Vegetation of the application area (refer to Appendix C for an enlarged map).

A visual reconnaissance of the study area was undertaken by ERC before surveying commenced. Different homogenous habitat units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each.

The following data was recorded:

- All identifiable indigenous and exotic plant species (Appendix A of the Biodiversity Specialist Report) in each identified vegetation unit.
- Sightings of faunal species.
- General ecological and habitat data that may assist in the description of the biodiversity of the study area.

A plotless sampling method was used to record floristic data. Taxa observed in the study area during the time of the study were recorded and included in the species lists. The floristic composition of each of the identified broad vegetation units are described and discussed. Species identification was done following reputable checklists and field guides. Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes and if necessary, SANBI in Pretoria and other specialists were consulted in order to assist in species identification.

Floristic diversity of the study area

A total of 257 plant species (from 67 plant families and 173 genera) were recorded in the studied area during the study period. This view indicates a moderately high plant diversity. Of this number, 35 are trees or woody shrubs (27 exotic), 58 are grasses (8 exotic), 15 are sedges (none exotic) and 149 are herbs or herbaceous climbers, creepers or shrubs (44 exotic). 178 (69%) of the plant species that were recorded are indigenous to South Africa. At least four of these species are Red Data listed and/or protected in some or other capacity.

From available literature (Pujol, 1988; Pooley, 1998; Schmidt et al, 2002; Shearing and Van Heerden, 1994; Van Wyk et al, 1997; Van Wyk and Gericke, 2003) it was established that at least 83 of the recorded plant species in the studied areas are to some extent used for some or other social activities (medicinal, food/nourishment and/or cultural).

Table 17: Summary of the number of plant families, genera and species recorded in the study area.

	Families	Genera	Species
PTERIDOPHYTA (ferns):	1	1	1
GYMNOSPERMAE (conniferous plants):	2	3	3
ANGIOSPERMAE (seed plants): <i>Dicotyledonae:</i>	47	115	156
<i>Monocotyledonae:</i>	17	54	97
Total:	67	173	257

During the survey, which was performed on foot, taxa that were identifiable during the time of the study were noted and included in the species lists in Appendix B of the Biodiversity Specialist Report. The distinct possibility exists that some plant species that emerge and bloom during summer or another time of the year or under very specific circumstances, or species that are locally rare, could have been missed during the latest survey.

The mentioned species lists contain the plant family name and scientific and common names of all plant species that were observed in the study area during the time of the study. Also included is, where applicable, the conservation status of a species. Information on whether a species is utilised for medicinal, cultural or nutritional uses is also provided in the mentioned species lists.

Description of Broad Vegetation Units in the Study Area

Three broad vegetation units (VUs), two based on floristic differences of different topographical positions and natural habitat types, and one based on anthropogenic transformation, were recorded in the study area and are subsequently described (Figure 34).

The VUs are as follows:

- Vegetation Unit 1 (VU1): Natural Grassland.
- Vegetation Unit 2 (VU2): Wetlands.
- Vegetation Unit 3 (VU3): Transformed Areas.

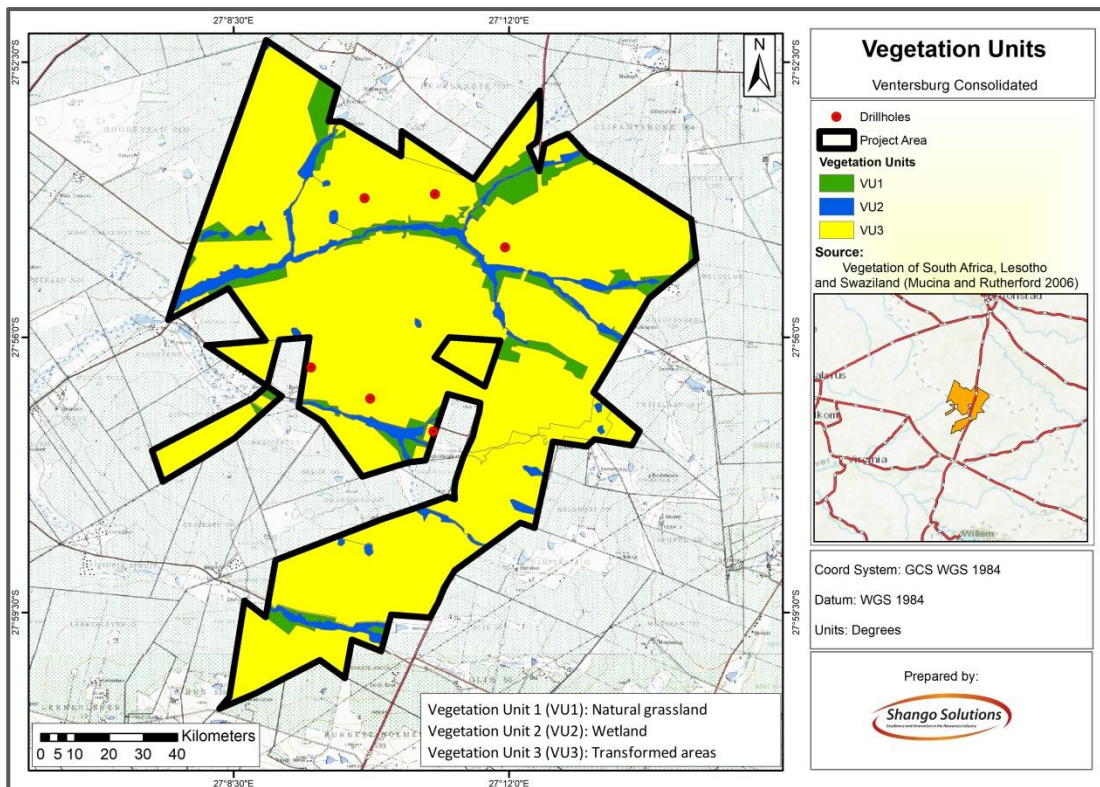


Figure 34: Image depicting the different Vegetation Units recorded in the study area (refer to Appendix C for an enlarged map).

VU1: Natural grassland vegetation

This VU (Figure 35) consists of patches and sometimes isolated fragments of natural grassland that once occurred all over the landscape, but was destroyed to make place for crop farming. These fragments generally occur on the edges of drainage lines, on the fringes of cultivated or old cultivated lands or close to homesteads as grazing for livestock. The overall estimated veld condition of these natural grassland fragments is generally moderate to poor.

Few woody plants occur, but where they do have some prominence in the landscape it mainly includes the indigenous trees *Vachellia karroo* and *Searsia pyroides*, the short shrub *Ziziphus zeyheriana* and the exotic tree *Prosopis glandulosa* in some localized areas. The herbaceous layer is generally dominated by grasses of which the most prominent are *Cymbopogon pospischilii*, *Cynodon dactylon*, *Eragrostis chloromelas*, *E. curvula*, *E. lehmanniana*, *E. obtusa*, *E. plana*, *Panicum coloratum*, *Setaria sphacelata var. torta* and *Themeda triandra*. Forbs and other herbs include *Berkheya onopordifolia*, *Commelina africana*, *Conyza podocephala*, *Helichrysum aureonitens*, *H. rugulosum*, *Hermannia depressa*, *Pentzia globosa*, *Salvia runcinata*, *Selago densiflora*, *Stachys hyssopoides* and the exotic *Verbena aristigera*.

127 plant species (5 woody plants – 2 exotics, 36 graminoid species – 1 exotic, and 86 herbaceous forbs, shrubs and succulents – 15 exotics) were identified in VU1 during the time of the study. From available literature (Pujol, 1988; Pooley, 1998; Schmidt et al, 2002; Shearing and Van Heerden, 1994; Van Wyk et al, 1997; Van Wyk and Gericke, 2003), it was established that at least 37 of the plant species recorded in VU1 are utilised for some or other social activity or use (medicinal, nourishment/food and/or cultural).



Figure 35: VU1: Natural grassland with few trees in the background (source: ERC, 2018).

VU2: Wetland vegetation

VU2 consists of wetland vegetation that is associated with natural drainage lines (Figure 36), small natural pans (Figure 37) and man-made dams (Figure 38). The vegetation consists of water and moisture-loving plants. These areas are also general poor in terms of veld condition due to decades of over utilisation by livestock. The drainage lines that make out the largest portion of this VU general drain in a western and southern direction and no baseflow was observed during the time of the study. Some water accumulations in natural depressions were observed and most dams were also full of water at the time of the study.

Dominant graminoids include the reed *Phragmites australis*, the indigenous grasses *Andropogon appendiculatus*, *Agrostis lachnantha*, *Cynodon transvaalensis*, *Echinochloa holubii*, *Eragrostis micrantha*, *E. plana*, *Hemarthria altissima*, *Leersia hexandra*, *Paspalum distichum*, and the exotics *Bromus catharticus*, *Paspalum dilatatum* and *P. urvillei*, and also the sedges *Cyperus denudatus*, *C. fulgens*, *C. longus*, *Eleocharis dregeana*, *Juncus rigidus*, *Kyllinga erecta* and *Pycreus macranthus*. Forbs and other herbs that mostly occur are the indigenous, *Helichrysum acutatum*, *Mimulus gracilis*, *Persicaria decipiens*, *Potamogeton thunbergii*, *Salvia runcinata*, *Vahlia capensis*, and the exotics *Alternanthera sessilis*, *Aster squamatus*, *Cirsium vulgare*, *Oenothera rosea*, *Persicaria lapathifolia* and *Verbena officinalis*. Trees and woody shrubs do occur, but in low numbers and is dominated by exotics such as *Acer negundo*, *Eucalyptus camaldulensis*, *Populus deltoids*, *P. canescens* and *Salix babylonica*.



Figure 36: VU2: A section of a south draining natural drainage line with typical wetland vegetation (source: ERC, 2018).



Figure 37: VU2: A small, isolated, natural pan filled with water from recent rains (source: ERC, 2018).



Figure 38: VU2: A large man-made dam situated in the course of a natural non-perennial drainage line (source: ERC, 2018).

During this study a total of 126 plant species (16 woody plants – 9 exotic, 44 graminoid species – 4 exotic, and 66 herbaceous forbs, shrubs and succulents – 25 exotic) were identified in VU2. From available literature (Pujol 1988; Schmidt et al, 2002; Van Wyk et al, 1997; Van Wyk and Gericke, 2003) it was established that at least 35 of these species are used for some or other social activities (medicine, food and/or cultural).

VU3: Transformed areas

VU3 represents all totally transformed areas in the study area, which mainly includes currently and old cultivated lands (Figure 39), major road infrastructure and farm homesteads. Other than small fragmented pockets, individual trees and some areas where natural vegetation has spontaneously rehabilitated, no natural vegetation remains in VU3. Most lands are currently cultivated with a monoculture of summer grain crops such as maize (*Zea mays*) (Figure 39), soya beans (*Glycine max*) or sunflower (*Helianthus annuus*), others have been planted with perennial grazing crops such as Common Finger Grass (*Digitaria eriantha*) or Weeping Love Grass (*Eragrostis curvula*), or a combination of fodder crops (Figure 40). Farm yards and homesteads (Figure 41) generally have a high variety of plant species and unfortunately exotics plants, many of them declared weeds or invaders, dominate these areas. Tall exotic trees such as *Eucalyptus camaldulensis*, *E. sideroxylon*, *Casuarina equisetifolia*, *Gleditsia triacanthos*, *Juniperus* species, *Melia azedarach*, *Populus deltoides*, *Schinus molle*, and many more, are common in these areas. Likewise, in the case of herbaceous vegetation many exotics also occur in a variety of dominance that differ from one area to the next, making it difficult to describe them from a floristic point of view. Almost half (45%) of the plant species occurring in this VU are exotic.



Figure 39: VU3: crop field cultivated with *Zea mays* (maize) (source: ERC, 2018).



Figure 40: VU3: a mixture of perennial grazing grass planted on an old cultivated land (source: ERC, 2018).



Figure 41: VU3: a typical farm homestead with tall exotic trees and other transformed habitats.

The highest diversity of plant species was recorded in VU3. 165 plant species (90 indigenous, 75 exotic) were recorded during the time of the study. It was established from available literature (Pujol, 1988; Pooley, 1998; Schmidt et al, 2002; Shearing and Van Heerden, 1994; Van Wyk et al, 1997; Van Wyk and Gericke, 2003), that at least 59 of the plant species recorded in VU3 are utilised for some or other social activity or use (medicinal, nourishment/food, and/or cultural).

Flora species of conservation significance

Only four plant species of conservation significance were recorded during the study (Table 4). Two of these species recorded are listed as Declining Red Data species by Raimondo *et al* (2009), and all four species are listed as protected according to the Free State Nature Conservation Ordinance (Ordinance 8 of 1969) (FSNCO, 1969).

Regarding red listed species, according to (Raimondo et al, 2009), the following:

- A taxon is Declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes in South Africa causing a continuing decline in the population.

No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species (TOPS) as published in Government Gazette no. 36375 of 16 April 2013 (TOPS, 2013), nor any protected trees as listed by the National Forest Act (NFA, 1998), were recorded in the study area during the time of the study.

Descriptions of abbreviations used in Table 18 are as follows:

- P (FS) – Provincially protected species (FSNCO, 1969).
- D – Declining (Raimondo et al, 2009).

Table 18: List of flora species of conservation significance recorded in different vegetation units (VU) in the study area.

SPECIES NAME	GROWTH FORM	SPECIES STATUS	VU		
			1	2	3
<i>Ammocharis coranica</i>	Herb, geophyte	P (FS)		X	
<i>Boophone disticha</i>	Herb, geophyte	D; P (FS)	X		
<i>Eucomis autumnalis</i> subsp. <i>clavata</i>	Herb, geophyte	D; P (FS)	X	X	
<i>Schizocarpus nervosus</i>	Herb, geophyte	P (FS)	X		

Exotic flora

A high number of exotic plants were recorded in the study area during the time of the study. 79 exotic plant species (27 trees/woody shrubs, 8 grasses and 44 herbs or herbaceous/succulent shrubs) were recorded. According to the Conservation of Agricultural Resources Act (Act No. 43 of 1983) in Henderson (2001) and the National Environmental Management Biodiversity Act's 2014 list of proposed weeds and invaders (NEMBA, 2014), 36 of these species (22 trees/shrubs, 1 grass and 13 herbs) are classified as alien weed and invader species (Table 19) and the remaining 43 are common ruderal and agrestal weeds.

All exotic plant species in the species lists (Appendix B: Tables 23 to 29 of the Biodiversity Specialist Report) are preceded by an asterisk (*) and/or indicated by the letter "E" in the Species Status column in the case of uncategorized exotic species. In the case of declared or proposed weeds or invaders the invasive status of the species, according to CARA (1983) (Table 20) and NEMBA (2014) (Table 21) are indicated in the conservation status column of the species lists in Appendix B as follows:

- C1 – declared weed category 1 (CARA, 1983).
- C2 – declared invader category 2 (CARA, 1983).
- C3 – declared invader category 3 (CARA, 1983).
- Cx1, Cx2 or Cx3 – proposed weed or invaders (CARA, 1983).
- C (T) – potential transformer (CARA, 1983).
- N1b – NEMBA (2014) category 1b.
- N2 – NEMBA (2014) category 2.
- N3 – NEMBA (2014) category 3.

Table 19: List of declared alien weeds and invaders recorded in the study area.

SPECIES NAME	INVASIVE STATUS	GROWTH FORM	VU		
			1	2	3
<i>Acacia mearnsii</i>	C2 / N2	Tree			X
<i>Acer negundo</i>	Cx3 / N3	Tree		X	X
<i>Agave americana</i>	Cx2	Tree			X

SPECIES NAME	INVASIVE STATUS	GROWTH FORM	VU		
			1	2	3
<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	C1 / N1b	Herb			X
<i>Casuarina equisetifolia</i>	C2 (T) / N2	Tree			X
<i>Cereus jamacaru</i>	C1 / N1b	Cactus / Tree			X
<i>Cestrum laevigatum</i>	C1 / N1b	Shrub / tree		X	X
<i>Cirsium vulgare</i>	C1 / N1b	Herb	X	X	X
<i>Cuscuta campestris</i>	C1 / N1b	Herb, parasite			X
<i>Datura ferox</i>	C1 / N1b	Herb			X
<i>Datura stramonium</i>	C1 / N1b	Herb		X	X
<i>Echinopsis spachiana</i>	C1 / N1b	Cactus / Tree			X
<i>Eucalyptus camaldulensis</i>	C2 / N1b	Tree		X	X
<i>Eucalyptus sideroxylon</i>	C2	Tree			X
<i>Gleditsia triacanthos</i>	C2 / N1b	Tree		X	X
<i>Grevillea robusta</i>	C3 / N1b	Tree			X
<i>Melia azedarach</i>	C3 / N3	Tree			X
<i>Nicandra physalodes</i>	N1b	Herb		X	X
<i>Oenothera indecora</i>	Cx3	Herb		X	X
<i>Oenothera rosea</i>	Cx3	Herb		X	X
<i>Opuntia ficus-indica</i>	C1 / N1b	Cactus / Tree	X		X
<i>Opuntia imbricata</i>	C1 / N1b	Cactus / shrub			X
<i>Opuntia stricta</i>	C1 / N1b	Cactus / shrub			X
<i>Pinus</i> species	C2 / N2	Tree			X
<i>Populus deltoides</i> subsp. <i>wislizenii</i>	Cx2 (T)	Tree		X	X
<i>Populus x canescens</i>	C2 / N2	Tree		X	
<i>Prosopis glandulosa</i>	C2 / N1b	Tree	X	X	X
<i>Rumex crispus</i>	Cx3	Herb		X	X
<i>Salix babylonica</i> var. <i>babylonica</i>	C2	Tree		X	
<i>Salsola kali</i>	C(T) / N1b	Herb			X
<i>Schinus molle</i>	Cx3	Tree			X
<i>Solanum elaeagnifolium</i>	C1 / N1b	Herbaceous	X		X

SPECIES NAME	INVASIVE STATUS	GROWTH FORM	VU		
			1	2	3
		shrub			
<i>Sorghum halepense</i>	C2 / N2	Grass			X
<i>Tamarix ramosissima</i>	C3 / N1b	Tree		X	X
<i>Xanthium spinosum</i>	C1 / N1b	Herb		X	X
<i>Xanthium strumarium</i>	C1 / N1b	Herb		X	X

Table 20: Description of the invasive status of exotic plant species according to CARA (1983).

Invasive status (category)	Description
Declared weed (category 1) – C1 Proposed weed – CX1	<ul style="list-style-type: none"> Prohibited on any land or water surface in South Africa. Must be controlled or eradicated where possible (except in biological control reserves).
Declared invader (category 2) – C2 Proposed invader – CX2	<ul style="list-style-type: none"> Allowed only in demarcated areas under controlled conditions. Import of propagative material and trading allowed only by permit holders. Outside demarcated areas, it must be controlled, or eradicated where possible (except in biological control reserves). Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands unless authorization is obtained.
Declared invader (category 3) – C3 Proposed invader – CX3	<ul style="list-style-type: none"> No further plantings of these species are allowed (except with special permission). Trade of propagative material is strictly prohibited. Existing plants may remain but must be prevented from spreading. Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands, or as directed.
Potential Transformer – C (T)	<ul style="list-style-type: none"> Plants that are already invading natural or semi-natural habitats, and have the potential to dominate a vegetation layer but not yet having a marked effect. They are either transformers elsewhere in the world or showing signs of this ability in Southern Africa.

Table 21: Description of the invasive status of exotic plant species according to NEMBA (2014).

Invasive status (category)	Description
Category 1b – N1b	<ul style="list-style-type: none"> Invasive species requiring compulsory control as part of an invasive species control program 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

Invasive status (category)	Description
	<p>program</p> <ul style="list-style-type: none"> No permits will be issued
Category 2 – N2	<ul style="list-style-type: none"> Invasive species regulated by area A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants No permits will be issued for these plants to exist in riparian zones
Category 3 – N3	<ul style="list-style-type: none"> Invasive species regulated by activity An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species No permits will be issued for Cat 3 plants to exist in riparian zones

Habitat sensitivity

The objective of a sensitivity mapping exercise is to determine the location and extent of all sensitive areas that must be protected from transforming land uses as far as possible. A development proposal should only be considered compatible with the biodiversity sensitivities of the site if all sensitive areas are avoided and are incorporated into an open space system (GDARD, 2014). A number of criteria are generally used to determine habitat sensitivity of which the following are some of the main ones:

- Ecological function: This relates to the degree of ecological connectivity between systems within a landscape matrix. Therefore, systems with a high degree of landscape connectivity amongst one another are perceived to be more sensitive and will be those contributing to ecosystem service (e.g. wetlands) or overall preservation of biodiversity. The potential of the habitat to deliver ecosystem services within itself and to other neighboring habitats are also taken in to consideration.
- Conservation importance: This relates to species diversity, endemism (unique species or unique processes) and the high occurrence of threatened and protected species or ecosystems protected by legislation.
- Other factors:
 - Current diversity of exotic species.
 - Degree to which the natural habitat has been degraded due to various factors.
 - Degree of habitat transformation.
 - Degree of habitat fragmentation.
 - Degree of bush encroachment.

Three ratings were considered to describe the sensitivity of the application area:

- **High** – sensitive ecosystem with either low inherent resistance or low resilience towards disturbance factors or highly dynamic systems considered being important for the maintenance of ecosystem integrity.

Most of these systems represent ecosystems with high connectivity with other important ecological systems or with high species diversity and usually provide suitable habitat for a number of species of conservation significance. These areas should be protected.

- **Moderate/Medium** – These are slightly modified systems which occur along gradients of disturbances of low-medium intensity with some degree of connectivity with other ecological systems or ecosystems with intermediate levels of species diversity but may include potential ephemeral habitat for species of conservation significance.
- **Low** – Degraded and highly disturbed/transformed systems with little ecological function and are generally very poor in species diversity.

A sensitivity rating of High was attributed to VU1 (Natural grasslands) and VU2 (Wetlands). VU1 still has a relatively natural character albeit somewhat degraded due to overgrazing, fragmentation and the edge effects of other neighboring transformed habitats. As described in the following chapter, however, the portions of VU1 that still persist in the study area form part of an Endangered Ecosystem, which pushes its relative sensitivity higher than a moderate rating. VU2 has High sensitivity due to its important function as water drainage and storage habitat for surrounding ecosystems and the faunal assemblages that depend on it, as well as its relevant connectivity with VU1 habitats along its mostly linear distribution. VU3, on the other hand, is attributed a Low sensitivity due to its totally transformed nature and the large amount of alien weeds and invaders occurring in that habitat.

Figures 42 and 43 present the sensitivity of habitats in the study area relevant to the positions of proposed six drill sites. A buffer zone is delineated for the highly sensitive area where drill site 2 of the Biodiversity Specialist Report (Figure 42) currently falls just inside a highly sensitive area. It is strongly suggested that this particular proposed drill site be moved about 65 m northwest from its currently proposed position as indicated in Figure 43. This will ensure that a 50 m buffer between the proposed drill site and the natural grassland can be sustained.



Figure 42: Sensitivity categories in relation to proposed six drillhole sites (source: ERC, 2018).

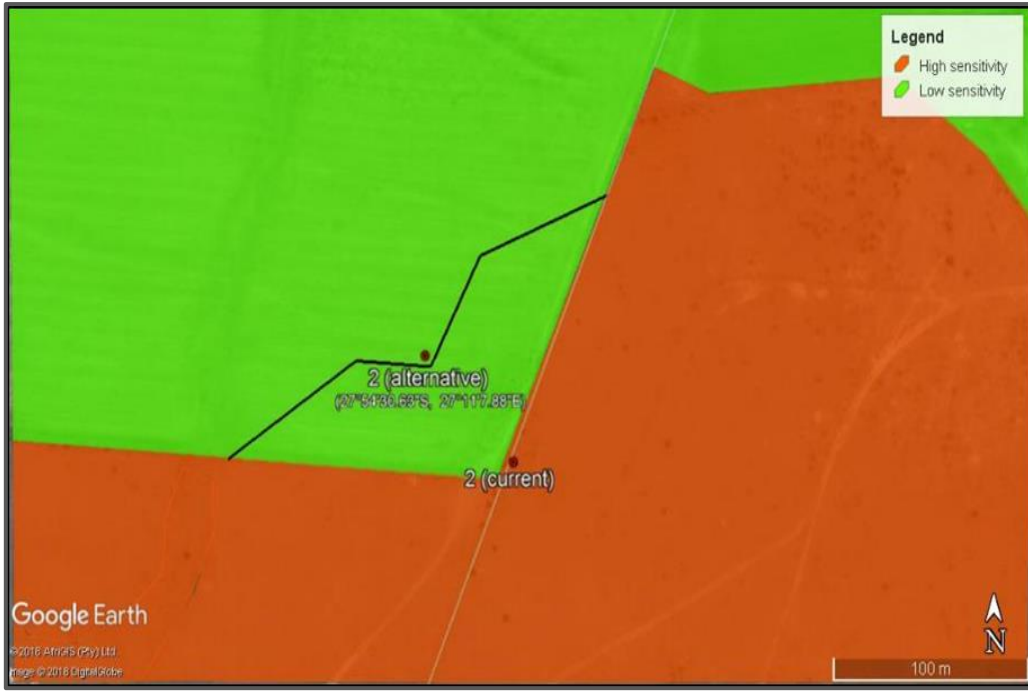


Figure 43: Newly proposed position for drill site 2 (source: ERC, 2018).

This drillhole has been moved to the position as per recommendation by the Biodiversity specialist. Figure 44 illustrates the distribution of habitat sensitivity over the entire study area.

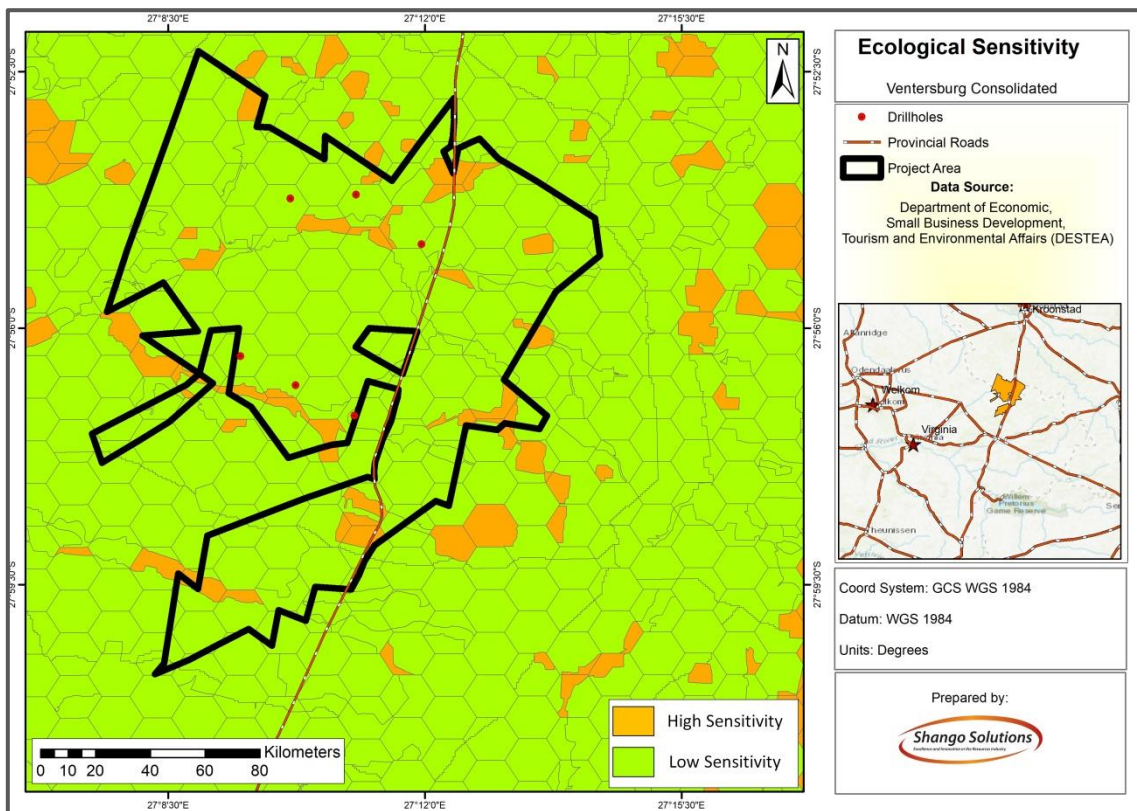


Figure 44: Ecological sensitive areas (refer to Appendix C for an enlarged map).

8.1.2 Environmental Aspects which may Require Protection and/or Remediation

There are features on-site that may require protection. Environmental aspects both within the application and surrounding area that may require protection or remediation are listed in Table 22. These aspects have been identified and are based on the information contained in the description of the baseline receiving environment as well as the impact assessment. These environmental aspects that may require protection or remediation have been included in the action plan and technical management measures contained in this report.

Table 22: List of potential impacts per activity.

Aspect	Feature
Ground water	Ground water resources
	Ground water quality and quantity
Surface water	Surface water resources (such as rivers, dams and pans)
	Surface water quality and quantity
Biodiversity	Species of concern (flora and fauna)
	Primary vegetation units
	Rivers, streams, dams and pans
Soils	Stockpiled soils
Land use	Grazing
	Cultivation
	Dwellings
Land capability	Agricultural potential
	Grazing potential
Air quality	Ambient air quality
Noise	Ambient noise levels
Social	Livelihoods
Economic	Employment
Heritage and cultural	Heritage resources (cemeteries, graves, structures older than 60 years)
	Paleontological features

8.1.3 Description of Specific Environmental Features and Infrastructure On-Site

Specific environmental features and infrastructure on-site include wetlands, rivers, the N1 Highway and provincial roads, farm access roads and dirt tracks, SANRAL, Transnet and Eskom servitudes, farmhouses and associated buildings. These features have been verified and updated during the Public Participation Process.

9. IMPACTS AND RISKS IDENTIFIED

Impacts and risk were identified based on the proposed prospecting activities to take place on-site. As such, Table 23 lists the potential impacts related to each of the significant activities related to the prospecting operation.

Table 23: List of potential impacts per activity.

Aspect	Potential Impacts
Planning	
Social	Safety and security risks to landowners and lawful occupiers
	Interference with existing land uses
Operation: 6 Diamond Core Drillholes	
Social	Interference with existing land uses
	Sense of place
	Safety and security risks to landowners and lawful occupiers
	Damage/disruption of services
	Perceptions and expectations
	Damage to road infrastructure
	Job creation
	Discovery of economy viable minerals
	Fugitive dust emissions
	Contamination of groundwater
	Noise
Heritage	Disturbance/damage to heritage features
	Disturbance/damage to paleontological material
	Damage and disturbance to archaeological material
Ecology	Vegetation clearance
	Habitat loss/destruction for fauna and flora species
	Habitat fragmentation and edge effect
	Loss of species of conservation significance
	Introduction of alien species
Surface water	Degradation and/or destruction of wetland habitats
	Loss of indigenous fauna and flora diversity associated with wetlands
	Spillage of oils, fuels and chemicals
Groundwater	Contamination from surface spills
Soils	Erosion and sedimentation
	Soil compaction
	Hydrocarbon spills/contamination
Decommissioning	
Soils	Soil instability
	Soil pollution/contamination
Surface water	Pollution of surface water resources
Groundwater	Groundwater pollution from hydrocarbon spills
Social	General environmental pollution
	Damage to existing infrastructure
	Fugitive dust emissions

Aspect	Potential Impacts
	Noise
Rehabilitation	
Soils	Soil compaction
	Soil pollution
Surface water	Surface water contamination
Social	Disturbance to communities in vicinity
	Waste disposal

Each of the identified risks and impacts for these phases was assessed using 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 F.

A summary of the impacts and their significance before and after mitigation is provided in Section 13 of this report (Table 31).

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. 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 impact 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 EIA Regulations (2014). 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 24.

Table 24: 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 25.

Table 25: 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 26):

$$ER = C \times P$$

Table 26: 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 27.

Table 27: 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 (GNR 326, 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 and 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 28).

Table 28: 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:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Table 29).

Table 29: 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 (Figure 30).

Table 30: 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).
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 Basic Assessment and are for the prospecting layout as well as activities proposed.

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.

Safety and security risks to landowners and lawful occupiers

Required access and use of land for ground based surveys, drilling, sampling and mapping for geological reports is a risk to the safety and security of landowners and lawful occupiers due to property access and use by unfamiliar people in the area.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Safety and security risks to landowners and lawful occupiers	-12.00	-8.00	-9.33

Mitigation measures:

- 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 landowner. This formal agreement should additionally stipulate landowners 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 land use

During the planning phase, the Applicant and the contractors will require access to the site in order to confirm where the activities will take place and where machinery will be placed. This may interfere with current land uses.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Interference with existing land uses	-11.00	-7.00	-8.17

Mitigation measures:

- 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.

Sense of place

The proposed prospecting project will impact on the established sense of place of the property. The character of the area will change with the addition of invasive prospecting activities. Additional vehicles, increased noise and dust, the removal of vegetation for drillhole sites as well as the potential influx of workers will all contribute to the alteration of the sense of place.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Sense of place	-6.75	-3.50	-4.00

Mitigation measure/s:

- The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any damages due to the prospecting activities.

Deterioration/disruption of services and existing infrastructure

Drilling operations have the potential to disrupt or damage services such as underground infrastructure (pipelines) and surface infrastructure (roads, powerlines) situated within the study area. Prior to commencement with drilling, all services must be clearly demarcated (if there are any in the drilling area).

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Damage/disruption of services and existing infrastructure	-13.00	-5.00	-7.00

Mitigation measures:

- Ensure that service detection or identification is undertaken prior to the commencement of invasive prospecting activities.
- All invasive prospecting work cannot be undertaken within 100 m of any existing infrastructure such as dwellings, cultivated fields, Eskom transmission/distribution lines, Telkom lines, roads, graveyards and any fences unless express permission is received from the relevant landowner/lawful occupier.
- Roads to be constructed for the purpose of prospecting activities must be rehabilitated.

Perceptions 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 ongoing, open and transparent communication with affected stakeholders, communities and landowners.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Perceptions and expectations	-11.00	-4.00	-5.25

Mitigation measures:

- Adhere to an open and transparent communication procedure with stakeholders at all times.
- Ensure that accurate and regular information is communicated to I&APs.
- Ensure that information is communicated in a manner which is understandable and accessible 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. 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 works, the number of jobs would not be substantial and duration thereof would be short lived. In this regard, the nature of this impact is rated as positive however the significance thereof is relatively low.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Job creation	9.00	10.00	13.33

Mitigation measures:

- 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 economy viable minerals

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

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Job creation	23.75	23.75	35.63

Mitigation measures:

- None required.

Fugitive emissions (Dust)

Invasive prospecting activities as well as travel to and from site may result in the generation of dust. This impact is considered to have a short duration and due to the small scale of the prospecting activities and low number of vehicles. As such, this impact is anticipated to have a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Fugitive emissions (dust)	-6.00	-3.00	-3.00

Mitigation measures:

- All vehicles utilising public gravel roads must adhere to the speed limits.

- By minimising the removal of vegetation and topsoil in affected area, this will minimise the potential for dusty conditions.
- Prospecting activities (including drill sites) must be located 100 m away from farm dwellings.

Noise

The onsite prospecting activities will pose the potential for noisy conditions due to use of machinery and vehicles. The small number of vehicles and temporary prospecting works are anticipated to result in a noise impact with a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Noise	-7.50	-3.50	-4.00

Mitigation measures:

- All construction vehicles and machinery must be maintained in good working order.
- When working or traveling past noise sensitive receptors, no unnecessary hooting or noise should occur.

Disturbance/damage/destruction of cultural and heritage features, archaeological sites and paleontological material

There is a limited possibility for archaeological finds, heritage features and paleontological material within the study area. This is due to the extensively transformed nature of the application area and commercial dry land agriculture taking place, specifically in areas proposed for the six (6) prospecting drillholes. However, within the broader project area and away from the proposed drillhole sites, two heritage features were identified: namely a family burial site (approximately 350 m from DH 1) and a historical barn (approximately 2 km from DH 6). During the Public Participation Process, it was reported that a cemetery is present on Portion 0 of the Farm Kromspruit 476 (approximately 4 km from DH5). There is a possibility that there could be more cultural and heritage features on-site, which have not been identified at this stage. Unidentified archaeological sites and heritage features can seriously hamper development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, Section 35).

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/damage/destruction of cultural and heritage features, archaeological sites and heritage material	-16.00	-7.00	-8.00

Mitigation measure/s:

- All heritage structures must be suitably identified prior to invasive prospecting works proceeding and suitably demarcated and avoided.
- No prospecting must be undertaken within 100 m from heritage features and archaeological sites.
- Should heritage sites be identified on-site during invasive prospecting activities, all prospecting activities must stop and a Heritage specialist should be notified.

Clearance of vegetation

The clearance of vegetation is required in order to prepare the drill sites. An area of approximately 0.54 ha will be impacted upon as well as any temporary access roads. Due to the small scale of clearing, the short duration thereof and the rehabilitation that will occur, this impact has a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Clearance of vegetation	-13.75	-6.00	-7.88

Mitigation measures:

- Minimise clearing to areas that are required for invasive works. Where possible, cut vegetation instead of clearing to minimise soil disturbance.
- Where possible, locate drill sites as close to existing access roads to minimise the extent of vegetation disturbance caused by temporary access roads.
- Rehabilitate all disturbed areas following invasive prospecting activities to the conditions that existed prior to prospecting.

Habitat loss/destruction for fauna and flora species

Habitat loss refers to physical disturbance of habitats through clearing, grading and other permanent to semi-permanent loss or degradation. Loss of habitat on-site could lead to loss of biodiversity as well as habitat important for the survival of populations of various species. The location of the proposed invasive prospecting is specified, so certain areas of natural habitat will be potentially affected. However, the overall loss of habitat is expected to be quite small.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Habitat loss/destruction for fauna and flora species	-9.75	-4.50	-5.25

Mitigation measure/s:

- Undertake prospecting activities in previously disturbed places and/or habitats with a lower sensitivity score.
- Rehabilitate disturbed areas as soon as possible.
- Control alien plants.

Habitat fragmentation and edge effect

Habitat fragmentation is a concern because of its potential to isolate populations and reduce biodiversity. The site is already fragmented due to human settlement and agricultural activities taking place. It is not expected that the proposed activities will cause any significant additional fragmentation, because each drilling site will occupy a relatively small footprint. There will possibly also be damage to habitats associated with travelling from existing access routes to sites selected for drilling. Limited fragmentation and edge effects are expected.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Habitat fragmentation and edge effect	-6.50	-4.50	-4.50

Mitigation measure/s:

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.

Loss of species of conservation significance

Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities, but are also affected by overall loss of habitat. Threatened species include those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations.

Consequences may include:

1. Fragmentation of populations of affected species.
2. Reduction in area of occupancy of affected species.
3. Loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chance of survival of the species.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of species of conservation significance	-17.00	-5.50	-6.42

Mitigation measure/s:

- A pre-commencement survey of the identified site must be undertaken by a suitably qualified specialist to ensure that no red list data or protected flora and fauna will be directly impacted upon.
- Search and rescue of species of concern.
- Obtain permits for any protected species found on-site.
- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.

Introduction of alien species

Major factors contributing to invasion by alien invader plants includes inter alia high disturbance (such as clearing for construction activities) and negative grazing practices. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of this may include:

1. Loss of indigenous vegetation.
2. Change in vegetation structure leading to change in various habitat characteristics.
3. Change in plant species composition.
4. Change in soil chemical properties.
5. Loss of sensitive habitats.
6. Loss or disturbance to individuals of rare, endangered, endemic and/or protected species.

7. Fragmentation of sensitive habitats.
8. Change in flammability of vegetation, depending on alien species.
9. Hydrological impacts due to increased transpiration and runoff.
10. Impairment of wetland function.

The application area is predominantly utilised for crop farming. There is a high possibility that alien plants could be introduced to areas within the footprint of the proposed activities from surrounding areas in the absence of control measures. The potential consequences may be of moderate seriousness for surrounding natural habitats. However, in most cases, it is in the interests of the land owner to control infestations.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Introduction of alien species	-13.00	-4.00	-4.67

Mitigation measure/s:

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.
- Manage alien plants within close proximity to exploration activities.

Degradation and/or destruction of wetland habitats

In terms of Section 19 of the NWA (1998), owners/managers/people occupying land on which any activity or process undertaken which causes, or is likely to cause pollution or degradation of a water resource must take all reasonable measures to prevent any such disturbance from occurring, continuing or recurring. These measures may include measures to (inter alia):

- Cease, modify, or control any act or process causing the pollution/degradation.
- Comply with any prescribed waste standard or management practice.
- Contain or prevent the movement of pollutants or the source of degradation.
- Remedy the effects of the pollution/degradation.
- Remedy the effects of any disturbance to the bed and banks of a watercourse/wetland.

Part of the definition of pollution of water resources states that any physical alterations to a water resource, for example the excavation of a wetland/stream or changes to the morphology of such a water resource may be considered to be pollution. Activities which cause an alteration to the biological properties of a wetland i.e. the fauna and flora contained within and supported by that water resource are therefore also considered to be a form of pollution.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Degradation and/or destruction of wetland habitats	-4.50	-2.00	-2.33

Mitigation measures:

- Clearing of vegetation or topsoil must be minimised as far as possible.
- Any construction activities in or within a delineated buffer zone of a water resource may only take place after the necessary water use license has been obtained.

- Where wetlands may be encroached upon by proposed activities, the edge of the wetland must be clearly demarcated in the field with pegs or poles that will last for the duration of the construction phase.
- Prospecting machinery and associated vehicles may not be allowed to enter wetlands. Strictly no re-fuelling of vehicles or machinery should be allowed to take place in any area close to a wetland.
- During and after construction areas of exposed soil can easily erode and subsequently end up in the wetlands. A well-designed storm water system must be put in place to avoid erosion into wetlands. Natural runoff from the natural terrestrial habitat surrounding the wetlands should however not be restricted unnecessarily.
- The Environmental Control Officer (ECO) must continually monitor the activities for erosion/sedimentation and ensure that suitable mitigation measures are implemented where necessary (e.g.: hay bales, silt traps, etc.).
- A suitably qualified specialist must monitor that no drilling is undertaken on or within 100 m from the edge of a watercourse and within 1:100 years of a floodline.
- All disturbed areas must be suitably rehabilitated on completion of the works to ensure that erosion does not result.
- The use of potential pollutants (paint, chemicals, etc.) during construction and operational phases must be strictly controlled and a high quality of management and supervision concerning such materials must be enforced, especially close to wetland buffer zone areas.
- Sanitary facilities must be made available to prospecting workers to prevent urine and human waste entering the wetlands.
- If at any point prospecting activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats.

Loss of indigenous fauna and flora diversity associated with wetlands

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of indigenous fauna and flora diversity associated with wetlands	-4.50	-2.00	-2.33

Mitigation measures:

- Destruction of natural wetland vegetation must be avoided at all cost.
- Special attention should be paid to alien and invasive control within the whole study area. Alien and invasive vegetation control should take place throughout all development phases to prevent loss of habitat of indigenous fauna and flora.
- Movement of vehicles and construction workers in wetlands and buffer zones should be strictly prohibited.
- No harvesting of plants or animals should be allowed.
- Any specimens of protected plant species known to occur in the wetlands and the delineated buffer zone and may potentially be impacted by the prospecting activities, are to be fenced off for the duration of the activity.
- If at any point prospecting activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats.

- Red Data listed and protected species as well as sensitive habitats related to wetlands should be strictly monitored.
- Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the construction, operational and decommissioning phases.

Spillage of oils, fuels and chemicals

During the operational phase, the spillage of oils, fuel and drilling chemicals can result in the pollution of water resources if due care is not taken.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Spillage of oils, fuels and chemicals	-10.50	-4.50	-6.00

Mitigation measure/s:

- The placement of drip trays under the drilling rigs should be implemented and recorded to minimise the contamination of waste oil from the drilling rig.
- Oil recovered from the drilling rigs should be collected, stored and disposed of by accredited vendors for recycling.
- Drilling fluids should be biodegradable and should be kept in a surface container. Proper rehabilitation and off site removal of excess fluids should take place.

Groundwater contamination from surface spills

Groundwater contamination may occur as a result of hydrocarbon (oil and diesel) spills within the drill pads and other surface activities. Other spills that may occur include diesel and oil spills associated with the equipment on-site. In most instances these spills can be managed through the implementation of good housekeeping as well as sound environmental practices and training. It is recommended that drip trays are used at all times to contain any leaks or spills associated with the machinery to be used during exploration. The regional extent of these impacts is not expected to be significant, but would rather be restricted to the site.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Groundwater contamination from surface soils	-10.50	-4.50	-6.00

Mitigation measure/s:

- It is proposed that the following conditions for Environmental Authorisation are set from a groundwater perspective:
 - No development should take place within 100 m of the rivers and streams.
 - No drillholes should be drilled in the immediate vicinity of any existing private water boreholes that are in use. If this cannot be avoided, the landowner should be provided with an alternative water borehole or water resource.

Erosion and sedimentation

As certain areas will be disturbed through vegetation clearing, the risk of erosion and sedimentation must be suitably managed. No drilling is permitted within 100 m from the edge of a watercourse and within 1:100 years of a floodline.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Erosion and sedimentation	-6.00	-3.00	-4.00

Mitigation measures:

- Clearing of vegetation or topsoil must be minimised as far as possible.
- The ECO must continually monitor the activities for erosion/sedimentation and ensure that suitable mitigation measures are implemented where necessary (e.g.: hay bales, silt traps, etc.).
- A suitably qualified specialist must monitor that no drilling is undertaken on or within 100 m from the edge of a watercourse and within 1:100 years of a flood line.
- All disturbed areas must be suitably rehabilitated on completion of the works to ensure that erosion does not result.

Soil compaction

Drilling will result in small scale compaction of soil. These areas will be limited to the areas where these invasive activities occur. Through the implementation of the proposed mitigation measures, this impact is anticipated to have a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Soil compaction	-6.00	-3.50	-4.67

Mitigation measure/s:

- All areas that are compacted as a result of prospecting activities must be assessed by the ECO and where necessary, scarifying must take place to loosen the soil.

Hydrocarbon spills

The vehicles and equipment on-site would present a risk of hydrocarbon spills with the resultant potential for contamination of soils. Due to the small number of vehicles and short duration of the on-site prospecting activities, in conjunction with the mitigation measures put forward, this impact is anticipated to have a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Hydrocarbon spills and contamination	-6.00	-3.50	-4.67

Mitigation measures:

- Drip trays must be placed under vehicles.
- Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of.
- During refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks.
- Spill clean-up equipment must be available on-site at all times.
- In the event of large spills, this must be reported to the authorities and a specialist spill contractor immediately sought to assist with the clean-up.

Contamination of groundwater (water quality and quantity)

The requirement for casing of drillholes as presented in the EMPR is anticipated to prevent any adverse impacts on groundwater quantity and quality for surrounding groundwater users. Furthermore, a monitoring programme is proposed in the EMPR for the continued monitoring of surface and groundwater quantity and quality. As such,

this impact is anticipated to have a low negative significance through the implementation of these mitigation measures.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Contamination of groundwater	-15.00	-4.50	-6.00

Mitigation measures:

- Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes.
- Pre- drilling and post- drilling water sampling to be undertaken on nearby water resources.
- Ensure that all mitigation measures as stipulated in the EMPR relating to the diamond core drilling are adhered to.
- Rehabilitate disturbed areas as soon as possible.

Soil instability

One of the purposes of rehabilitation is to ensure that the erosion potential of the disturbed areas is minimised. This will be achieved by reinstating the topography to match the surroundings as well as reinstating vegetation cover to match the surroundings. As such, this impact is anticipated to have a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Soil instability	-6.75	-3.00	-4.00

Mitigation measure/s:

- Reinstatement of the topography to match the surroundings.
- Reinstatement of vegetation cover to match the surroundings.
- Monitor the reinstated areas to ensure that erosion does not occur.
- Any contaminated soils are to be collected and removed from site and suitably disposed of.
- Vegetation regrowth must be monitored to ensure that it matches the surrounding areas.

Soil pollution/contamination

The risk of soil pollution and contamination as a result of the on-site prospecting activities must be managed on a day to day basis to ensure that following rehabilitation, the disturbed areas are not adversely affected. Through the implementation of the mitigation measures put forward, this impact is considered to have a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Soil pollution/contamination	-6.00	-3.50	-3.67

Mitigation measures:

- 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.

Disturbance to communities in the vicinity

The closure and rehabilitation activities may result in minor disturbance to communities in the vicinity of the works. The contractors must be aware of this and ensure that they completed this phase in as short a time as possible. This impact is rated as a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Interference with land uses	-3.50	-3.00	-3.00

Mitigation measure/s:

- All work must be completed in the shortest time possible.

Generation and disposal of waste

The waste that may be generated on-site may include packaging waste, waste oils, oil contaminated rags, hydraulic fluids and scrap metals. Upon completion of the prospecting activities, all foreign materials including general and hazardous waste must be removed from site and disposed of at a suitably licenced landfill site. Under no circumstances is any form of waste to be disposed of on-site. These requirements are detailed in the EMPR and will be legally binding on the contractors. As such, through these measures, this impact is rated as a low negative significance.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Generation and disposal of waste	-8.25	-3.50	-4.08

Mitigation measure/s:

- Any excess or waste material or chemicals, including drilling muds etc. 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.
- All permanent facilities must be removed from site upon closure. This will include the associated equipment, material and waste on-site.
- Under no circumstances is any form of waste to be disposed of on-site.

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

10. MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

No alternative sites have been investigated. The application area has been selected as the preferred site based on the historical data and geological information available, which indicates the potential for economically viable minerals to occur. The development footprint is expected to be a fraction (0.54 ha) of the application area size, which is estimated to be 7 943.07 ha. The geology is the primary driver in determining the location of prospecting and mining. As such, no assessment of alternative development scenarios was conducted.

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

As discussed above, the proposed application area has been selected due to the geology of the site, which indicates the potential for economically viable minerals to occur. The site layout was determined based on the

location of existing mining areas in the area. The vegetation of the preferred development location within the overall site has been previously disturbed and as such this will minimise the clearance of pristine vegetation within the overall site. No alternative development location within the overall site has been identified as viable or is considered in this report.

Consultation with all I&APs is on-going. Negative impacts identified above will be mitigated through implementation of the proposed mitigation measures as detailed in the EMPR. Where negative impacts cannot be avoided, rehabilitation will be undertaken.

The negative impacts of the development range from Medium to Low significance and would be reduced to low should the proposed mitigation measures be implemented accordingly.

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 comment regarding impact identification and assessment.
- Finalisation of impact identification and scoring.

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

Table 31: Impact significance table.

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Safety and security risks to landowners and lawful occupiers	-12.00	-8.00	-9.33
Interference with existing land uses	-11.00	-7.00	-3.50
Sense of place	-6.75	-3.50	-3.50
Damage/disruption of services and existing infrastructure	-13.00	-5.00	-5.83
Perceptions and expectations	-11.00	-4.00	-4.67
Job creation	10.00	10.00	13.33
Discovery of economy viable minerals	23.75	23.75	35.63
Fugitive emissions (dust)	-6.75	-3.00	-3.50

Impact	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Noise	-7.50	-3.50	-3.50
Damage/destruction of heritage sensitive areas and heritage sensitive areas and paleontological material	-16.00	-7.00	-9.33
Clearance of vegetation	-13.75	-6.00	-7.00
Habitat loss/destruction for fauna and flora species	-9.75	-4.50	-5.25
Habitat fragmentation and edge effect	-6.50	-4.00	-4.00
Displacement of species of conservation significance	-17.00	-5.50	-6.42
Introduction of alien species	-13.00	-4.00	-4.67
Degradation and/or destruction of wetland habitats	-4.50	-2.00	-2.33
Loss of indigenous fauna and flora diversity associated with wetlands	-5.00	-1.50	-2.33
Spillage of oils, fuels and chemicals	-10.50	-4.50	-6.00
Groundwater contamination from surface spills	-10.50	-4.50	-6.00
Erosion and sedimentation	-6.00	-3.00	-4.00
Soil compaction	-9.00	-3.50	-3.50
Contamination of groundwater (water quality and quantity)	-15.00	-4.50	-6.00
Soil instability	-6.75	-3.00	-4.00
Soil pollution/contamination	-6.00	-3.50	-4.67
Disturbance to communities in the vicinity	-3.50	-3.00	-3.00
Generation and disposal of waste	-8.25	-3.50	-4.08

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

14. SUMMARY OF SPECIALIST REPORTS

The application area comprises undulating plains which are predominantly utilised for dryland agriculture. The area falls in the Vaal Water Management Area, which includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo Rivers. The Vaal Water Management Area comprises 12 tertiary catchment areas and application area is specifically situated in the Quaternary Catchment C42J.

According to Mucina and Rutherford (2006) the dominant vegetation types present on-site are the Vaal-Vet Sandy Grassland (Gh6), Central Free State Grassland (Gh10) and the Highveld Salt Pans (AZI10). The Vaal-Vet Sandy Grassland which covers the majority of the site is **Endangered** and is considered a **Protected** Ecosystem in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA, 2004): National List of Ecosystems That Are Threatened and In Need of Protection. The Central Free State covers a small portion of application area and it is **Vulnerable**. The Highveld Salt Pans is **Least threatened**. No endangered or protected animal species were encountered within the application area. Two heritage features were identified within the application area.

Faunal Assessment

The natural habitat of the study area has been largely transformed through agriculture, specifically crop production. The largest portion of the application area is more or less homogenous from a dominant habitat point of view. Given this homogeneity, one would not expect a large diversity of native animals to still occur in the area. Certain animals, such as the Blue crane (*Anthropoides paradiseus*), may inhabit croplands where natural short grasslands are unavailable. Others, such as small rodents, are attracted to the abundance of food provided by the crop cultivars. These are not arguments that the croplands should be conserved, but rather that they may determine the abundance of animals on the site and play a role in species occurrence.

The most important natural elements that were observed are the natural drainage lines/seasonal tributaries, small pockets of natural grassland and agricultural field margins. The drainage lines may facilitate the creation of seasonal, stagnant pools which are important resources in frog and dragonfly/damselfly reproduction. Additionally, the small remnants of natural grassland and field margins have been proven to be important in harbouring native animal diversity. These two landscape elements (should) contain most of the natural vegetation and therefore most of the faunal diversity. Although trees are sparsely distributed throughout the site they remain an important structural component of the ecosystem and are important especially for the occurrence of birds.

The occurrence of rocks/boulders and termite mounds is generally low, but where present these landscape elements may provide shelter, food and reproductive opportunities to a great diversity of animals (including all the animal groups considered in this study) and their disturbance should therefore be avoided as much as possible. Where literature allowed, a species was listed with regards to the number of sightings for that species near the relevant locality (i.e. Ventersburg).

Flora Assessment

Four plant species of conservation significance were recorded within the application area. Two of these species recorded are listed as Declining Red Data species, and all four species are listed as provincially protected. No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species (TOPS), nor any protected trees as listed by the National Forest Act, were recorded in the study area during the time of the Biodiversity study. Three broad vegetation units (VUs), two based on floristic differences of different topographical positions and natural habitat types, and one based on anthropogenic transformation, were recorded in the study area. The VUs are as follow:

- Vegetation Unit 1 (VU1): Natural Grassland.
- Vegetation Unit 2 (VU2): Wetlands.
- Vegetation Unit 3 (VU3): Transformed Areas.

A sensitivity rating of High was attributed to VU1 (Natural grasslands) and VU2 (Wetlands). VU1 still has a relatively natural character albeit somewhat degraded due to overgrazing, fragmentation and the edge effects of

other neighbouring transformed habitats. The portions of VU1 that still persist in the study area form part of the **Endangered** and **Protected** Vaal-Vet Sandy Grassland ecosystem. VU2 has High sensitivity due to its important function as water drainage and storage habitat for surrounding ecosystems and the faunal assemblages that depend on it, as well as its relevant connectivity with VU1 habitats along its mostly linear distribution. VU3, on the other hand, is attributed a Low sensitivity due to its totally transformed nature and the large amount of alien weeds and invaders occurring in that habitat. A buffer zone was delineated for the highly sensitive area where one of the drill sites currently falls just inside a highly sensitive area. It was strongly suggested that this particular proposed drill site be moved about 65 m northwest from its currently proposed position. In this regard, this proposed drill site was moved as per the Ecology specialist's recommendation.

Wetland Assessment

The study area falls in the Vaal Water Management Area (WMA 5), which includes major rivers such as the Vaal, Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts and Molopo rivers. The Vaal Water Management Area includes 12 tertiary catchment areas. The application area is specifically situated in Quaternary Catchment C42J.

Within the application area, two non-perennial streams (Rietspruit and Kromspruit) drain north-west and south-west. A third, unnamed non-perennial stream drains into the Rietspruit north of the Kromspruit. East of the study area, the Enslinspruit drains northwards. Further south of the study area, the Slootspruit drains north-westwards into the Rietspruit.

The wetlands in the application area consist of a variety of types, namely: un-channelled and channelled valley bottom wetlands that are associated with the various streams. In some areas of the streams, there are associated floodplain wetlands. There are also a number of natural pans or depressions where water accumulates during the wet season. Further, there are a number of man-made dams in the area, most of which are associated with the natural streams and drainage lines.

Vegetation assemblages in the study area consist of water and moisture-loving plants. The wetland vegetation is generally poor in terms of ecological veld condition due to decades of over utilisation by livestock.

Five soil forms were identified in the establishment of wetland boundaries within the application area. These soil forms are Katspruit, Kroonstad, Bloemdal, Sepane and Rensburg. Along the course of the Rietspruit and the unnamed drainage line just to its south, Katspruit, Kroonstad and Sepane soil forms were the most prevalent. Soil forms that were mostly recorded along the course of the Kromspruit are Katspruit, Sepane and Rensburg. Soil forms associated with pans and depressions mostly include Katspruit, Kroonstad, Bloemdal and Rensburg.

The wetlands in the application area are moderately to highly modified with some loss of natural habitats. These wetlands are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of the floodplains is not usually sensitive to flow and habitat modifications. The wetlands play a small role in moderating the quantity and quality of water of major rivers of the Vaal Management Area.

A sensitivity rating of High is attributed to the wetlands in the application area. This is mainly due to their important function as water drainage and storage habitat for surrounding ecosystems and the faunal and floral assemblages that depend on it, as well as the relevant connectivity with terrestrial habitats along their mostly linear distribution. Any significant damage to the linear drainage lines, which mostly contain the wetlands of the application area, will have a significant impact on similar habitats downstream, further enhances the sensitive nature of these habitats.

Heritage and Palaeontological Assessment

A Heritage Impact Assessment (inclusive of a Palaeontology study) was undertaken over the application area. A field survey was conducted on foot and a vehicle was used to gain access to (i) the farm properties within the application area and (ii) the proposed six drillhole locations. The foot survey that was undertaken identified two heritage sites within the application area. However, these two heritage sites are located away from the proposed six drillhole locations. The sites include:

- A family burial site with one grave.
- A provincial graded barn house utilised as a guesthouse.

The burial site belonged to the De Beer family who were the previous owners of the farm. The burial ground is sectioned off with a fence. The size of the area fenced off area suggests the possibility of more graves which may not have been marked.

The provincial graded historical structure is documented as a European styled barn of high local significance. The barn is described to bear resemblance to features such as a Mansard Roof, which is defined as a covering with a steep lower part and a not flatter upper part on all four sides. Within South Africa, there exist two or three similar structures. The site has been incorporated into the tourism economy of the area and is more commonly referred to as the Barn Guesthouse. Currently, the Barn Guesthouse is utilised as site offices for the ongoing road construction activities along the N1 Highway. It is highly likely that other such structures, farmhouses and complexes of significant value exist. However, they are yet to be documented and graded on the National Inventory.

The two heritage sites identified within the application area are considered as High sensitive heritage features. However, these two sites will not be impacted by the proposed invasive prospecting activities as they are located outside the areas where the proposed drilling activities will take place. The grave site is located 350 metres away from the nearest drillhole site and the historical building is located about 2 kilometres away from the nearest drillhole site. As part of the consultation process, landowners and Interested and Affected Parties were asked to indicate if they are aware of heritage features with the application. Mr Erasmus Ferreira, owner of Portion 0 of the Farm Kromspruit 476 indicated the presence of a cemetery on the farm. This cemetery on Mr Ferreira's farm is considered a High sensitive feature.

According to the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS) Fossil Sensitivity Map of the underlying application area, a large portion south of the application area is incorrectly depicted as a moderate fossil sensitivity. The application area is covered by Aeolian sands of the Quaternary age which has been extensively farmed and ploughed over the period of 150-200 years.

15. ENVIRONMENTAL IMPACT STATEMENT

Based on the impact assessment that was conducted, the environmental impacts associated with prospecting activities are expected to be localised and of low significance, if mitigation measures are implemented. Mitigation measures and suitable monitoring programmes were recommended by the EAP in order to eliminate and/or reduces environmental impacts. These mitigation measures and monitoring programmes have been included as commitment in the Environmental Management Programme. The Environmental Management Programme aims to present management measures that will eliminate, offset or reduce adverse environmental impacts, as well as to provide the framework for environmental monitoring. The primary purpose of the Environmental Management

Programme is to ensure that negative environmental impacts of the proposed project are effectively managed within acceptable limits and that the positive impacts are enhanced.

In terms of site sensitivities, the most sensitive features which will require protection on-site may be summarised as follows:

- Critical biodiversity areas.
- Ecologically sensitive areas
- Heritage sites (buildings structures older than 60 years and grave sites).
- Watercourses (rivers, wetlands, pans and dams).

In terms of positive impacts, the identification of mineral deposits within the application area provides an opportunity for a potential viable economic activity in the form of mining. Mining will contribute greatly for local economic stimulation through direct employment, future business opportunities, royalties and tax revenues.

16. FINAL SITE MAP

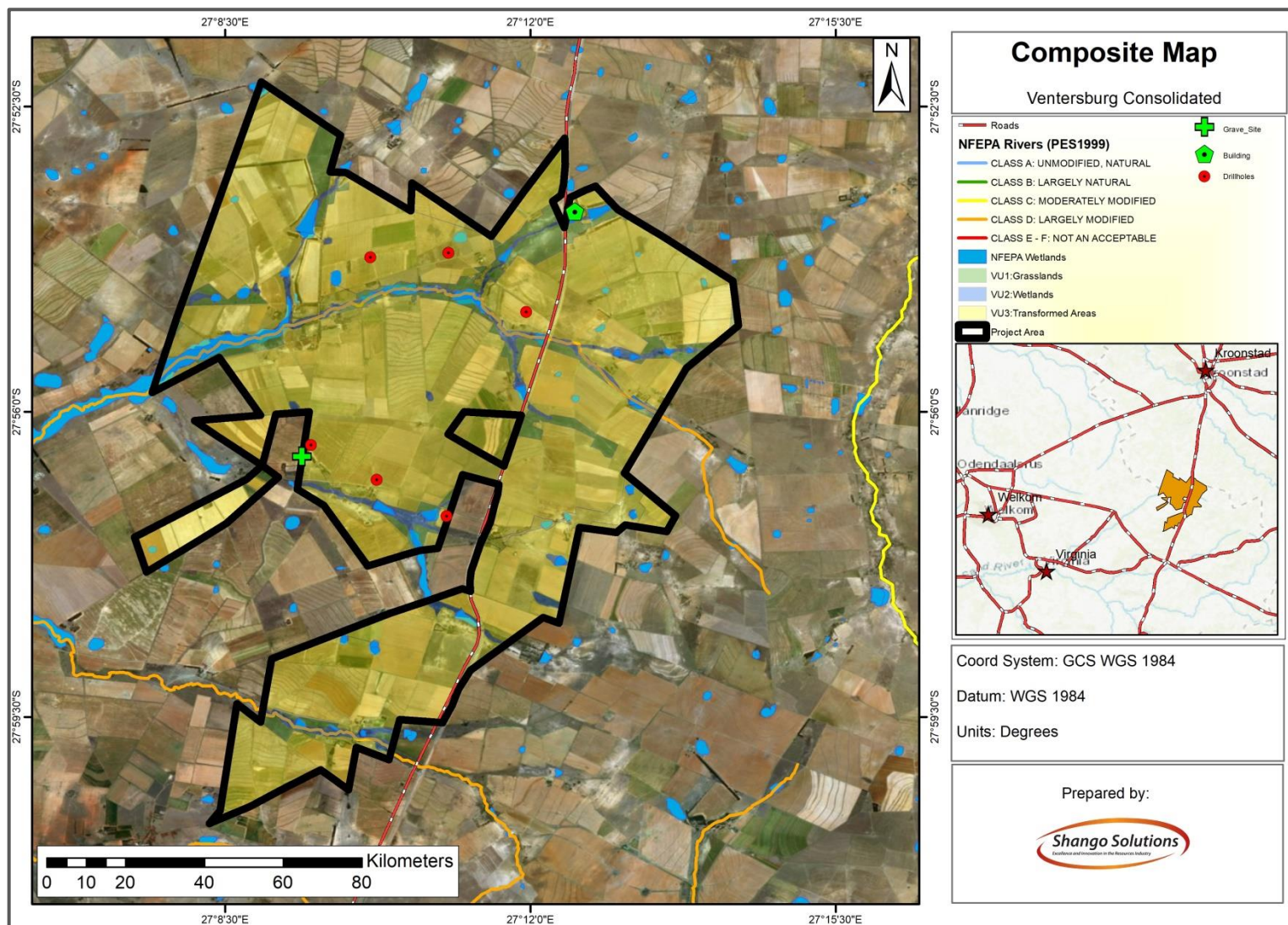


Figure 45: Composite map of the application area (refer to Appendix C for an enlarged map).

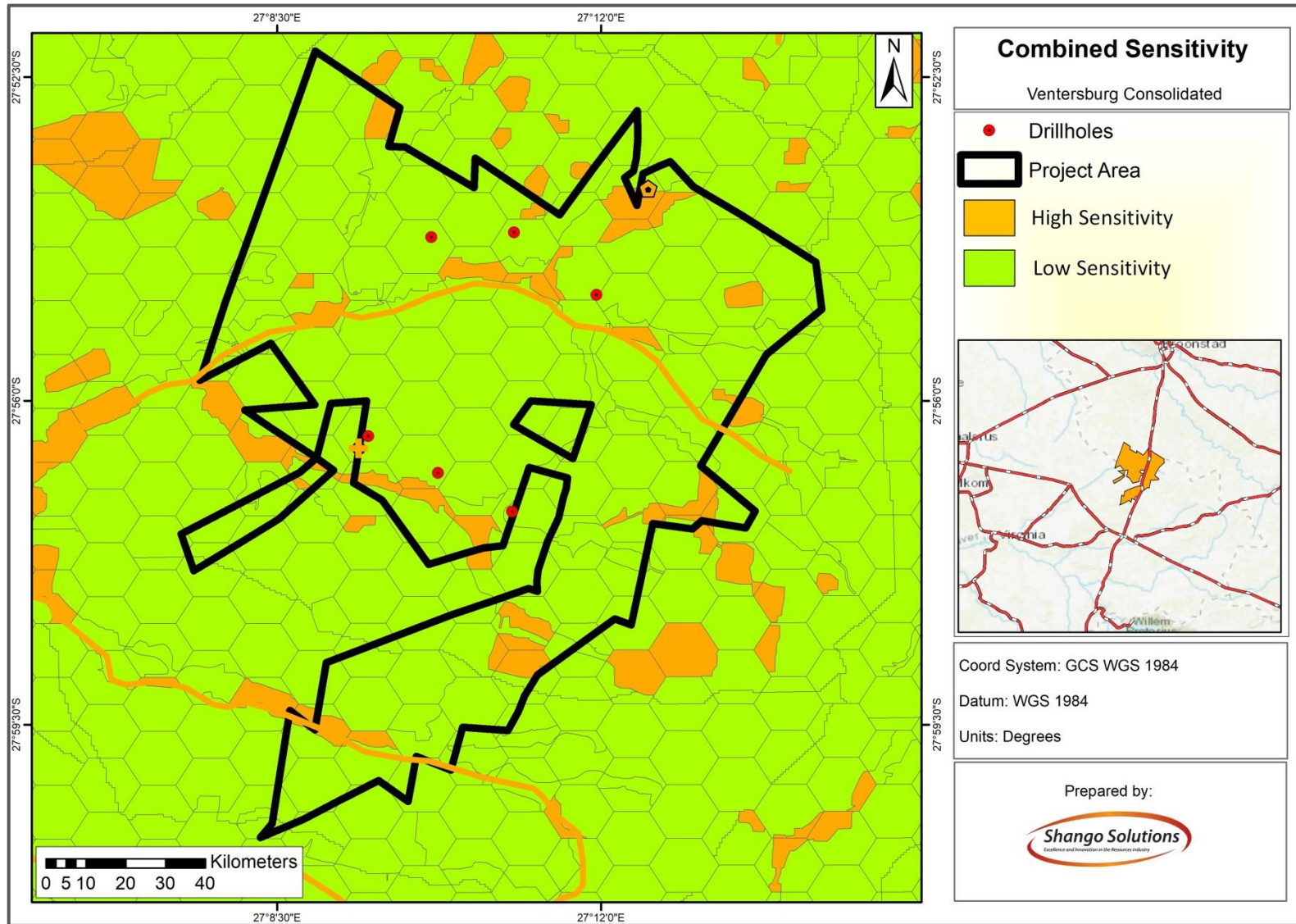


Figure 46: Combined sensitivity map of the application area (refer to Appendix C for an enlarged map).

17. SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The positive implications of the Ventersburg Consolidated Prospecting Right are (i) job creation during prospecting operations and (ii) the discovery of an economically viable mineral resource. In terms of negative impacts, a number of potential environmental risks on surface water, groundwater, heritage features, ecology and wetlands were identified and include the following:

- Safety and security risks to landowners and lawful occupiers.
- Interference with land use.
- Sense of place.
- Loss of habitat.
- Perceptions and expectations.
- Deterioration/disruption of services and existing infrastructure.
- Job creation.
- Discovery of economy viable minerals.
- Clearance of vegetation.
- Soil compaction.
- Soil/pollution/contamination.
- Erosion and sedimentation.
- Hydrocarbon spills/contamination.
- Contamination of groundwater.
- Fugitive Emissions (dust).
- Noise.
- Disturbance/damage/destruction of cultural resources, archaeological sites and heritage sensitive areas.
- Habitat loss/destruction.
- Habitat fragmentation and edge effect.
- Displacement of faunal species.
- Flora direct and indirect mortality.
- Introduction of alien species.
- Groundwater contamination from surface spills.
- Soil instability.
- Disturbance to communities in the vicinity.
- Generation and disposal of waste.

18. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The following potential mitigation measures and residual risks have been provided for each environmental aspect assessed. 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 their decision-making. Furthermore, it should be noted that the results of the public consultation will be used to update the proposed potential mitigation measures prior to the submission of the finalised BAR and EMPR to the DMR.

Safety and security risks to landowners and lawful occupiers

- 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 landowner. This formal agreement should additionally stipulate landowners 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 as well as local, provincial and national regulations with regards to road safety and transport.

Interference with land use

- 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.

Sense of place

- The Applicant must enter into formal written agreements with the affected landowners and provide compensation for any damages due to the prospecting activities.

Deterioration/disruption of services and existing infrastructure

- Ensure that service detection or identification is undertaken prior to the commencement of invasive prospecting activities.
- All invasive prospecting work cannot be undertaken within 100 metres of any existing infrastructure such as dwellings, cultivated fields, Eskom transmission/distribution lines, Telkom lines, roads, graveyards and any fences unless permission is received from the relevant landowner/lawful occupier.
- Roads to be constructed for the purpose of prospecting activities must be rehabilitated.

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 Interested and Affected Parties.
- Ensure that information is communicated in a manner which is understandable and accessible to Interested and Affected Parties.
- 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 minerals

- None required.

Fugitive emissions (dust)

- All vehicles utilising public gravel roads must adhere to the speed limits.
- By minimising the removal of vegetation and topsoil in affected areas, the potential for dusty conditions this will be minimised.
- Prospecting activities (including drill sites) must be located 100 metres away from farm dwellings.

Noise

- All construction vehicles and machinery must be maintained in good working order.
- When working or traveling past noise sensitive receptors, no unnecessary hooting or noise should occur.

Disturbance/damage/destruction of cultural and heritage features, archaeological sites and palaeontological material

- All heritage structures must be suitably identified prior to invasive prospecting works proceeding and suitably demarcated and avoided.
- No prospecting must be undertaken within 100 metres from heritage features and archaeological sites.
- Should heritage sites be identified on-site during invasive prospecting activities, all prospecting activities must stop and a Heritage specialist should be notified.

Clearance of vegetation

- Minimise clearing to areas that are required for invasive works. Where possible, cut vegetation instead of clearing to minimise soil disturbance.

- Where possible, locate drill sites close to existing access roads to minimise the extent of vegetation disturbance caused by temporary access roads.
- Rehabilitate all disturbed areas following invasive prospecting activities to the conditions that existed prior to prospecting.

Habitat loss/destruction of fauna and flora species

- Undertake prospecting activities in previously disturbed places and/or habitats with a lower sensitivity score.
- Rehabilitate disturbed areas as soon as possible.
- Control alien plants.

Habitat fragmentation and edge effect

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.

Loss of species of conservation significance

- A pre-commencement survey of the identified site must be undertaken by a suitably qualified specialist to ensure that no Red List Data or protected flora and fauna will be directly impacted upon.
- Search and rescue of species of concern.
- Obtain permits for any protected species found on-site.
- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.

Introduction of alien species

- Undertake activities in previously disturbed areas and/or habitats with lower sensitivity.
- Locate activities on the boundaries of existing disturbance.
- Use existing access roads as much as possible.
- Rehabilitate disturbed areas as soon as possible.
- Manage alien plants within close proximity to exploration activities.

Degradation and/or destruction of wetland habitats

- Destruction of natural wetland vegetation must be avoided at all cost.
- Special attention should be paid to alien and invasive control within the whole study area. Alien and invasive vegetation control should take place throughout all development phases to prevent loss of habitat of indigenous fauna and flora.
- Movement of vehicles and construction workers in wetlands and buffer zones should be strictly prohibited.
- No harvesting of plants or animals should be allowed.
- Any specimens of protected plant species known to occur in the wetlands and the delineated buffer zone and may potentially be impacted by the prospecting activities, are to be fenced off for the duration of the activity.
- If at any point prospecting activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats.

- Red Data listed and protected species as well as sensitive habitats related to wetlands should be strictly monitored.
- Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the construction, operational and decommissioning phases.

Spillage of oils, fuels and chemicals

- The placement of drip trays under the drilling rigs should be implemented and recorded to minimise the contamination with waste oil from the drilling rig.
- Oil recovered from the drilling rigs should be collected, stored and disposed of by accredited vendors for recycling.
- Drilling fluids should be biodegradable and should be kept in a surface container. Proper rehabilitation and off site removal of excess fluids should take place.

Groundwater contamination from surface spills

- It is proposed that the following conditions for Environmental Authorisation is set from a groundwater perspective:
 - No development should take place within 100 metres m of the rivers and streams.
 - No drillholes should be drilled in the immediate vicinity of any existing private water boreholes that are in use. If this cannot be avoided, the landowner should be provided with an alternative water borehole or water resource.

Erosion and sedimentation

- Clearing of vegetation or topsoil must be minimised as far as possible.
- The appointed Environmental Control Officer must continually monitor the activities for erosion/sedimentation and ensure that suitable mitigation measures are implemented where necessary (e.g.: hay bales, silt traps, etc.).
- A suitably qualified specialist must monitor that no drilling is undertaken on or within 100 metres from the edge of a watercourse and within 1:100 years of a flood line.
- All disturbed areas must be suitably rehabilitated on completion of the works to ensure that no erosion occurs..

Soil compaction

- All areas that are compacted as a result of prospecting activities must be assessed by the Environmental Control Officer and where necessary, scarifying must take place to loosen the soil.

Hydrocarbon spills

- Drip trays must be placed under vehicles.
- Any spills or leaks must immediately be cleaned up and the contaminated soil suitably disposed of.
- During refuelling of vehicles or equipment, drip trays must be utilised to prevent spills or leaks.
- Spill clean-up equipment must be available on-site at all times.
- In the event of large spills, this must be reported to the authorities and a specialist spill contractor immediately sought to assist with the clean-up.

Contamination of groundwater (water quality and quantity)

- Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes.
- Pre- and post- drilling water sampling to be undertaken on nearby water resources.

- Ensure that all mitigation measures as stipulated in the Environmental Management Programme relating to the diamond core drilling are adhered to.
- Rehabilitate disturbed areas as soon as possible.

Soil instability

- Reinstate the topography to match the surroundings.
- Reinstate vegetation cover to match the surroundings.
- Monitor the reinstated areas to ensure that erosion does not occur.
- Any contaminated soils are to be collected and removed from site and suitably disposed of.
- Vegetation regrowth must be monitored to ensure that it matches the surrounding areas.

Soil pollution/contamination

- 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 plastic lining and any spills or leaks must be cleaned up.

Disturbance to communities in the vicinity

- All work must be completed in the shortest time possible.

Generation and disposal of waste

- Any excess or waste material or chemicals, including drilling muds etc. 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.
- All permanent facilities must be removed from site upon closure. This will include the associated equipment, material and waste on-.
- Under no circumstances is any form of waste to be disposed of on-site.

19. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

- The approval of the project is for prospecting only. The approval excludes any mining activities.
- The Applicant is to appoint a suitably qualified Environmental Control Officer (ECO) who must 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 area 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.
- 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 should adhere to the conditions of the EA, EMPR and specialist reports (where relevant) for this project.

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

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

- The baseline environment was compiled through desktop studies and specialist reports undertaken around the vicinity of the application area. The possibility exists that the baseline data is outdated or incomplete. Site visits have been undertaken in order to verify the desktop data utilised. The baseline environment is subject to change based on the results of the public participation process. Furthermore, the description of the baseline environment has been further informed by the results of the Public Participation Process.
- It is assumed that the BAR Public Participation Process will provide inputs towards the strengthening of the
- Heritage Impact Assessment.
- The Heritage specialist assumes that the identified heritage resources represent the total number of heritage resources within the development footprint with exception to those resources that are subterranean in nature. If any such resources, not visible to the earth surface are discovered during construction activities they will be treated as chance finds.
- The Biodiversity specialist assumes that plant species flowering only during specific times of the year could be confused with a very similar species of the same genus. Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- Due to habitat conditions encountered during the time of the Biodiversity Study, some species could only be identified up to genus level and some could not be identified at all. In order to obtain a comprehensive understanding of the dynamics of the biodiversity of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this survey was conducted in one season during a once-off site visit of two and a half days.
- Data collection for the Biodiversity Study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis. No quantitative data was collected or analysed for the calculation of ecological veld and/or habitat condition. Any comments or observations made in this regard are based on observations, the expert knowledge and relevant professional experience of the specialist investigator.
- No faunal trapping was conducted as part of this study. The faunal assessment relied heavily on desktop and literature studies, supported by on-site observations.
- During the fieldwork phase of the Biodiversity assessment, access to all farms was not possible due to lack of contact details at the time. The habitat mapping therefore relied somewhat on extrapolation from areas that were actually visited.
- The Biodiversity specialist reserves the right to amend the report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.
- It is assumed that wetland plant species flowering only during specific times of the year could be confused with a very similar species of the same genus. Some wetland plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- In order to obtain a comprehensive understanding of the dynamics of the wetland habitats of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this survey was conducted in one season during a once-off site visit of two and a half days.

- Data collection for the Wetland Study relied heavily on data from representative, homogenous wetland sections, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- During the fieldwork phase of this assessment, access to all farms was not possible due to lack of contact details at the time. The final wetland delineation therefore relied somewhat on extrapolation from areas that were actually visited and delineated in detail.
- No formal water quality or aquatic faunal assessments (e.g. SASS 5) were conducted as part of this study. All comments on these subjects were made from estimations of the current, visible situation in the field.
- The Wetland specialist reserves the right to amend the report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

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

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 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.

Due to the nature of the proposed prospecting activities, potential impacts are expected to be localised. The potential impacts that have been identified will have a low significance if prospecting impacts are mitigated correctly. The EMPR aims to present management measures that will eliminate, offset or reduce adverse environmental impacts, as well as to provide the framework for environmental monitoring.

Based on the various impact assessments as well as the mitigation measures put forward in this report, it is 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 five (5) years.

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, 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 No.107 of 1998) (20 November 2015) have been considered and this is anticipated to result in an increase in the rehabilitation costs estimated using above mentioned quantum.

A detailed Final Rehabilitation, Decommissioning and Closure Plan (FRDCP) has been compiled in terms of the requirements of Regulations Pertaining to the Financial Provision for Prospecting, Prospecting, Mining or

Production Operations. This FRDCP has been included in Appendix G. Please refer to Appendix G for a detailed description of the amount required to meet the objectives of the FRDCP.

.An amount of ZAR 7 528 900 will be required to finance the Prospecting Work Programme. 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.

25. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information has been requested from the Competent Authority.

26. 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, contractor 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.

The consultation process will allow directly affected parties to raise their concerns. Further to this, it must be noted that I&AP's, including directly affected parties such as landowners, have the opportunity to review and comment on this report. The results of the public consultation have been included in the final report submitted to the department 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 Prospecting Right 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 Sections 1.2 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 (high and medium).
- Grassland.
- Woodland/Open Bush.

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+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 have been identified and assessed, it can be said that the closure plan will sufficiently address the objectives for the preferred alternative. However, this EMPR does aim 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. Making the area safe. i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing drillholes, etc.
2. Recreating a free draining landform. This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
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. Verification of rehabilitation success (entails monitoring of rehabilitation).
6. Successful closure (obtain closure certificate).

It is not known if there are any water boreholes located on the site and if access and supply will be granted by the landowner. It is anticipated that water brought onto the site will be sourced from the Local Municipality. Water will be trucked from these sources to the identified drill sites. Water bowsers will be utilised during the drilling operations as and when required.

Continuous water supply will be required during drilling. An on-site water storage tanks with a capacity of at least 15 000 litres for water supply to the drill may be required. Additional water requirements relate to the potable water supply for employees and workers. A temporary 260 litre on-site vertical water storage tank for drinking water is recommended during the drilling operations.

29.2 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.

29.3 Impacts To Be Mitigated In Their Respective Phases

Table 32: Impacts to be mitigated.

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Site clearance	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha Short term Localised 	<ul style="list-style-type: none"> Demarcation of sensitive areas in consultation with relevant specialists and ECO Utilise local labour if possible Minimise removal of vegetation as far as possible Identification and relocation of protected species by a qualified ecologist (and application of the relevant biodiversity permits where required) Minimise physical footprint of construction Minimise dust generation Limit vehicle access Implement alien vegetation management Ongoing identification of risks and impacts Emergency preparedness Monitoring and review Avoid disturbance of fauna as much as possible 	<ul style="list-style-type: none"> NEMA MPRDA NEMBA NEMAQA Dust Regulations NWA DWAF Best Practice Guidelines 	<ul style="list-style-type: none"> Construction Operation
Site access	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 7 943.07 ha Short term Localised 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> NEMA OSH MHSA 	<ul style="list-style-type: none"> Construction Operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Establishment of site infrastructure	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha Short term Localised 	<ul style="list-style-type: none"> Minimise physical footprint of construction Ensure construction is consistent with occupational health and safety requirements Minimise vegetation clearance Ensure proper and adequate drainage Minimise waste and control waste disposal Fencing of all drill sites with security access control and warning signs Establish waste storage areas for recycling 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 	<ul style="list-style-type: none"> NEMA MPRDA NEMBA NEMAQA Dust Regulations NWA DWAF Best Practice Guidelines NHRA 	<ul style="list-style-type: none"> Construction Operation
Storage of construction vehicle	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha Short term Localised 	<ul style="list-style-type: none"> 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 a size that the equipment can be placed inside it 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 	<ul style="list-style-type: none"> NWA DWAF Best Practice Guidelines 	<ul style="list-style-type: none"> Construction Operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<ul style="list-style-type: none"> exploration sites to reduce the compaction of soils 		
Transportation/ access to and from drill sites	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha short term Localised 	<ul style="list-style-type: none"> Where possible, drill sites should be located along existing access roads to reduce the requirement for additional access roads Any new temporary access routes to a drill site 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 landowners 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 Damage caused to public roads as a result of the 	<ul style="list-style-type: none"> NEMA NEMBA CARA NEMAQA Dust Regulations Road Traffic Act 	<ul style="list-style-type: none"> Construction Operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>construction activities must be repaired in consultation with the relevant municipal authorities</p> <ul style="list-style-type: none"> All measures should be implemented to minimise the potential of dust generation 		
Storage of hazardous substances	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha short term Localised 	<ul style="list-style-type: none"> All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or 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; and 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 time within bunded areas Adequate spill prevention and cleanup procedures should be developed and implemented during the prospecting activities Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA 	<ul style="list-style-type: none"> NWA NEMWA DWAF Best Practice Guidelines NEMA 	<ul style="list-style-type: none"> Construction Operation
Waste management	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Short term Localised 	<ul style="list-style-type: none"> Waste generated on-site must be recycled as far as possible. Recyclable waste must not be stored on-site for excessive periods to reduce risk of environmental contamination Drill muds, formation water (if encountered), etc. would constitute waste and must be classified 	<ul style="list-style-type: none"> DWAF Minimum requirements for waste disposal NEMWA 	<ul style="list-style-type: none"> Construction Operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>and ranked in terms of relevant legislation for correct disposal</p> <ul style="list-style-type: none"> A Waste Management System must be implemented, and provide for adequate waste storage (in the form of enclosed containers) waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on-site 		
Prospecting drillholes	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha Short term Localised 	<ul style="list-style-type: none"> Vegetation clearing for prospecting sites should be kept to a minimum in order to reduce the disturbance footprint 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 to a potential sensitive area, 	<ul style="list-style-type: none"> SANS 10103 ECA Noise Regulations NEMAQA Dust Regulations NWA 	<ul style="list-style-type: none"> Construction Operation Decommissioning

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			<p>the contractor must limit the number of simultaneous activities to the minimum</p> <ul style="list-style-type: none"> • Ensure proper storage of fuels • On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on-site, and to minimize disruption of traffic • Workforce should be kept within defined boundaries and to agreed access routes. • No invasive prospecting activities to be undertaken within 100 m of a watercourse • Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation. • No ablution of site laydown areas are to be located within 100 m of a watercourse. • Where shallow aquifers are encountered, a survey of the drinking water/ livestock watering boreholes should be undertaken (within 5km of the drillhole sites). A detailed groundwater monitoring programme should be developed for these drinking water/ livestock watering boreholes and pre and post prospecting water quality samples should be taken. • Where drinking water/ livestock watering boreholes are to be affected, and where a pollution event occurs at a particular water borehole, then the advise of a Geohydrologist should be sought with regards to the need for 		

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
			plugging and casing of the drillholes.		
Invasive Prospecting	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> 0.54 ha Short term 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> OHS MHSA 	<ul style="list-style-type: none"> Construction Operation
Re-fuelling	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Short term Localised 	<ul style="list-style-type: none"> Refueling may only take place within demarcated areas that are subject to appropriate spill prevention and containment measures refueling 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 	<ul style="list-style-type: none"> NWA DWAF BPG 	<ul style="list-style-type: none"> Construction Operation
Maintenance and repair	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Short term Localised 	<ul style="list-style-type: none"> Trucks, machinery and equipment must be regularly serviced to ensure they are in proper working condition and to reduce 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 	<ul style="list-style-type: none"> NWA DWAF BPG NEMA 	<ul style="list-style-type: none"> Construction Operation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Drillhole closure	<ul style="list-style-type: none"> • Decommissioning • Closure 	<ul style="list-style-type: none"> • Short term • Localised 	<ul style="list-style-type: none"> • Where groundwater is encountered during drilling, all affected drillholes that will not be 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: <ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> • NWA • DWAF BPG 	<ul style="list-style-type: none"> • Decommissioning • Closure
Removal of surface infrastructure	<ul style="list-style-type: none"> • Decommissioning 	<ul style="list-style-type: none"> • Short term • Localised 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • MPRDA • Rehab Plan 	<ul style="list-style-type: none"> • Decommissioning

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Removal of waste	<ul style="list-style-type: none"> Decommissioning 	<ul style="list-style-type: none"> Short term Localised 	<ul style="list-style-type: none"> Any excess or waste material or chemicals, including drilling muds etc. 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 	<ul style="list-style-type: none"> NWA DWAF BPG 	<ul style="list-style-type: none"> Decommissioning
Rehabilitation	<ul style="list-style-type: none"> Rehabilitation 	<ul style="list-style-type: none"> All disturbed areas 	<ul style="list-style-type: none"> 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) equaling 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 	<ul style="list-style-type: none"> MPRDA Rehab Plan NEMA 	<ul style="list-style-type: none"> Rehabilitation

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Time period for implementation
Consultation	<ul style="list-style-type: none"> • Planning • Construction • Operation 	<ul style="list-style-type: none"> • Medium term • Localised 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • NEMA • OHSA • MHSA 	<ul style="list-style-type: none"> • Planning • Construction • Operation
Monitoring	<ul style="list-style-type: none"> • Post operational 	<ul style="list-style-type: none"> • All rehabilitation areas 	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> • MPRDA Rehab Plan 	<ul style="list-style-type: none"> • Post-operational

29.4 Impact Management Actions And Outcomes

Table 33: Impact management actions and outcomes.

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Site clearance	<ul style="list-style-type: none"> Deterioration and damage to existing access roads and tracks Dust generation Clearance of vegetation Invasion by alien species Sedimentation Erosion 	<ul style="list-style-type: none"> Topography Soil Air quality Surface water Groundwater Transportation 	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Avoid and control through implementation of EMPR mitigation measures (e.g. speed limit enforcement, vehicle maintenance) 	<ul style="list-style-type: none"> NEMA NEMBA CARA Threatened Protected Species (TOPS) Regulations NEMAQA Dust Regulations NWA DWAF best Practice Guidelines
Storage of construction vehicles	<ul style="list-style-type: none"> Pollution of surface and groundwater resources from potential hydrocarbon spills Compaction of soils 	<ul style="list-style-type: none"> Surface water Groundwater Soils 	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Avoid through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> Threatened Protected Species (TOPS) Regulations NEMAQA Dust Regulations NWA DWAF best Practice Guidelines

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Transportation to and from drill sites	<ul style="list-style-type: none"> • Soil compaction • Disturbance and loss of fauna and flora • Wearing and tearing of existing roads • Dust generation from increased traffic 	<ul style="list-style-type: none"> • Soil disturbance • Fauna and flora • Air quality 	<ul style="list-style-type: none"> • Construction • Operation 	<ul style="list-style-type: none"> • Avoid through implementation of EMPR mitigation measures (e.g. speed limit enforcement, vehicle maintenance) 	<ul style="list-style-type: none"> • Threatened Protected Species (TOPS) Regulations • NEMAQA • Dust Regulations • NWA • DWAF best Practice • Guidelines
Storage of hazardous substances	<ul style="list-style-type: none"> • Potential hydrocarbon spills that could pollute surface and ground water resources 	<ul style="list-style-type: none"> • Surface water • Groundwater 	<ul style="list-style-type: none"> • Construction • Operation 	<ul style="list-style-type: none"> • Avoid through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> • NEMA • NEMBA • NWA • DWAF best Practice • Guidelines
Waste management	<ul style="list-style-type: none"> • Pollution of habitats and surrounding areas 	<ul style="list-style-type: none"> • Pollution 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning 	<ul style="list-style-type: none"> • Avoid through implementation of EMPR mitigation measures 	DWAF minimum requirement for waste disposal
Drillholes	<ul style="list-style-type: none"> • Vegetation clearance • Possible erosion • Changes in drainage and surface hydrology • Soil disturbance and compaction • Emissions from vehicles 	<ul style="list-style-type: none"> • Ecology • Topography • Access/footprint • Soil disturbance • Noise 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning 	<ul style="list-style-type: none"> • Avoid through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> • SANS10103 • ECA Noise Regulations • NEMAQA • Dust Regulations • NWA

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	<ul style="list-style-type: none"> Land use conflict Noise disturbance due to acoustic sources Dust generation Disturbance or damage of palaeontological resources Potential spills of hydrocarbons Influx of people Impact on groundwater 	<ul style="list-style-type: none"> Air Quality Socio-economics Groundwater 			
Refuelling	<ul style="list-style-type: none"> Potential hydrocarbon spills that could pollute soil or surface and/or groundwater resources. 	<ul style="list-style-type: none"> Pollution Surface water Groundwater 	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Avoid through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> NWA DWAF best Practice Guidelines
Maintenance and repair	<ul style="list-style-type: none"> Potential hydrocarbon spills that could pollute surface and groundwater resource 	<ul style="list-style-type: none"> Pollution Surface water Groundwater 	<ul style="list-style-type: none"> Construction Operation 	<ul style="list-style-type: none"> Control through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> NWA
Drillhole closure	<ul style="list-style-type: none"> Pollution of groundwater resources Potential pollution of habitats with cement residue that may be exposed to runoff etc. 	<ul style="list-style-type: none"> Pollution Groundwater 	<ul style="list-style-type: none"> Decommissioning 	<ul style="list-style-type: none"> Control through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> NWA
Removal of surface infrastructure	<ul style="list-style-type: none"> Soil compaction Pollution of soil and surrounding vegetation 	<ul style="list-style-type: none"> Landform Topography Soils 	<ul style="list-style-type: none"> Decommissioning 	<ul style="list-style-type: none"> Control through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> MPRDA in accordance with Rehabilitation Plan
Rehabilitation	<ul style="list-style-type: none"> Soil compaction 	<ul style="list-style-type: none"> Topography 	<ul style="list-style-type: none"> Rehabilitation 	<ul style="list-style-type: none"> Control through implementation of 	<ul style="list-style-type: none"> MPRDA in accordance with

Activity	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	<ul style="list-style-type: none"> • Soil and water contamination • Erosion • Change is drainage and surface hydrology • Loss of habitat 	<ul style="list-style-type: none"> • Land use • Soil disturbance • Ecology • Surface water • Groundwater 		EMPR mitigation measures	Rehabilitation Plan
Monitoring of rehabilitated sites	<ul style="list-style-type: none"> • Soil compaction • Soil and water contamination • Erosion • Disturbance to wildlife and communities in close vicinity 	<ul style="list-style-type: none"> • Topography • Land use • Soil disturbance • Ecology • Surface water • Groundwater 	<ul style="list-style-type: none"> • Post-operation 	<ul style="list-style-type: none"> • Control through implementation of EMPR mitigation measures 	<ul style="list-style-type: none"> • 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, 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). A detailed FRDCP has been compiled and included as Appendix G.

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 to be covered in the FRDCP (Appendix G).
 - 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- in this regard this FRDCP 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 FRDCP (Appendix G).

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. Making the area safe. i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing drillholes, etc.
2. Recreating a free draining landform. This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
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. Verification of rehabilitation success (entails monitoring of rehabilitation).

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 Public Participation Process (PPP) is a requirement of several pieces of the South African legislation and aims to ensure that all relevant Interested and Affected Parties (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 study area.
- Re-establishment of the pre-developed land capability to allow for a suitable post-mining 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 No. 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

In line with the DWAF (2008) Best Practice Guideline A6: Water Management for Underground Mines. All drillholes that will not be 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:

- 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 Revegetation

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 as necessary 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 subsoils and adequate replacement of the accumulated reserves of topsoil (for example, over the drillhole sites), so as to encourage the establishment of pioneer vegetation.
- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary, and as agreed with the re-vegetation specialist.

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 drillhole 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 drillhole sites are safe and are 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 it 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 capping of drillholes will prevent future environmental issues related to fluid leakage or lateral movement through the drillhole, as well as protect water resources. 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

For a detailed description of the financial provision, please refer to Appendix G for the Final Rehabilitation, Decommissioning and Closure Plan.

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

An amount of ZAR 7 528 900 will be required to finance the Prospecting Work Programme. 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 34: 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 and acquisition of historic data	<ul style="list-style-type: none"> All impacts identified in the EMPR 	<ul style="list-style-type: none"> Site inspections and checklists Complaints register 	<ul style="list-style-type: none"> Contractor's environmental representative; ECO 	<ul style="list-style-type: none"> Daily inspections and checklists
Surface electromagnetic geophysical surveys	<ul style="list-style-type: none"> All impacts identified in the EMPR 	<ul style="list-style-type: none"> Site inspections and checklists Complaints register 	<ul style="list-style-type: none"> Contractor's environmental representative; ECO 	<ul style="list-style-type: none"> Daily inspections and checklists
Stream sediment, underground mine and grid sampling	<ul style="list-style-type: none"> All impacts identified in the EMPR 	<ul style="list-style-type: none"> Site inspections and checklists Complaints register 	<ul style="list-style-type: none"> Contractor's environmental representative; ECO 	<ul style="list-style-type: none"> Daily inspections and checklists
Site clearance	<ul style="list-style-type: none"> Possession of permits for protected species Relocation of protected species Alien vegetation management 	<ul style="list-style-type: none"> Document control Site inspections and checklists Report review and Development of actions plans 	<ul style="list-style-type: none"> Contractors Environmental Representative Environmental specialist or ECO 	<ul style="list-style-type: none"> Once-off control of documents, site visit and reporting Monthly site visit Monthly Reports for annual Environmental Audit Assessment

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities	Monitoring and reporting frequency and time periods for implementation
Diamond drilling	<ul style="list-style-type: none"> • Alien vegetation management • Noise (if any complaints are registered by residents) • Air quality (if complaints are registered) • Surface and groundwater management • Impacts on heritage features 	<ul style="list-style-type: none"> • Site Inspections and checklists • Report review and development of corrective action plans • Inspection of surface water features • Survey of groundwater users and use within 5km of the invasive prospecting sites • Demarcation of sensitive areas 	<ul style="list-style-type: none"> • Contractors Environmental Representative • Environmental specialist, ECO • Geohydrologist (if required) 	<ul style="list-style-type: none"> • Once-off control of documents, site visit and reporting • Monthly site visit • Monthly Reports for annual Environmental Audit Report • Prior to invasive prospecting activities and monitoring post-prospecting.
Data compilation	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Access routes	<ul style="list-style-type: none"> • All impacts identified in the EMPR 	<ul style="list-style-type: none"> • Site inspections and checklists • Complaints register 	<ul style="list-style-type: none"> • Contactor's environmental representative; ECO 	<ul style="list-style-type: none"> • Daily inspections and checklists
Environmental screening by ECO	<ul style="list-style-type: none"> • All impacts identified in the EMPR 	<ul style="list-style-type: none"> • Site inspections and checklists • Complaints register 	<ul style="list-style-type: none"> • Contactor's environmental representative; ECO 	<ul style="list-style-type: none"> • Daily inspections and checklists
Temporary general waste storage (General/domestic waste - Wheelie bin)	<ul style="list-style-type: none"> • All impacts identified in the EMPR 	<ul style="list-style-type: none"> • Site inspections and checklists • Complaints register 	<ul style="list-style-type: none"> • Contactor's environmental representative; ECO 	<ul style="list-style-type: none"> • Daily inspections and checklists
Temporary hazardous waste storage (Hazardous waste –	<ul style="list-style-type: none"> • All impacts identified in the EMPR 	<ul style="list-style-type: none"> • Site inspections and checklists 	<ul style="list-style-type: none"> • Contactor's environmental representative; ECO 	<ul style="list-style-type: none"> • 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
Sealed Container)		<ul style="list-style-type: none"> Complaints register 		
Undertake decommissioning and rehabilitation as per the rehabilitation plan	<ul style="list-style-type: none"> Alien vegetation management Noise (if any complaints are registered by residents) Air quality (if complaints are registered) 	<ul style="list-style-type: none"> Site inspections and checklists Report review and development of corrective action plans 	<ul style="list-style-type: none"> Contractors Environmental Representative Environmental specialist, ECO 	<ul style="list-style-type: none"> Monthly site visit Monthly Reports for annual Environmental Audit Report
Monitoring of rehabilitation efforts	<ul style="list-style-type: none"> All impacts identified in the EMPR 	<ul style="list-style-type: none"> Site inspections and checklists Complaints register 	<ul style="list-style-type: none"> ECO Independent Environmental Auditor 	<ul style="list-style-type: none"> Monthly reports

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.
- Yearly 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 to 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 mining 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):

12 March 2018

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:

Western Allen Ridge Gold Mines (Pty) Ltd

Name of company:

12 March 2018

Date:

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