Application for a Prospecting Right and Associated Environmental Authorisation and Waste Management Licence (WML) for proposed prospecting of Aggregate Stone-dolerite, Clay and Sand on the Portion of Portion 1 of Vooruitzicht 81 in the Sol Plaatje Local Municipality, Northern Cape Province

Final EIA/EMPr Report

DMR Reference Number: NC 30/5/1/1/2/ (12569) PR

Report Prepared for

Misabrite (Pty) Ltd

Report Prepared by

GEOLOGICAL CONSULTING SERVICES PTY (LTD)

July 2022

Title:	*Application for a Prospecting Right and Associated Environmental Authorisation and Waste Management Licence (WML) for proposed prospecting of Aggregate Stone-dolerite, Clay and Sand on the Portion of Portion 1 of Vooruitzicht 81 in the Sol Plaatje Local Municipality, Northern Cape Province*
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Executive Summary

Introduction

Misabrite applied for a PR (Department of Mineral Resources (DMR) Ref: NC 12419 PR) and replaced it with a new PR application (DMR Ref: NC 12569 PR) for the proposed prospecting of aggregate stone- dolerite, clay, and sand. Subsequent to the submission of the PR application (DMR Ref: NC 12569 PR), the applicant held consultation meetings with the DMR, and from the detailed project description, the Department requested that the application be amended to include bulk sampling.

The proposed prospecting project, which includes bulk sampling, will cover an area of ±316.32 ha and located on the Portion of Portion 1 of Vooruitzicht 81 located approximately 5km west of the city of Kimberley in the Northern Cape Province.

Misabrite requires a prospecting right in terms of the Mineral and Petroleum Resources Development Act (Act No. 22 of 2002) (MPRDA). Before the prospecting right will be granted, Misabrite must undertake an EA and WML process in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA). The competent authority for the EA/WML process is the Northern Cape Department of Mineral Resources (DMR).

The proposed project triggers activities listed in terms of Listing Notices 1 and 2 of the NEMA and will therefore require an EA from the DMR. In addition, the proposed project also triggers activities listed in Category A of GNR 921 of the NEM: WA, which requires a WML from the DMR. Activities listed in Listing Notice 2 of the NEMA and Category B of GNR921 of the NEM:WA require that a full Environmental Impact Assessment (EIA) (Scoping and Impact Assessment Phases) be conducted. An integrated application for an EA and WML was conducted, and a full EIA (Scoping and Impact Assessment) process was followed.

Who is conducting the EIA?

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Misabrite the independent Environmental Assessment Practitioner (EAP) to conduct the PRA/EA/WML application process for the project.

The reports and documentation for the integrated EA/WML application process were compiled and finalised for submission to the DMR for the EA/WML in terms of the NEMA for consideration and decision making. Where required, the DMR will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

Who will evaluate the EIA?

Before the proposed development can proceed, approval must be obtained from the appropriate regulatory authorities. The Scoping Report and this EIA/EMPr Report were submitted to the DMR for review and decision making. Currently the process is in its EIA/EMPr Report stage where the draft reports were submitted to the stakeholders for review and comment. Comments received have been incorporated into this Final EIA/EMPr Report to be submitted to DMR for a decision be taken by the Department as to whether the project may proceed or not.

Description of the Proposed Development

Before an aggregate, clay and sand mining process can be planned and implemented, a number of tests and surveys must be conducted to ensure that the project is economically viable, technically feasible, and environmentally sound. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the aggregate stone.

The proposed prospecting project will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include 20 Reverse Circulation (RC) drilled boreholes. Non- invasive methods will include analytical desktop studies, aerial photograph interpretation, satellite interpretation, and decision-making on the viability of the project. The bulk sampling will include a trench/pit measuring 50m x 5m x 4m.

The prospecting project will include:

- *Prospecting area;*
- *Ablution facility*
- *Temporary Access roads*
- *Diesel storage*
- *Fences*
- *Office site*
- *Processing Plant*
- *Vehicle parking area*

The prospecting right will be required for two (2) years.

Motivation for the Proposed Project

The mining industry is of great importance to the South African economy. According to the DMR, sand, clay and aggregate mining opens up more opportunities to small scale miners since it requires less capital for operation. There is not much capital that goes into buying expensive underground machinery. Demand for aggregate and sand in South Africa is driven by the construction industry, which is comprised of residential building, non-residential building, and civil construction.

The DMR lists 881 quarrying operations located throughout South Africa. 92.2 million tonnes of mined aggregate, clay, natural sand, dimension stone and limestone to the value of R9.4bn was sold locally during 2016 while the value of exports of quarry products reached US$61.5m. Although the majority of quarries are individually owned by small operators, a number of large companies are also involved in the sector. These include cement producers like Lafarge, PPC, AfriSam and Dangote Cement that own limestone quarries, construction companies such as Raubex that own sand and aggregate operations, and brick manufacturers like Corobrik that own clay quarries.

The definition of prospecting in terms of the MPRDA states: "intentionally searching for any minerals by means of any method which disturbs the surface or sub-surface of the earth, including any portion of the earth that is under the sea or under other water…". Prospecting is the physical search for minerals, fossils, precious metals, or mineral specimens, which allows a company to survey or investigate an area of land for the purpose of identifying an actual or probable mineral deposit, before investments are made into the mining activities.

Assessment of the geological information available has determined that the area in question may have good quality aggregate reserves. In order to ascertain the above and determine the nature, location, and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the aggregate stone.

The information that will be obtained from the prospecting to be undertaken will be necessary to determine, should aggregate stone be found, how and where the aggregate stone will be extracted and how much economically viable reserves are available within the proposed prospecting area.

Should good quality aggregate be found in the project area, Misabrite will be able to mine the available reserves. This will result in job creation and boost to local businesses is continued.

Misabrite expects that substantial benefits from the project will accrue to the immediate project area, the sub-region, and the province of the Northern Cape. This prospecting activity has a potential to decrease unemployment rates in proposed areas and surroundings. This prospecting activity will also bring revenue into the city and the province which will in turn boost the economy of the country and contribute to the supply of aggregate stone, clay and sand required by the construction industry in South Africa.

These benefits must be offset against the costs of the project, including the impacts to landowners. Further to the above, it has been determined that the prospecting project activities will not have a conflict with the spatial development plans for the Sol Plaatje LM and Francis Baard DM, the Integrated Development Plans, and the Environmental Management Framework (EMF) for the affected municipalities.

A process that ensures consultation with Interested and Affected Parties (I&APs) for the project was undertaken. The stakeholder engagement process was conducted in a way to provide all interested and affected parties with an opportunity to comment on the project, with several platforms that allow public commenting opportunities offered to the I&APs. A number of stakeholders, including the Sol Plaatjie and community leaders support the project as it will create jobs and empower community members. All issues raised by the interested and affected parties were recorded and addressed throughout the EIA process.

Alternatives Considered

The alternatives considered were as follows:

- *Location: The proposed prospecting area is located in an area where dolerite occurs widely spread as dykes, sills, and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. The rocks are highly durable, and this are often seen capping the sandstone and mudstone hills. These dolerites (Jd) can also be seen at the bottom or south of the prospecting right. The rest of the farm is covered by sand (Qs). The site is therefore regarded as the preferred site and alternatives are not considered*
- *Type of Activity: An alternative to the type of activity would be farming. The land use alternatives will be investigated in more detail in the impact assessment phase of the process.*
- *Design or Layout of the Activity: Since no complicated surface infrastructure will be required for this project no design and layout alternatives for the proposed project were determined. The applicant will revise the layout of the project should there be fatal flaws identified. This will be assessed in detail during the impact assessment phase of the project.*
- *The Technology to be used in the Activity: In terms of the proposed technologies, these have been chosen based on long term proven success in prospecting. The prospecting activities proposed in the Prospecting Works Programme are dependent on the preceding phase (desktop studies), therefore no alternatives have been indicated. The location of the intrusive drilling and trenching activities will be determined during Phase 1 of the Prospective Works Programme. All infrastructure will be temporary and/or mobile.*
- *The Operation Aspects of the Activity: No permanent services in terms of water supply, electricity, and or sewage facilities will be required. Temporary access roads will however be constructed in areas where there are no existing access routes. The activities will commence with Phase 1 and undertaken as described in Section 5.*
- *No-go Option: The option of not approving the activities will result in a significant loss of valuable information regarding the status of aggregate Stone-dolerite, Clay, and Sand, present on the identified properties. In addition, should economical reserves be present, and the applicant does not have the opportunity to prospect, the opportunity to utilize these reserves for future phases will be lost.*

The assessment also included the "no-go "option. All the identified alternatives were assessed in detail in the specialist studies and impact assessment phase.

Environmental Impact Assessment Process

An EIA seeks to identify the environmental consequences of a proposed project from the beginning, and helps to ensure that the project, over its life cycle, will be environmentally acceptable, and integrated into the surrounding environment in a sustainable way. The project triggers activities listed in GNR984 (Listing Notice 2) of the NEMA and requires that a full EIA (scoping and impact assessment phases) be conducted.

A summary of this process is shown in Figure ES-1.

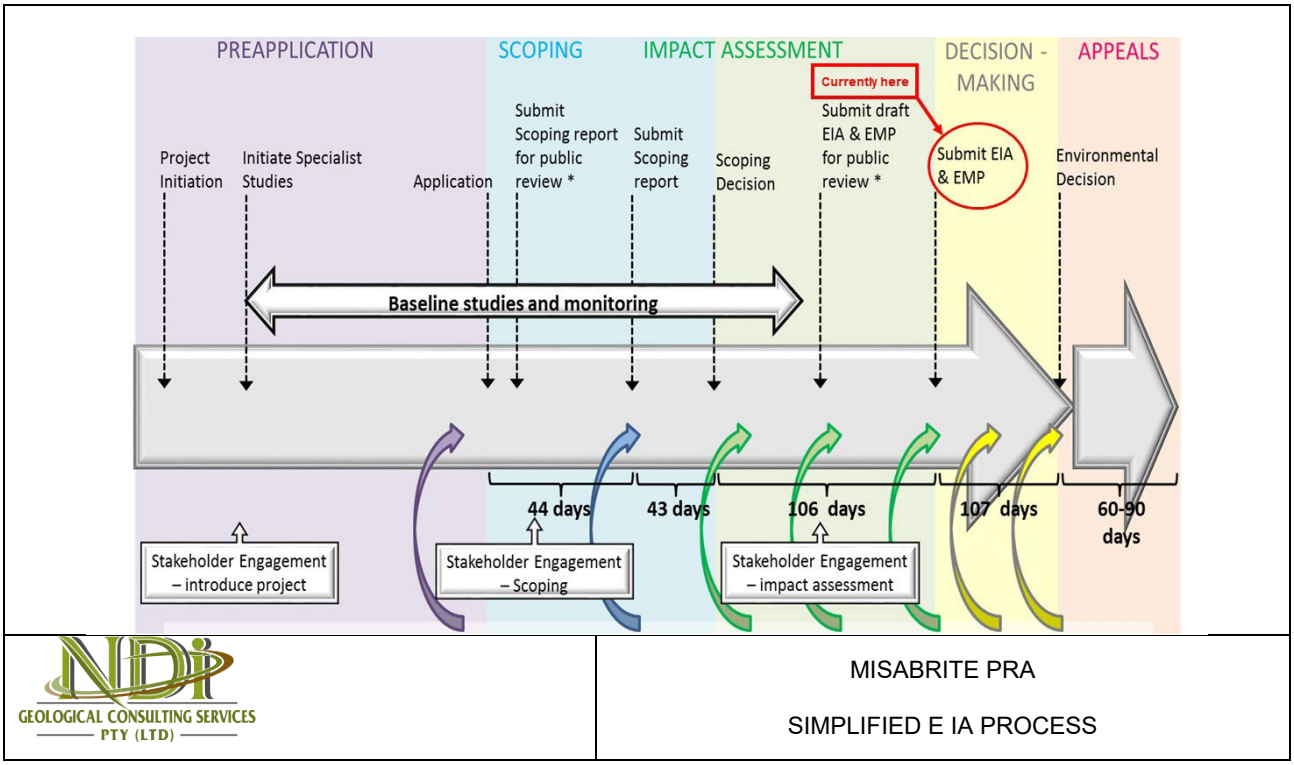

Figure ES-1: Illustration of the EIA process to be followed

Stakeholder Engagement Process

Activities that were undertaken for the public involvement process during the scoping phase are:

- *Announcement of the proposed project via advertisements, notification letters and onsite notices;*
- *Development of a stakeholder database;*
- *The Draft Scoping Report was made available for a 30-day commenting period; and*
- *Compilation of the Comments and Responses Report (CRR).*

During the EIA phase, stakeholder engagement entailed:

- *Notification of the availability of the Draft EIA/EMPr Report for review and comment:*
- *The 30-day review and comments period; and*
- *Updating of the CRR.*

Profile of the receiving environment

A summary of the main baseline aspects is included in Table ES-1, with more detail included in Section 10 of this report.

Table ES- 1:Summary of the Profile of the Receiving Environment

Aspect	***Description***
Geographical	*The proposed project area is situated in the Sol Plaatjie Local Municipality's area of jurisdiction, within the Francis Baard District Municipality, Northern Cape Province. The wards affected by the project include Ward 16 and 27. The affected property is located approximately 5km outside Kimberley town.*
Topography	*Kimberley is set in a relatively flat landscape with no prominent topographic features within the urban limits. The only "hills" are debris dumps generated by more than a century of diamond mining. From the 1990s these were being recycled and poured back into De Beers Mine (by 2010 it was filled to within a few tens of metres of the surface). Certain of the mine dumps, in the vicinity of the Big Hole, have been proclaimed as heritage features and are to be preserved as part of the historic industrial landscape of Kimberley.* *The surrounding rural landscape, not more than a few minutes' drive from any part of the city, consists of relatively flat plains dotted with hills, mainly outcropping basement rock (andesite) to the north and northwest, or Karoo age dolerite to the south and east. Shallow pans formed in the plains.*
Climate	*The climate around Kimberley is essentially a continental one - the weather provides hot wet summers (December to February) and mild dry winters (June to August). The highest maximum temperature is experienced during November, January, and February. The average maximum goes beyond 33 °C. The coldest months of the year are June and July, where the average temperature drops well below 20 °C.*
Geology	*The farm is underlain by Archaean age rocks which also include a variety of Senozoic sediments and intrusive rocks. The gneiss, pegmatite, granite, and amphibolite are some of the Archaean age rocks which outcrop in the area of study.* *The proposed prospecting area is located in an area where dolerite occurs widely spread as dykes, sills, and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. The rocks are highly durable, and this are often seen capping the sandstone and mudstone hills. These dolerites (Jd) can also be seen at the bottom or south of the prospecting right. The rest of the farm is covered by sand (Qs).*
Land use and land capability	*The current landuse on the affected properties is farming and mining.*
Biodiversity	*The proposed prospecting area is located in the Savanna Biome. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.* *Most of the savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost savanna types, goats are the major stock. In some types crops and*

Aspect	*Description*
	subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld. *According to the SANBI remaining vegetation types database, there is no remaining natural vegetation on the affected area. The threatened ecosystem associated with the site is the Kimberley Thornveld, which is classified at Least Threatened.*
Heritage Resources	*A HIA conducted by the specialist found a very low density 'background scatter' of cf. Fauresmith artefacts was noted in areas where Hutton Sands are removed, both on the prospecting site and in an immediately adjacent property (Morris 2012). No colonial era or other cultural resources were in evidence. Archaeological significance of the area is reckoned to be low. There is potential for subsurface material across the entire area, but indications are that densities would be low. Steps for reporting in the event of archaeological material being found are indicated.*
Noise	*The PRA area is located in a rural area and the typical noise rating in the area is expected to be that for rural districts / suburban districts with little road traffic. According to SANS 10103:2008, the continuous noise rating level is thus likely between 35 dB(A) at night to 45 /50 dB(A) during the day.*
Wetlands	*The SANBI data shows that there are no wetlands occurring on the study area. The wetland delineation undertaken by the biodiversity specialist found that there are riparian areas located on the affected property.*
Conservation Plan	*According to the Norther Cape Provincial Biodiversity Conservation Plan (C Plan), a portion of the affected property is classified as an Ecological Support Area (ESA). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas (CBAs) and/or in delivering ecosystem services.*
Protected Areas	*There are no protected areas or important bird areas affected by the proposed prospecting activities.*
Surface water	*The project is located within quaternary catchments, which include C91E (located within the Lower Vaal Water Management Area(WMA). There is a drainage line that traverses the project area. According to the SANBI Wetland Inventory (2006) National Freshwater Ecosystem Priority Areas (NFEPA) (2011), the affected quaternary catchment areas are not regarded as important in terms of fish sanctuaries, rehabilitation, or corridors.* *In addition, the project area is not considered important in terms of translocation and relocation zones for fish.*
Groundwater	*The DWS launched the Reconstruction and Development Programme (RDP) in South Africa, which highlighted the importance of groundwater resources in the country as well as the role they will play in satisfying the targets of the RDP. According to the DWS aquifer classification the following applies for the prospecting area:* • *The aquifer is classified as a Minor aquifer region (which is a moderately-yielding aquifer system of variable water quality), except for areas around Koppies where the aquifer is classified as a poor aquifer region which is a low to negligible yielding aquifer system of moderate to poor water quality;* • *Aquifer Vulnerability is classified as moderate (vulnerable to some pollutants, but only when continuously discharged or leached); and*

Aspect	Description
	• *Aquifer Susceptibility is classified as Medium 4 (minor aquifer region, with moderate vulnerability)* • *The Groundwater Harvest Potential Map of South Africa published by the Department of Water Affairs (Baron et al, 1998) classifies the area around Kimberley has having a harvest potential of 6 000 to 10 000 m3/km2/annum, defined as the maximum volume of groundwater that may annually be abstracted per square kilometre per annum without depleting the aquifers.* • *Groundwater Yield: The DWS National Groundwater Archive (NGA) shows that the groundwater yield in the prospecting area is between 0.5 and 2.0l/s and that the aquifer is fractured.* • *Local Geohydrology: The local hydrogeology within the study area is hosted by the Karoo dolerite rock and basement rocks. The surrounding lithological units are classified as intergranular and fractured with the estimated yield of 0.5 – 2 l/s.* • *Groundwater aquifers within the study area are potentially recharged through regional and local recharge system due to the limited rainfall in the area. Groundwater harvest potential as indicated by Baron et al, (1998) is approximately 6 000 to 10 000 m³/km²/annum, which is the maximum groundwater which can be sustainably abstracted per square kilometre.* • *Hydro-census and Land Use: There are no boreholes within a 1 km radius of the study area to.*

Anticipated Impacts

Risks and potential impacts were categorised according to the type of activity undertaken and the relation to each environmental variable. Findings from specialist studies were incorporated into this EIA/EMPr Report. The following impacts as described in Table ES-2 are anticipated because of the construction, operation, and decommissioning phases of the project:

Table ES- 2: Anticipated Impacts

Element of Environment	Potential Impact Descriptions
Socio-Economic	*Possible job opportunities during the construction and operation.*
Hydrogeology	*Possible groundwater contamination.*
Surface water	*Possible surface water contamination.*
Air Quality	*Possible impact on Air Quality in the area.*
Climate Change	*Possible contribution to climate change through emission of Green House Gases*
Blasting and Vibrations	*Possible impacts on private properties and fauna due to blasting and vibrations*
Noise	*Possible generation of noise during construction and operation.*
Soils/Land Use/Land Capability	*Loss of soil resource and change in land capability and land use.*
Biodiversity	*Disturbance and loss of biodiversity, especially SCC.*

Element of Environment	*Potential Impact Descriptions*
Aquatic ecology	*Possible loss, sedimentation, and contamination of aquatic resources*
Heritage	*Possible impact on heritage and cultural resources (including graves) in the area.*
Traffic	*Potential safety issues due to the increased traffic.*
Cumulative Impacts	*Cumulative Impacts*

Specialist Studies

Specialist studies contained in the Scoping Report and Plan of study were conducted to assess the anticipated impacts. All specialists assessed the impact (including cumulative) of each proposed activity/aspect in relation to the construction, operation, closure, and decommissioning phases and developed appropriate mitigation measures that can be implemented to reduce or eliminate the potential impacts identified.

Quantification of Impacts

The anticipated impacts associated with the proposed project were assessed according to Ndi Geological Consulting Services (Pty) Ltd.'s standardised impact assessment methodology which is presented in Section 12. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

Summary of the Impact Assessment Process

This section contains the assessment of potentially positive and negative environmental impacts that could possibly be caused by the proposed mine.

The impacts are linked to the activities conducted for the proposed development, broadly relating to construction, operational and decommissioning phases. Specific emphasis was placed on any relevant environmental, social, and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as professional judgement of the EAP team through appraisals on the project description, listed activities and the environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to identify mitigation measures that may be implemented to reduce the impacts to an acceptable level where required.

The impacts evident from the detailed impact assessment (Section 13) of the proposed project are both positive and negative in nature.

Key Impacts Identified

The positive and negative implications were assessed according to the construction, operational and decommissioning phases of the proposed Project. A detailed description of the main impacts is provided in Section 13 and the main impacts are provided in Section 19.1.

The proposed activities have medium and low significance and will be short term activities. The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided. Generally prospecting activities have low impact on the environment. The planned

activities negative impacts can be controlled and avoided or minimised. Mitigation measures will be used to manage and control any potential impact. The main impacts will include:

- *Increased ambient noise levels resulting from drilling activities and increased traffic movement;*
- *Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on the water resources utilised by the communities and landowners;*
- *Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning;*
- *Increased vehicle activity within the area resulting in potential destruction and disturbance of flora and fauna;*
- *Poor access control to farms may impact on cattle movement, breeding and grazing practices;*
- *Influx of job seekers to site may result in increased opportunistic crimes;*
- *Potential visual impacts by drilling activities as well as vegetation clearance;*
- *Prospecting will be undertaken by special sub-contractors, and it is not anticipated that employment opportunities for local and/or regional communities will result from prospecting activities; and*
- *Short term boost for local businesses.*

The summary of the potentially significant impacts and risks can be found in Table ES- 3.

Table ES- 3: Summary of potentially significant impact and risk

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Data Collection and Assessment	Desktop Study	None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Geological Mapping		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Planning for Drilling Surveys		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Access Roads	Establishment of access roads, campsite, physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Low	Rehabilitation of areas cleared of vegetation and dust control	Low
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Medium Low	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	Medium Low	Monitoring through rehabilitation and management of spoil sites	Low
Fence		Aquatic Ecosystem contamination, destruction, and loss of habitat	Aquatic ecosystems	Construction	Medium Low	Control of access to aquatic ecosystems and riparian habitat areas and within the regulated 500 m buffer.	Low
Hydrocarbon storage area		Destruction of graves and cultural heritage sites	Heritage and archaeological resources	Construction	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
Mobile office		Destruction of fossils	Palaeontological resources	Construction	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low
Ablution Facility		Loss of natural vegetation in the affected areas	Flora	Construction	Low	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Low
		Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Low	Relocation of affected species of conservation importance	Low
		Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Low	Dust control measures	Low
		Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low
		Visual impacts as a result of vegetation clearance	Visual	Construction	Low	Rehabilitation of areas cleared of vegetation	Low
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Medium Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Low	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
RC Drilling and Bulk Sampling	Drilling, trenching and bulk sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Socio-Economic	Operation	Low	Control of times during which operation activities will take place	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Medium Low	Rehabilitation of affected areas and control using bunds	Low
		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation will have negative impacts on the water quality due to increase turbidity in the watercourses. This will have an impact on aquatic habitats.	Surface Water	Operation	Low	Control through management and monitoring of surface runoff	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Low	Rehabilitation of affected areas	Low
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Air Quality	Operation	Medium Low	Dust control measures	Low
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Medium Low	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Low
		The drilling operations may result in the destruction of graves and other heritage resources.	Heritage Resources	Operation	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Low
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Low	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Low
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Low	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Low
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A	N/A
Borehole capping Removal of equipment and infrastructure	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	N/A	N/A
		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	Land Use	Decommissioning and Closure	N/A	N/A	N/A
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Low	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Low
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Medium Low	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Low
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Air Quality	Decommissioning and Closure	Low	Dust control measures and rehabilitation of areas stripped of vegetation	Low

NAME OF ACTIVITY		***POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)***	***ASPECTS AFFECTED***	***PHASE In which impact is anticipated***	***SIGNIFICANCE if not mitigated***	***MITIGATION TYPE***	***SIGNIFICANCE if mitigated***
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	*Noise*	*Decommissioning and Closure*	*Low*	*Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers*	*Low*

Environmental Management Programme

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate most of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

Misabrite will be responsible for ensuring that all environmental obligations pertinent to the proposed project are met. The implementation of the EMPr and the meeting of the environmental objectives and targets is also the responsibility of Misabrite.

Conclusion and Recommendation

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed prospecting for aggregate stone-dolerite, Clay, and Sand on portion of Portion 1 of Farm Vooruitzicht 81 by Misabrite in accordance with the requirements of the NEMA and National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA). This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Specialist input has been included for all key environmental aspects that were identified during the scoping phase of the process.

Specialist studies were undertaken during the EIA Phase of the proposed project with the objective of identifying and weighing anticipated impacts and risks associated with the prospecting activities as well as in accordance with all relevant legislative requirements.

The findings of the impact assessment have shown that the proposed project will have negative impacts on the receiving environment, including:

- *All the identified impacts will be localised, short term and will have a medium and low significance. The significance of potential environmental impacts can be reduced to low and very low significance with implementation of mitigation measures and monitoring.*
- *Cumulative noise, visual and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.*
- *Vegetation loss is unavoidable during the construction phase of the project. This will however be limited to the footprint of the infrastructure (access road, camp, boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.*

Where possible, mitigation and management measures, no-go areas, as well as further recommendations have been provided by specialists which will lead to a reduction in the significance of these impacts to medium and low significance, including:

- *Ensuring the layout of the prospecting infrastructure does not impact on the water resources and regulated 100m buffer area without approval from the DWS;*
- *Ensuring the layout of the prospecting infrastructure does not impact on the heritage resources without approval from SAHRA;*
- *Stormwater management must be implemented;*
- *Re-vegetation of the rehabilitated areas with indigenous species;*
- *Where possible rehabilitation will be conducted in tandem with construction and operational phases of the project; and*

- *The land use and the overall land capability as the soil can be rehabilitated to be reused for agriculture and mining purposes.*

Monitoring plans, which should be implemented throughout the prospecting activities, have also been provided to ensure that adverse impacts are reduced, and continuous improvements are made.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for drilling and trenching purposes will be the main area experiencing impacts. The impacts will be temporary in nature, and a detailed management plan has been provided to address the potential impacts associated with these activities. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DFFE

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed prospecting project fulfils the process requirements of the NEMA and the NEM: WA. The EAP recommends that an EA/WML be issued by the DMR and that the construction and operation should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIA/EMPr Report as well as conditions that will be included in the EA/WML by the DMR.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to Ndi Geological Consulting Services (Pty) Ltd by Misabrite (Pty) Ltd (Misabrite). The opinions in this Report are provided in response to a specific request from Misabrite to do so. Ndi Geological Consulting Services (Pty) Ltd has exercised all due care in reviewing the supplied information. Whilst Ndi Geological Consulting Services (Pty) Ltd has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Ndi Geological Consulting Services (Pty) Ltd does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of Ndi Geological Consulting Services (Pty) Ltd.'s investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which Ndi Geological Consulting Services (Pty) Ltd had no prior knowledge nor had the opportunity to evaluate.

List of abbreviations

ABET:	Adult Basic Education and Training
CA:	Competent Authority
CRR:	Comments and Responses Register
DEA:	Department of Environmental Affairs
DENC:	Northern Cape Department of Nature Conservation
DMR:	Department of Mineral Resources
DMS:	Dense Media Separation
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
EC:	Electrical Conductivity
EIA:	Environmental Impact Assessment
EIAR:	Environmental Impact Assessment Report
EMPr:	Environmental Management Programme
EMPr:	Environmental Management Programme
ESA:	Early Stone Age
ESA:	Ecological Support Area
FBDM:	Frances Baard District Municipality
GDP:	Gross Domestic Product
HIA:	Heritage Impact Assessment
HPDE:	High Density Polyethylene Pipes
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plan
IWUL:	Integrated Water Use Licence
LM:	Local Municipality
LoM:	Life of Mine

Mamsl:	meters above mean sea level
MHSA:	Mine Health and Safety Act 29 of 1996
MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
NC:	Northern Cape
NEM: WA:	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NEMA:	National Environmental Management Act, 1998 (Act 107 of 1998)
NFEPA:	National Freshwater Ecosystems Priority Areas
PAIA:	Promotion of Access to Information Act (Act No. 2 of 2000)
PCD:	Pollution Control Dam
PHRA:	Provincial Heritage Resources Agency
PoS:	Plan of Study
PPE:	Personal Protective Equipment
PRA:	Prospecting Right Application
PVC:	Polyvinyl chloride
SAHRA:	South African Heritage Resources Agency
SANS:	South African National Standard
SARS:	South African Revenue Services
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
SDF:	Skills Development Facilitator
SLP:	Social and Labour Plan
SMMEs:	Small, Medium & Micro Enterprise Businesses
WMA:	Water Management Area
WML:	Waste Management Licence
WSP:	Workplace Skills Plan

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE PROPOSED PROSPECTING OF AGGREGATE STONE-DOLERITE, CLAY, AND SAND ON THE PORTION OF PORTION 1 OF FARM VOORUITZICHT 81 IN THE SOL PLAATJE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

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

NAME OF APPLICANT	Misabrite (Pty) Ltd
TEL NO	082 572 4274
FAX NO:	053 832 5018
POSTAL ADDRESS	48 Aviva Road, Hillcrest, Kimberley, 8301
PHYSICAL ADDRESS	48 Aviva Road, Hillcrest, Kimberley, 8301
FILE REFERENCE NUMBER SAMRAD	NC 30/5/1/1/2/ (12569) PR

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact 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) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

(i) nature, significance, consequence, extent, duration, and probability of the impacts occurring to inform identified preferred alternatives; and

(ii) degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed, or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

1 Project background

Misabrite applied for a PR (Department of Mineral Resources (DMR) Ref: NC 12419 PR) and replaced it with a new PR application (DMR Ref: NC 12569 PR) for the proposed prospecting of aggregate stone- dolerite, clay, and sand. Subsequent to the submission of the PR application (DMR Ref: NC 12569 PR), subsequent to the submission of the PR application and BAR to the DMR, during consultation with the Department, Misabrite indicated that they wanted to locate the plant within the PR area, outside the MP area. The DMR advised Misabrite that the inclusion of the plant within the PR area would trigger activities listed Listing Notice 2, which required that a Scoping and Impact Assessment process be followed. The DMR requested that Misabrite submit a revised application that included the plant and indicating that a Scoping and Impact Assessment process would be followed.

Misabrite appointed Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological) as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorisation process for its proposed Aggregate stone-dolerite, Clay and sand prospecting project located in the magisterial district of Francis Baard.

The proposed prospecting project will cover an area of 316.32 hectares and located approximately 5km west of the city of Kimberley.

Misabrite requires a prospecting right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA). Before the prospecting right will be granted, Misabrite must undertake an environmental authorisation process in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The competent authority for the environmental authorisation process is the Northern Cape Department of Mineral Resources (DMR).

The Department of Forestry, Fisheries, and the Environment (DFFE) has identified the need for the alignment of environmental authorisations and has promulgated a single environmental management system under NEMA whereby the DMR has become the competent authority for the authorisation of mining-related projects under the NEMA Environmental Impact Assessment (EIA) Regulations. This will result in simultaneous decisions in terms of NEMA and other environmental management Acts.

Before an aggregate, clay and sand mining process can be planned and built, a number of tests and surveys must be conducted to ensure that the project is economically viable, technically feasible, and environmentally sound. Assessment of the geological information available has determined that the area in question may have good quality aggregate reserves. In order to ascertain the above and determine the nature, location, and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the aggregate stone.

The proposed prospecting project will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include 20 Reverse Circulation (RC) drilled boreholes. Non-invasive methods will include analytical desktop studies, aerial photograph interpretation, satellite interpretation, and decision-making on the viability of the project. The bulk sampling will include a trench/pit measuring 50m x 30m x 4m.

The total duration of the prospecting and evaluation activities is planned for two (2) years, including rehabilitation. Most of the rehabilitation will be conducted while prospecting activities are undertaken. The final rehabilitation will be done once the prospecting activities have been completed at a site and before the drilling team leaves the site.

Since the proposed prospecting project triggers activities listed in Listing Notice 1 and 2 of the NEMA, a full Environmental Impact Assessment (EIA) including scoping and impact assessment phases will

be required per the requirements of NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017).

The stakeholder engagement process, as part of the EA/WML process, is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the "*adequate and appropriate opportunity for public participation in decisions that may affect the environment*". The stakeholder engagement process is primarily aimed at affording stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. In addition, the purpose of consultation with the landowners, affected parties and communities is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether and to which degree the project will affect them. The purpose of consultation with the stakeholders and I&APs is to provide the competent authority with the necessary information in order for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval. The registered I&APs were provided with an opportunity to review and comment on the draft Scoping Report and on the draft Impact Assessment Report.

The reports and documentation for the integrated EA/WML application process were compiled and finalised for submission to the DMR for the EA/WML in terms of the NEMA for consideration and decision making. Where required, the DMR will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

2 Purpose and context of this document

The project triggers activities listed in terms of Listing Notice 1 and 2 of the NEMA (as amended) and will require an EA) from the DMR. The proposed domestic waste facility will trigger activities listed in GNR 921 (Category B) of the NEM: WA and will therefore require a WML from the DMR. An integrated application for an EA and WML was undertaken, where a full Environmental Impact Assessment (EIA) including Scoping and Impact Assessment was followed as stipulated in GNR 326 of the NEMA and GNR921 of the NEM: WA.

An Environmental Impact Assessment (EIA) is defined as the process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. The aim of the EIA is to prevent substantial damage to the environment. The objectives of this study are to:

- Comply with the requirements of NEMA and NEM: WA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of the construction, operation, and closure of the proposed project. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation, and training needs in the EMPr; and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development and set conditions that must be adhered to.

2.1 Integrated Environmental Authorisation and Waste Management Licence Application Process

The first phase of the EA/WML application process was the Scoping Phase, which informed the Impact Assessment Phase. The Scoping Phase provided Interested and Affected Parties (I&APs) an opportunity to provide the EAP with issues and concerns with respect to the proposed project in order to inform the technical studies that were evaluated in this impact assessment phase of the project.

The Scoping Report provided a guide to the EIA process and specialist studies by:

- Providing an overview of the legal requirements with regard to the proposed project, the proposed project description and anticipated environmental and social issues and impacts that were further investigated in this impact assessment phase; and
- Setting out the scope of the EIA process and the Terms of Reference (ToR) for specialist studies (where applicable) and outlining the approach and methodologies to be used in the EIA process, e.g. the proposed impact rating methodology. The Scoping Report was submitted to the DMR for approval.

The EIA Phase entailed the following:

- Incorporating specialist findings into the Draft EIA/EMPr as per the approved Plan of Study contained in the Scoping Report;
- Conducting a quantitative impact assessment;
- Compiling the EMPr; and
- Stakeholder Consultation

Stakeholder engagement is a key element of the environmental decision-making process, and stakeholder engagement formed part of the Scoping Phase and formed part of the Impact Assessment Phase as described in Section 9.

Figure 2-1 provides an illustration of the proposed EIA process that was followed.

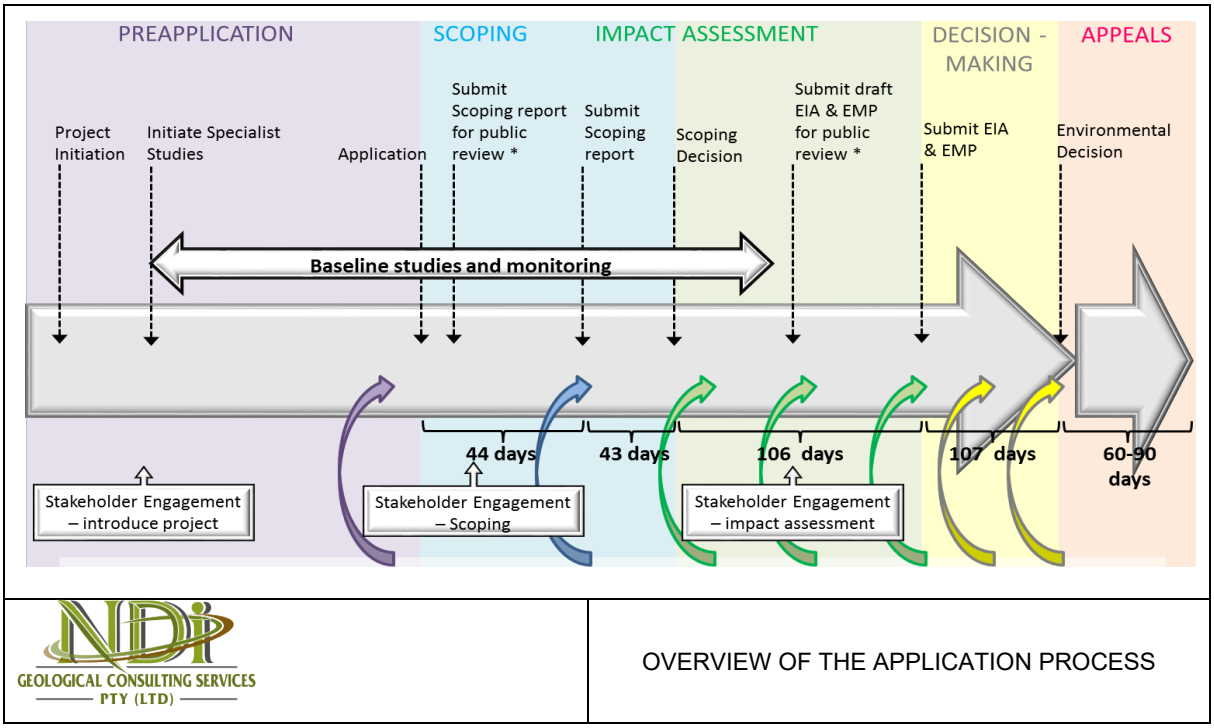


Figure 2-1: Overview the Environmental Impact Assessment Process

2.2 Report Index in Relation to the NEMA Regulations

Regulation 2, Appendix 3 of GNR 982 published in terms of NEMA stipulates the minimal requirements and issues that need to be addressed in the EIA Report. This report strives to address all these requirements as per regulations. Table 2-1 indicates the regulations that have been addressed and the section of the EIA where these requirements can be found.

Table 2-1: Requirements of Appendix 3 of Regulation 2 of GNR 982

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (a)	Details of – the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae.	Section 3
Appendix 3 (b)	The location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties.	Section 4

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 5-1 Figure 5-2
Appendix 3 (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered; A description of the activities to be undertaken, including associated structures and infrastructure.	Section 5
Appendix 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 6
Appendix 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 7
Appendix 3 (g)	A motivation for the preferred development footprint within the approved site.	Section 8
Appendix 3 (h)	A full description of the process followed to reach the proposed preferred activity, site, and location within the site, including-	
	Details of the development footprint alternatives considered;	Section 8
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9
	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 9.4
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 10
	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated.	Section 13
	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 12
	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 13

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
	The possible mitigation measures that could be applied and level of residual risk;	Section 13
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Section 15
	A concluding statement indicating the preferred alternative development location within the approved site.	Section 16
Appendix 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- a description of all environmental issues and risks that were identified during the environmental impact assessment process; and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 17
Appendix 3 (j)	An assessment of each identified potentially significant impact and risk, including- cumulative impacts; the nature, significance and consequences of the impact and risk; the extent and duration of the impact and risk; the probability of the impact and risk occurring; the degree to which the impact and risk can be reversed; the degree to which the impact and risk may cause irreplaceable loss of resources; and the degree to which the impact and risk can be mitigated.	Section 13 Section 17.1
Appendix 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 18
Appendix 3 (l)	An environmental impact statement which contains- i. a summary of the key findings of the environmental impact assessment; ii. a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 19
Appendix 3 (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.	Section 20

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Section 21
Appendix 3 (o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 22
Appendix 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 23
Appendix 3 (q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 24
Appendix 3 (r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 25
Appendix 3 (s)	An undertaking under oath or affirmation by the EAP in relation to: i. the correctness of the information provided in the reports; ii. the inclusion of comments and inputs from stakeholders and I&APs; iii. the inclusion of inputs and recommendations from the specialist reports where relevant; and iv. any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	Section 26
Appendix 3 (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Section 27
Appendix 3 (u)	An indication of any deviation from the approved scoping report, including the Plan of study, including- v. any deviation from the methodology used in determining the significance of potential; vi. environmental impacts and risks; and vii. a motivation for the deviation.	Section 28
Appendix 3(v)	Any specific information that may be required by the competent authority.	Section 29
Appendix 3(w)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA.	Section 30

3 Contact Person and Correspondence

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Misabrite as the independent Environmental Assessment Practitioner (EAP) to undertake the necessary environmental authorisation process and associated stakeholder engagement process to meet the requirements of NEMA and NEM: WA.

3.1 Details of EAP who prepared the report

The EAP involved in the compilation of this Scoping Report and contact details are provided in Table 3-1.

Table 3-1: EAP Contact Details

EAP Name	Contact Number	Fax Number	Email Address
Ndivhudzannyi Mofokeng	082 760 8420/ 053 842 0687	086 538 1069	atshidzaho@gmail.com ndi@ndigeoservices.co.za

3.2 Expertise of the EAP

3.2.1 Qualifications of the EAP

Ndivhudzannyi Mofokeng has a BSc (Hons) Earth Sciences in Mining and Environmental Geology.

Please refer to Appendix 1 for a copy of the EAP's Qualifications

3.2.2 Summary of EAPs past experience

The EAP, Mrs Ndivhudzannyi is a registered EAP (EAPASA Reg Number 2020/1554) with a BSc (Hons) Earth Sciences, majoring in Mining and Environmental Geology. She is a self-motivated and hardworking Geologist with 13 years of experience in environmental, mining exploration, open cast work and consulting in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and Percussion Drilling). Proven field experience in exploration, i.e. mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, supervisory duties in the field. Her responsibilities involve but are not limited to managing all Environmental matters: Environmental Impact Assessment and Environmental Management Programme, Environmental Authorizations, Environmental Auditing & Risk Assessment, Mine Closure & Rehabilitation, and conducting & reviewing Environmental specialists' studies. Ndivhudza also has experience in writing geological reports, including Prospecting Work Programmes and Mining Work Programmes Environmental Management Plans, handling Department of Mineral Resources and Energy documents in general like the submission of Mining & Prospecting Right Applications and Renewals.

Please refer to Appendix 2 for a copy of the EAP's Curriculum Vitae and Professional Registration Certificate.

The EAP team was supported by suitably qualified specialists conducted independent specialist studies.

4 Project Location

4.1 Property Description

The description of the affected property is provided in Table 4-1 and map showing the affected property is provided in Figure 4-1.

Table 4-1: Description of Properties affected by the Vooruitzicht Project

Farm Name:	Portion of Portion 1 of Farm Vooruitzicht 81
Application area (Ha)	316.32 ha
Magisterial district:	Kimberly District Municipality
Distance and direction from nearest town	Approximately 5km west of West end right outside of the City Centre.
21-digit Surveyor General Code for each farm portion	C03700000000008100000

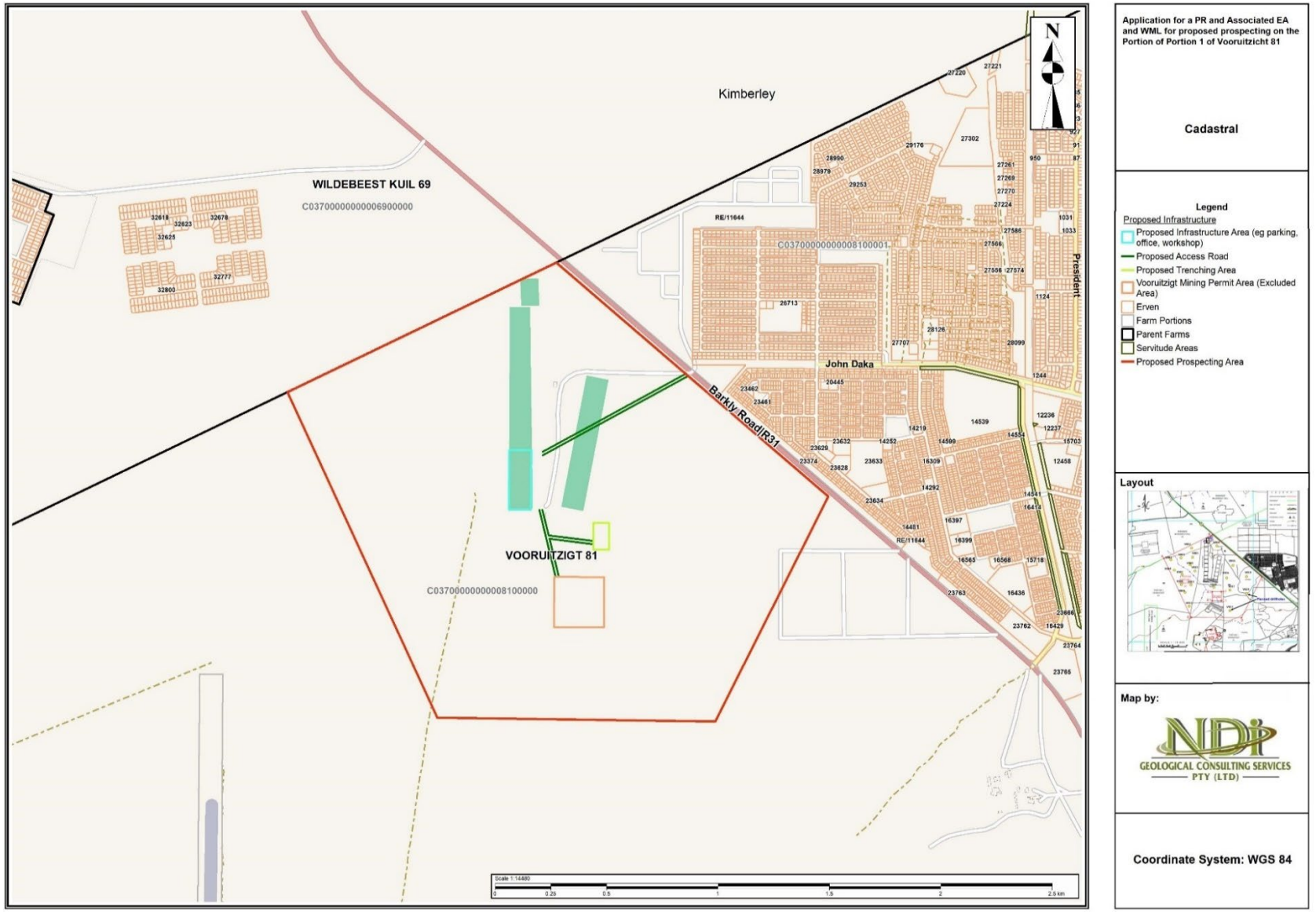


Figure 4-1: Cadastral Map

4.2 Locality map

The proposed Vooruitzicht project is located in the Northern Cape Province of South Africa, approximately 5 kilometres (km) outside the Kimberly City Centre.

A copy of the locality map is provided in Appendix 3.

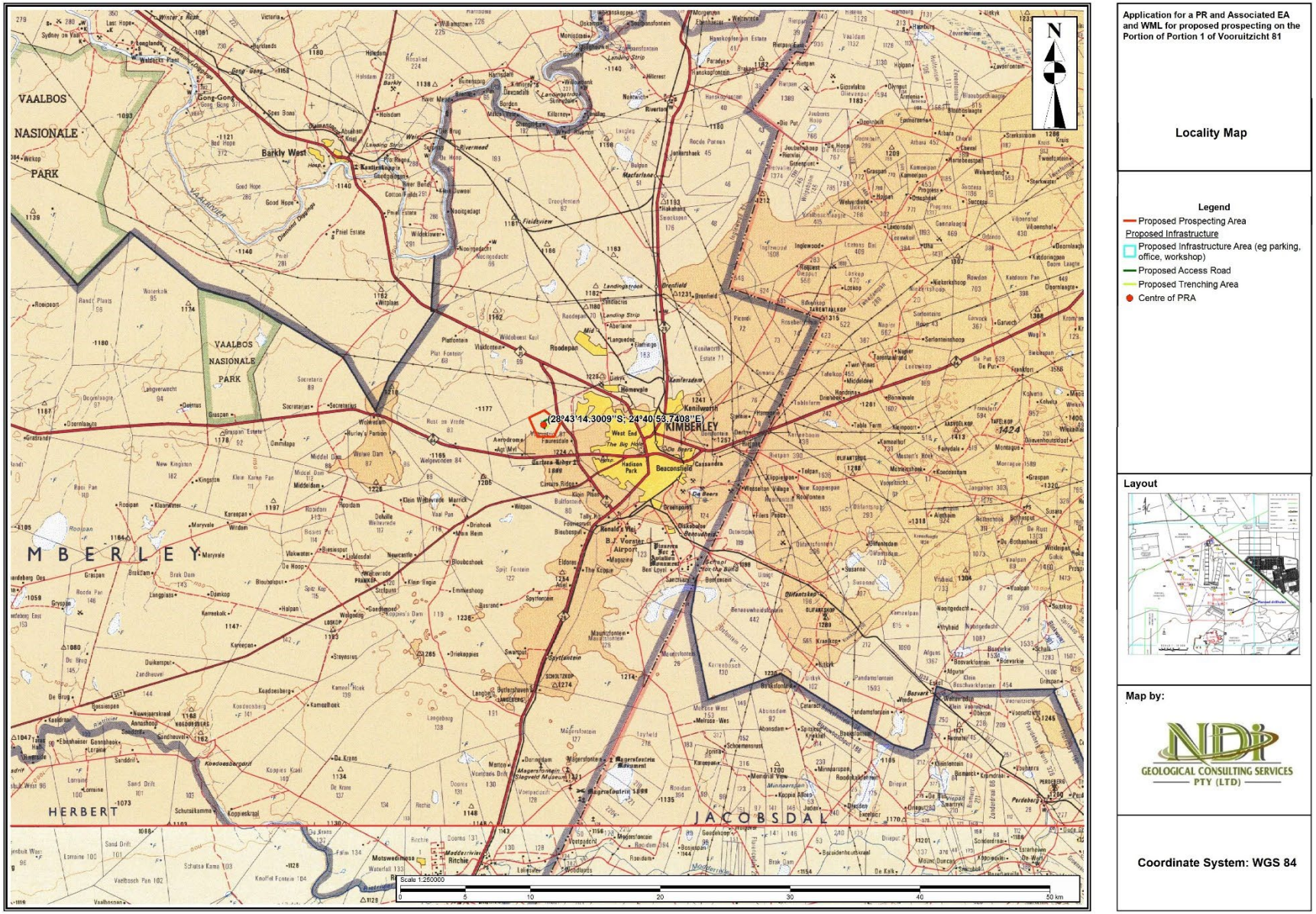


Figure 4-2: Locality Map

5 Project description

5.1 Overview

This prospecting will consist of non-invasive and invasive (drilling Sampling) activities. The review of available information that exists over the area of interest will be undertaken by means of conducting a literature review from satellite images and other available information.

Prospecting will be conducted over a period of two years and will be categorized into phases, wherein phase 1 will be desktop study followed by RC drilling in phase 2. Phase 3 will be analytical desktop studies. The machines and vehicles that will be used have been proven to be trusted to carry out the prospecting activities optimally. These machines and vehicles make use of hydrocarbon fuels such as diesel, petrol, and oil.

5.2 Phase 1 (Literature Review)

Existing data on the area of study with relation to the topography, geology, mineralogy, geophysics, hydrology etc. will be to be analysed. This data will aid in determining the amount of potential that the area carries in terms of manganese mineralisation and the factors that affect it and its extraction thereof. The report that will be produced from this study will inform the next stage which is geological mapping.

The non-invasive prospecting work will take approximately eleven months and will compile the relevant data and observations from the recent and historical work done on site. The deliverables will be a detailed report and maps highlighting areas with the best potential to contain Manganese.

Once this information has been assessed in detail, it will be used to further develop and refine the ongoing prospecting activities. Aerial photographs and a high-resolution satellite image will be acquired for the prospecting right application so that a target identification process using both desktop study and geological mapping. Both desktop study and geological mapping interpretations will be used to focus future prospecting activities.

After the Desktop Study, a site geological mapping will be undertaken.

This is a process of physically locating the manganese ore body outcrop while obtaining detailed information about it. This information includes the strike and dip of the outcrop, the colour, the grain size, and shape amongst others. The end result of this stage will be a detailed geological map of the farm which will be correlated with the other maps obtained during the desktop study.

5.3 Phase 2 (Drilling) and Trenching

This phase of drilling and trenching will consist of RC Drilling and will consist of drilling 20 boreholes and one trench. The prospecting drilling campaign will be aimed at defining the extent of mineralisation and will demonstrate geological continuity of the mineralized zone across the entire area under investigation (application area). Numerous samples will be collected and tested in a registered laboratory.

RC drilling involves the process of crushing the rock material into fragments. Using air pressure, the rock fragments are lifted up the hole into the cyclone where they are collected into sample bags. A rifle splitter is used to homogenize the sample and to split it into two. The weights of the samples are recorded. Part of the one sample is washed and placed into a labelled chip tray after logging by the Field Geologist. This sample is stored for future reference. The remainder of the logged sample is labelled while still in the sample bag and taken to an accredited laboratory for analysis. Detailed geological, grade resource models and mineral resource estimates will be the end result of this phase.

Each drill borehole and sample site will be rehabilitated as prospecting proceeds.

RC: 20 boreholes x 70m x R450/m

= 1400 X 450/m

= 630 000

The trench/pit will be 50m x 30m x 4

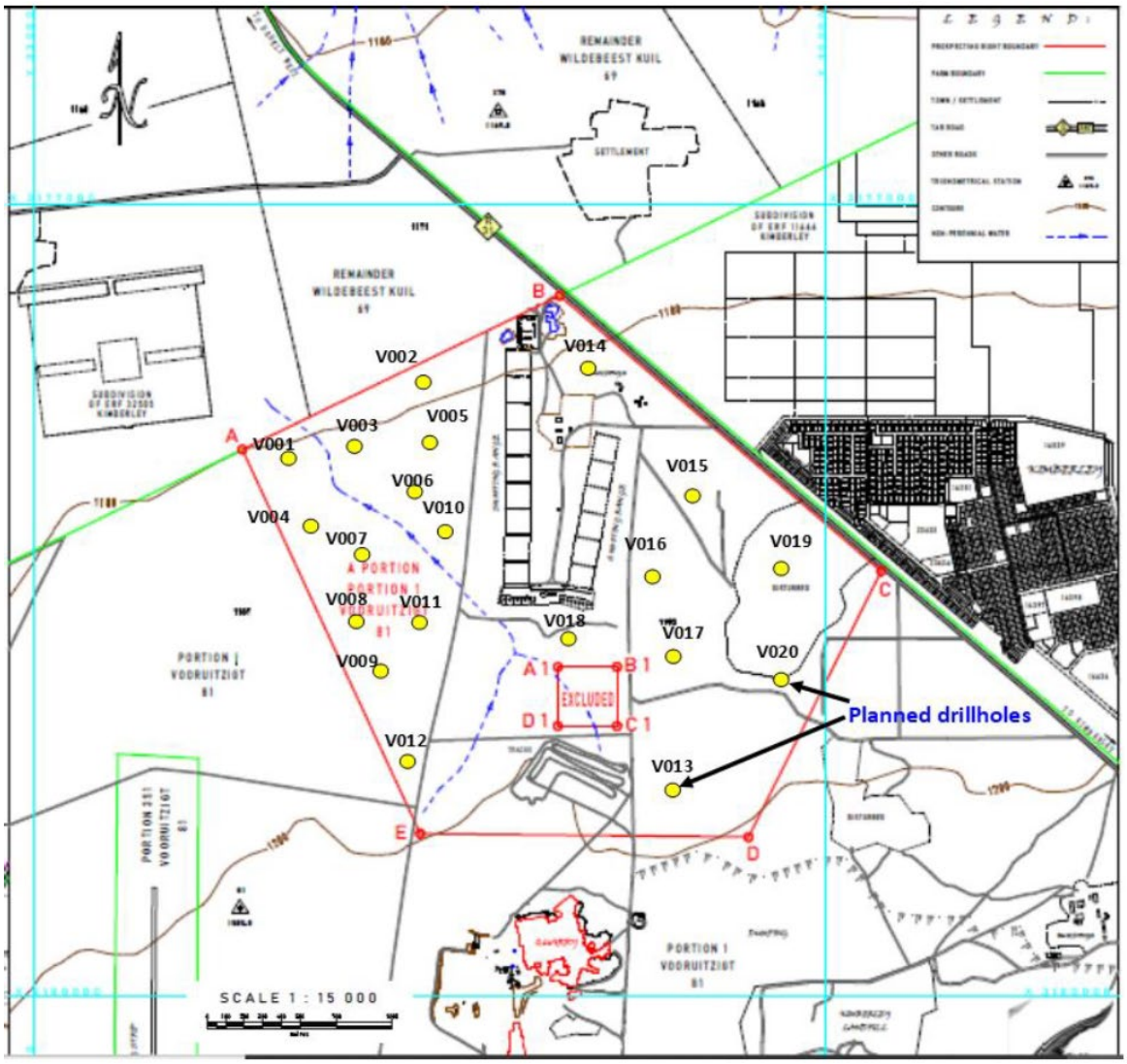


Figure 5-1: Prospecting boreholes location

5.4 Phase 3: Analytical Desktop Studies and Decision Making:

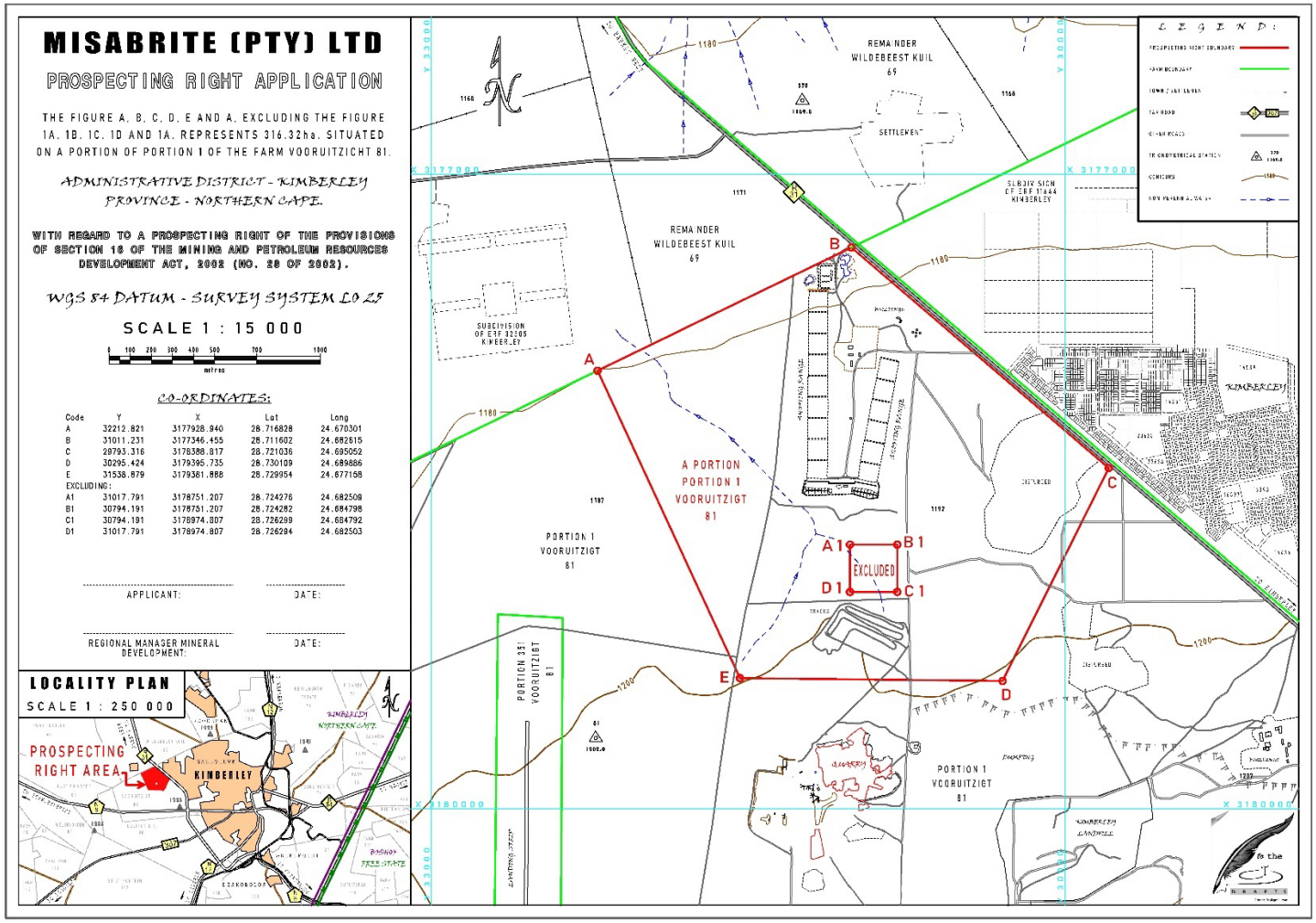
The project geologist monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure, and duration.

A GIS based database will be constructed capturing all exploration data.

Table 5-1: Project Phases and Requirements

Phase	Activity (What are the activities that are planned to achieve optimal prospecting)	Skill(s) required (Refers to the competent personnel that will be employed to achieve the required results)	Timeframe (In months) for the activity)	Outcome (What is the expected deliverable, e.g., Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (Deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (e.g., geologist, mining engineer, surveyor, economist, etc)
1	Non-invasive: Desktop Study including a Literature Survey, Aerial Photograph and Satellite Interpretation Geological mapping	Geologist Geologist	Month 1-6 Month 7-11	Geological Report Detailed progress report.	Month 6 Month 5	Geologist Geologist
2	Invasive: Boreholes Trench/Pit	Geologist Qualified exploration drilling contractors	Month12-22	Detailed Geological and Grade Resource Models, Mineral Resource Estimates to Indicated level of confidence	Month 11	Geologist
3	Non-invasive: Analytical Desktop studies/ including decision Making	Multi-disciplinary team of consultants	Month 23-24	Feasibility Study report and final report	Month 2	Competent Person's Report (CPR)



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LAYOUT PLAN

Figure 5-2: Layout Plan showing the location and area of the Prospecting Rights Area

5.5 Listed and specified activities

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

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

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

GNR 982, 983, 984 and 985 have been amended in 2017 through GNR 324, 325, 326 and 327, respectively.

The purpose of these regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed prospecting, with bulk sampling activity triggers activities listed in NEMA Listing Notice 1 and 2. Table 5-2 provides a summary of the identified NEMA listed activities that will be triggered by the prospecting project.

Table 5-2: Applicable Activities

Name of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Prospecting with bulk sampling and associated activities	316.32ha	X	GNR 983 as amended by GNR 327,Listing 1, Activity 20 GNR 984 as amended by GNR325, listing Notice 2, Activity 19	[redacted]
Trench/pit measuring 50m x 30m x 4m.	1500m^2	X	GNR 983 as amended by GNR 327,Listing 1, Activity 20 GNR 983 as amended by GNR 327, Activity 27 GNR 984 as amended by GNR325, listing Notice 2, Activity 19	
Drill boreholes (20 RC)	0.2ha	X	GNR 983 as amended by GNR 327,Listing 1, Activity 20	
Vegetation clearance	0.5ha	X	GNR 983 as amended by GNR 327, Activity 27	
Fencing	316ha	-	GNR 983 as amended by GNR 327: Activity 27	
Access and Mine Roads	1000m²	X	GNR 983 as amended by GNR 327: Activity 27	

Name of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Topsoil	0.01ha	-	GNR 983 as amended by GNR 327: Activity 27	[redacted]
Site Office	0.002ha	-	GNR 983 as amended by GNR 327,Listing 1, Activity 20 GNR 983 as amended by GNR 327: Activity 27	
Vehicle parking	0.02ha	-	GNR 983 as amended by GNR 327,Listing 1, Activity 20 GNR 983 as amended by GNR 327: Activity 27	
Domestic Waste Facility	-	-	GNR 983 as amended by GNR 327,Listing 1, Activity 20 GNR 983 as amended by GNR 327: Activity 27	GNR921 Category A (10, 11, 12)
Temporary storage of hydrocarbons	Less than 30m^3	[redacted]		
Stockpiling of topsoil	>0.5ha	X	GNR 983 as amended by GNR 327: Activity 27	
Transportation of material and ore	N/A	[redacted]		

5.6 Activities to be undertaken

5.6.1 Prospecting

Please refer to Sections 5.1 to 5.3 for a detailed description of the prospecting activities to be undertaken.

5.6.2 Establishment of Temporary Access Roads

There are various main and minor roads passing over the proposed project area. Some of these roads will be used to access the proposed prospecting project area. Where sites cannot be accessed via existing roads, temporary access roads (tracks) will be established.

5.6.3 Power

Diesel powered vehicles and machinery will be used for the proposed project.

5.6.4 Water Supply

It is anticipated that water will be brought onto site and trucked to the identified drill sites. Water bowsers will be deployed to the sites as and when required.

RC drilling in general does not require water. Additional water requirements relate to the potable water supply for prospecting personnel. A temporary vertical water storage tank for drinking water and general use by persons will be provided.

5.6.5 Ablution Facilities

Sewage waste will be generated from the campsite and drilling sites. Portable chemical toilets will be used for the management of sewage waste generated on site.

5.6.6 Temporary Site Office Area

A temporary site office area will be erected at the drill sites.

5.6.7 Accommodation

No accommodation for staff and workers will be provided on-site and all persons will be accommodated in nearby Kimberly town. Workers will be transported to and from the prospecting site on a daily basis.

Night security staff will be employed once equipment has been established on-site.

5.6.8 Blasting

It is expected that blasting may be required as part of the bulk sampling.

5.6.9 Waste Management

Hazardous Waste

Hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Hydrocarbon waste will be collected in drums for storage. The removal of the drums or any other appropriate receptacle will be undertaken by a registered waste disposal company, for disposal at a registered licensed waste disposal site. The drums will be placed on protected ground.

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

Oil waste and liquid fuel waste include used oils from prospecting machinery and vehicles and diesel/petrol waste.

General Waste

General waste to be generated from the proposed project area will include domestic waste which includes old food, polystyrene, old stationary, discarded Personal Protective Equipment (PPE) and old clothing generated from the drilling and campsites. General waste will be collected in drums and disposed of at a registered domestic waste disposal site (Kimberley).

Storage of Dangerous Goods (Hydrocarbons)

During the drilling activities, limited quantities of diesel fuel, oil and lubricants will be stored on site. The only dangerous good that will be stored in any significant amount will be the diesel fuel. No more than 30 m^3 will be stored above ground in diesel storage tanks.

6 Policy and legislative context

Table 6-1 lists the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of legislation relevant to the project.

Table 6-1: Policy and Legislative Context of Proposed Project

Legislation	Description and Relevance	Authority
Constitution of the Republic of South Africa, (No. 108 of 1996)	Chapter 2 – bill of rights Section 24 – Environmental Rights The proposed activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental rights of South Africans	N/A
Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA	The Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right. The EIA/EMPr process was undertaken in terms of the NEM: WA, NEMA and where required, the NWA, where the associated stakeholder consultation process was aligned with the PAIA in the sense that all I&APs were provided an opportunity to register as an I&AP prior to the initiation of the project and all registered stakeholders were in turn be provided a fair opportunity to review and comment on all draft reports submitted to the competent authorities for decision making.	N/A
Minerals and Petroleum Resources Development Act 28 of 2002	The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) makes provision for equitable access to and sustainable development of South Africa's mineral resources. The MPRDA requires that the environmental management principles set out in NEMA shall apply to all mining operations and serves as a guideline for the interpretation, administration, and implementation of the environmental requirements of NEMA. The MPRDA requires that a reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right, production right, prospecting work programme; exploration work programme, production work programme, mining work programme, environmental management programme, or an environmental authorization issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralized bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister.	Department of Mineral Resources, Northern Cape Province

Legislation	Description and Relevance	Authority
	Section 22 of the MPRDA as amended by Section 18 of Act 49 of 2008 The proposed project requires a Prospecting Right from the DMR.	
National Environmental Management Act (NEMA) (No. 107 of 1998)	Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment) Section 28 – Duty of care and remediation of environmental damage Environmental management principles have been incorporated into this EIA and EMPr, which the applicant will be required to comply with to ensure that negative impacts on the environment are avoided or kept to a minimum and that positive impacts are enhanced.	
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA Regulations 2014 (Government Notice (GN) 984), as amended	The EIA Regulations (GNR 982) were promulgated in terms of Sections 24 of the NEMA, to manage the process, methodologies, and requirements for the undertaking of an EIA. The GNR 982 stipulates that the applicant for activities listed under GNR 983, 984 or 985 must appoint an independent EAP to manage the EIA process. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental impact on the environment, and which may not commence without an EA from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&EIA) with applicable timeframes associated with each process. The EA must be obtained prior to the commencement of those listed activities. The project triggers activities listed in Listing Notices 1 and 2 and will require an EA from the DMR. According to GNR 326 of the NEMA, activities listed in Listing Notice 2 require that a full S&EIA be undertaken. The applicable listed activities that will be triggered by the project is provided in Table 5-2.	
Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805)	Environmental impacts will be generated primarily in the construction phase of this project with associated operational phase impacts. These have been assessed in Section 13 of this report.	
Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004	A full EIA (scoping and impact assessment) is required for the proposed project as activities are triggered under Listing Notice 2.	

Legislation	Description and Relevance	Authority
Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.		
DEA Integrated Environmental Management Guideline Series, Guideline 7: Public Participation in the Environmental Impact Assessment Process, 2012 (Government Gazette 807)	Public participation is a requirement of the Scoping/EIA Process and has been conducted for the proposed project as stipulated in Chapter 6 of the NEMA.	
National Water Act, 1998 (Act 36 of 1998)	There is a drainage line that traverses the project area, should any prospecting activities and/or infrastructure be located within 100m of the drainage line, a Section 21 (c&) IWUL will be required. **21 (c) & (i):** Impeding, diverting and altering the flow of water in a watercourse. Altering the bed, banks, course, or characteristics of a watercourse: All activities taking place within 100 m of a watercourse will be licensed under Section 21 c and I of the NWA.	Department of Water and Sanitation (DWS), Northern Cape
National Environmental Management Waste Act (Act No. 36 of 1998)	It is expected that activities listed in GNR921 (Category A) will be triggered for the domestic waste facility and will require a waste management licence. Table 5-2 provides a list of GNR921 activities triggered by the project. An integrated application and EIA process has been undertaken for both the NEMA and NEM: WA listed activities.	DMR and DWS, Northern Cape through the integrated application process
National Environmental Management Air Quality Act (Act No. 39 of 2004)	Air quality management Section 32 – Dust control. Section 34 – Noise control. Section 35 – Control of offensive odours. The principles of the NEM: AQA, focusing on minimisation of pollutant emissions have been taken cognisance of in the development of the EMPr.	Department of Environmental Affairs and Sol Plaatje Local Municipality

Legislation	Description and Relevance	Authority
The National Forestry Act, 1998 (Act No. 84 of 1998) (NFA)	The NFA protects against the cutting, disturbance, damage, destruction, or removal of protected trees. A biodiversity specialist study was undertaken for the application. The study included an assessment of the significance of biodiversity impacts and mitigation measures have been included in the EMPr. Should there be any protected trees that are affected by the project, Misabrite will apply for the required permit for the removal and/or relocation of the trees.	Department of Agriculture, Forestry and Fisheries (DAFF)
The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA)	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable, or protected Biodiversity hotspots and bioregions were investigated to determine the potential impacts that the project may have on the receiving environment as provided in Section 13. The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEM: BA. The NEM: BA ensures that provision is made by the site developer to remove any alien species, which have been introduced to the site or are present on the site	Department of Environmental Affairs
Northern Cape Nature Conversation Act No. 9 of 2009	This Act provides sustainable utilization of wild animals, aquatic biota, and plants to provide for them implementation of the convention on international trade in endangered species of wild fauna and flora. The Act provides for offenses and penalties of contravention Act, further provide for the appointment nature conservator to implement the provision of the Act. It also provides the issuing of the permits and other authorisations and provides matters connected therewith. A biodiversity assessment has been undertaken for the proposed project. The assessment found that there are protected trees (Vachellia erioloba (camel thorn trees)) located on the property. The camel thorns were only found on one site namely the Vooruitzigt site. Isolated individuals occur on the footprint areas of the proposed plant and prospecting area, while an open woodland dominated by camel thorns occur on the proposed prospecting application site of the Vooruitzigt site. It is expected that the relocation of trees will not be required since the areas earmarked for the infrastructure are mostly bare, where the old gun range currently is. The proposed trenching area is also mostly bare as shown in the figures below.	Northern Cape Department of Nature Conservation (DENC)

Legislation	Description and Relevance	Authority
	 Location of infrastructure  Location of proposed trenching However, should any relocation of the protected trees be required, Misabrite will apply for the required permit for the removal and/or relocation of the trees.	
Mine Health Safety Act, 1996 (Act No. 29 of 1996) (MHSA)	The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa. Misabrite will need to ensure that employees, contractors, sub-contractors and visiting personnel, adhere to this Act and subsequent amendment regulations on site.	Department of Mineral Resources (Northern Cape)
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Control measures for erosion Control measures for alien and invasive plant species The EMPr includes measures to control and manage alien invasive plant species.	Department of Agriculture Forestry and Fisheries

Legislation	Description and Relevance	Authority
National Heritage Resources Act 25 of 1999	Heritage Permit for structures 60 years or older. A heritage specialist study was conducted for the project. The study included an assessment of the significance of heritage impacts and mitigation measures which have been included in the EMPr. It is expected that the final layout of the project will ensure that no heritage resources are affected by the proposed project and infrastructure. Should any heritage and cultural resources be affected by the project, Misabrite will apply for the required permit for the destruction and/or relocation of the trees.	Northern Cape Heritage Resource Authority
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended in 2014.	Land Claims. There are no land claims associated with the affected properties.	Department of Rural Development and Land Reform

6.1 Municipal Plans and Policies: Sol Plaatje Integrated Development Plan

According to the Integrated Development Plan (IDP) for the Sol Plaatje Local Municipality (2017/22), there are opportunities in i.e. tourism, mining, agriculture. There is therefore a need to put more efforts in the current performance plans that will develop the municipality in the areas of agriculture, heritage, tourism, and mining.

It is expected that should the prospecting operation be successful, the resulting mining project will contribute significantly to the local, regional, and national economy. The prospecting project will have limited socio-economic impacts since the project will be of short duration. The extent to which the project will contribute to the economy has been assessed in the impact assessment section of this report (Section 13).

6.2 Other guidelines

Other guidelines that were made use of include:

- Northern Cape Provincial Biodiversity Conservation Plan;
- DWS, 2010. Operational Guideline: Integrated Water and Waste Management Plan. Resource Protection and Waste;
- Department: Water Affairs and Forestry, 2007. Best Practice Guideline A2: Water Management for Mine Residue Deposits;
- Department: Water Affairs and Forestry, 2007. Best Practice Guideline A4: Pollution control dams;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline A6: Water Management for Underground Mines.
- White paper on Integrated Pollution and Waste Management in South Africa, 2000;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G1 Storm Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G2: Water and Salt Balances;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G3. Water Monitoring Systems;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline G4: Impact Prediction;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline H1: Integrated Mine Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline H3: Water Reuse and Reclamation;
- DEAT. 2002. Integrated Environmental Management, Information series 2: Scoping. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 3: Stakeholder Engagement. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 4: Specialist Studies. Department of Environmental Affairs and Tourism (DEAT. 2002);

- DEAT. 2002. Integrated Environmental Management, Information series 12: Environmental Management Programmes. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs; and
- DEA. 2017. Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

7 Motivation

The mining industry is of great importance to the South African economy. According to the DMR, sand, clay and aggregate mining opens up more opportunities to small scale miners since it requires less capital for operation. There is not much capital that goes into buying expensive underground machinery. Demand for aggregate and sand in South Africa is driven by the construction industry, which is comprised of residential building, non-residential building, and civil construction.

The DMR lists 881 quarrying operations located throughout South Africa. 92.2 million tonnes of mined aggregate, clay, natural sand, dimension stone and limestone to the value of R9.4bn was sold locally during 2016 while the value of exports of quarry products reached US$61.5m. Although the majority of quarries are individually owned by small operators, a number of large companies are also involved in the sector. These include cement producers like Lafarge, PPC, AfriSam and Dangote Cement that own limestone quarries, construction companies such as Raubex that own sand and aggregate operations, and brick manufacturers like Corobrik that own clay quarries.

The definition of prospecting in terms of the MPRDA states: "*intentionally searching for any minerals by means of any method which disturbs the surface or sub-surface of the earth, including any portion of the earth that is under the sea or under other water…*". Prospecting is the physical search for minerals, fossils, precious metals, or mineral specimens, which allows a company to survey or investigate an area of land for the purpose of identifying an actual or probable mineral deposit, before investments are made into the mining activities.

Assessment of the geological information available has determined that the area in question may have good quality aggregate reserves. In order to ascertain the above and determine the nature, location, and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the aggregate stone.

The information that will be obtained from the prospecting to be undertaken will be necessary to determine, should aggregate stone be found, how and where the aggregate stone will be extracted and how much economically viable reserves are available within the proposed prospecting area.

Should good quality aggregate be found in the project area, Misabrite will be able to mine the available reserves. This will result in job creation and boost to local businesses is continued.

Misabrite expects that substantial benefits from the project will accrue to the immediate project area, the sub-region, and the province of the Northern Cape. This prospecting activity has a potential to decrease unemployment rates in proposed areas and surroundings. This prospecting activity will also bring revenue into the city and the province which will in turn boost the economy of the country and contribute to the supply of aggregate stone, clay and sand required by the construction industry in South Africa.

These benefits must be offset against the costs of the project, including the impacts to landowners. Further to the above, it has been determined that the prospecting project activities will not have a conflict with the spatial development plans for the Sol Plaatje LM and Francis Baard DM, the Integrated Development Plans, and the Environmental Management Framework (EMF) for the affected municipalities.

A process that ensures consultation with Interested and Affected Parties (I&APs) for the project was undertaken. The stakeholder engagement process was undertaken in a way that provided all interested and affected parties with an opportunity to comment on the project, with several platforms that allow public commenting opportunities to be offered to the I&APs. All issues raised by the interested and affected parties were recorded and addressed throughout the EIA process.

8 Motivation for the preferred development footprint

The identification and investigation of alternatives is a key aspect during the S&EIA process. All reasonable and feasible alternatives must be identified and assessed during the scoping phase to determine the most suitable alternatives to consider and assess during the impact assessment phase. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include social, financial, and environmental issues, which will be discussed in the evaluation of the alternatives. The preferred option is to be highlighted and presented to the authorities.

- Alternatives can typically be identified according to:
- Location alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. The alternatives are described, and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Incremental alternatives typically arise during the impact assessment process and are usually included as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered,

8.1 The property on which or location where it is proposed to undertake the activity

The proposed prospecting area is located in an area where dolerite occurs widely spread as dykes, sills, and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. The rocks are highly durable, and this are often seen capping the sandstone and mudstone hills. These dolerites (Jd) can also be seen at the bottom or south of the prospecting right. The rest of the farm is covered by sand (Qs). The site is therefore regarded as the preferred site and alternatives are not considered.

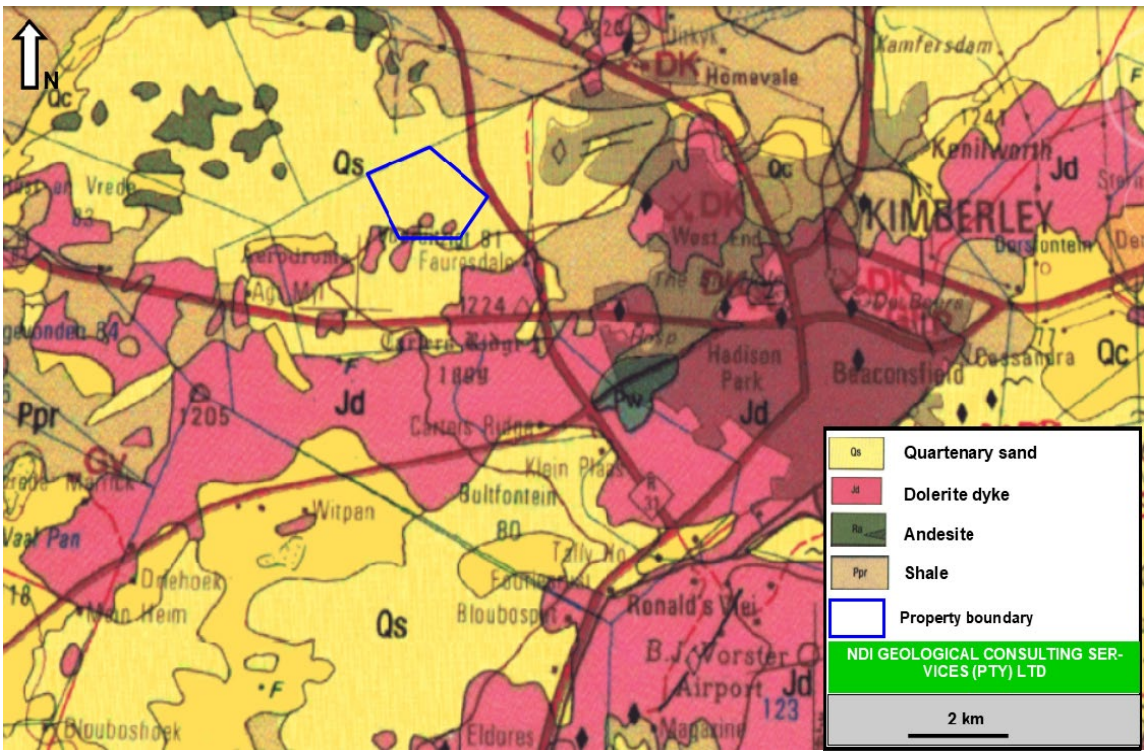

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Figure 8-1: Geology of the Prospecting Area

As such, no property alternatives were considered for the location of the prospecting area.

8.2 Type of Activity

The application is for prospecting rights and no alternatives were considered. The activity will be conducted in phases as described in Section 5 of this report. The prospecting phase of the Prospecting Works Programme will be dependent on the findings of Phase 1 of the process.

8.3 Design or Layout of the Activity

The design and location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora, and graves. All infrastructure will be temporary and/or mobile (Refer to Section 5.6 of this report).

No fatal flaws were identified during the specialist studies and therefore the layout plan does not required revision. The impact assessment has been included in Section 13 of this report.

8.4 The Technology to be used in the Activity

The proposed technologies have been chosen based on long term proven success in prospecting.

8.5 The Operation Aspects of the Activity

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. Temporary access roads will however be constructed in areas where there are no existing access routes

The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken. This phase will also include planning for the drilling survey.

Phase 2 will entail the invasive prospecting drilling and trenching campaign where the extent of mineralisation will be defined and the geological continuity of the geological continuity of the mineralised zone will be determined. Numerous samples will be collected and tested in a registered laboratory.

Phase 3 of the process will entail desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure, and duration.

8.6 The Option of Not Implementing the activity

The option of not implementing the activity will result in a loss of valuable information regarding the mineral status of the aggregate stone present on the affected properties. In addition to this, should economical reserves be present, and the applicant does not have the opportunity to prospect, the opportunity to utilise the reserves will be lost.

It is expected that the additional cumulative potential negative impacts on the environment associated with the proposed prospecting activities assessed in this EIA/EMPr Report would not exist should the project not be implemented. The environmental, social, and economic impacts have been assessed in detail in this impact assessment phase to identify and address all negative impacts, where possible.

9 Public Participation Process

The objectives of stakeholder engagement for the different phases of the application are as follows;

- During scoping: The objectives of the stakeholder engagement during scoping phase is to provide sufficient and accessible information to stakeholders in an objective manner to enable them to raise issues of concern and suggestions for enhanced benefits and to verify that their issues have been recorded. The stakeholders can also provide input into the Terms of Reference (ToR) for specialist studies, impact assessment and management planning and contribute relevant local and traditional knowledge to the environmental assessment;
- During impact assessment: The objectives of the stakeholder engagement during the impact assessment phase are to verify that their issues have been considered in the EIA and to further comment on the findings of the environmental assessment; and
- During the decision-making phase: Following the outcome of the decision-making process by authorities, stakeholders will be informed of the outcome and how and by when the decision can be appealed.

The stakeholder engagement process was conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA as summarised in Table 9-1.

Table 9-1: NEMA Stakeholder Guidelines

NEMA Section	Applicability to Stakeholder Engagement
Chapter 1	Outlines the principles of environmental management, several pertaining to public consultation (e.g. Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r).
Chapter 6,	Regulations 39 – 44 of the amended EIA Regulations GNR) 326, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA.
Section 24J of the NEMA	In 2017, the Minister of Environmental Affairs published, Section 24J of the NEMA in terms of**,** Public Participation Guidelines which guide the Public Participation Process in order to give effect to Section (2)(4)(f), (o) and 24 (1A)(C) of the NEMA.

Figure 9-1 provides a diagram of an Integrated Stakeholder Engagement Process for the proposed project.

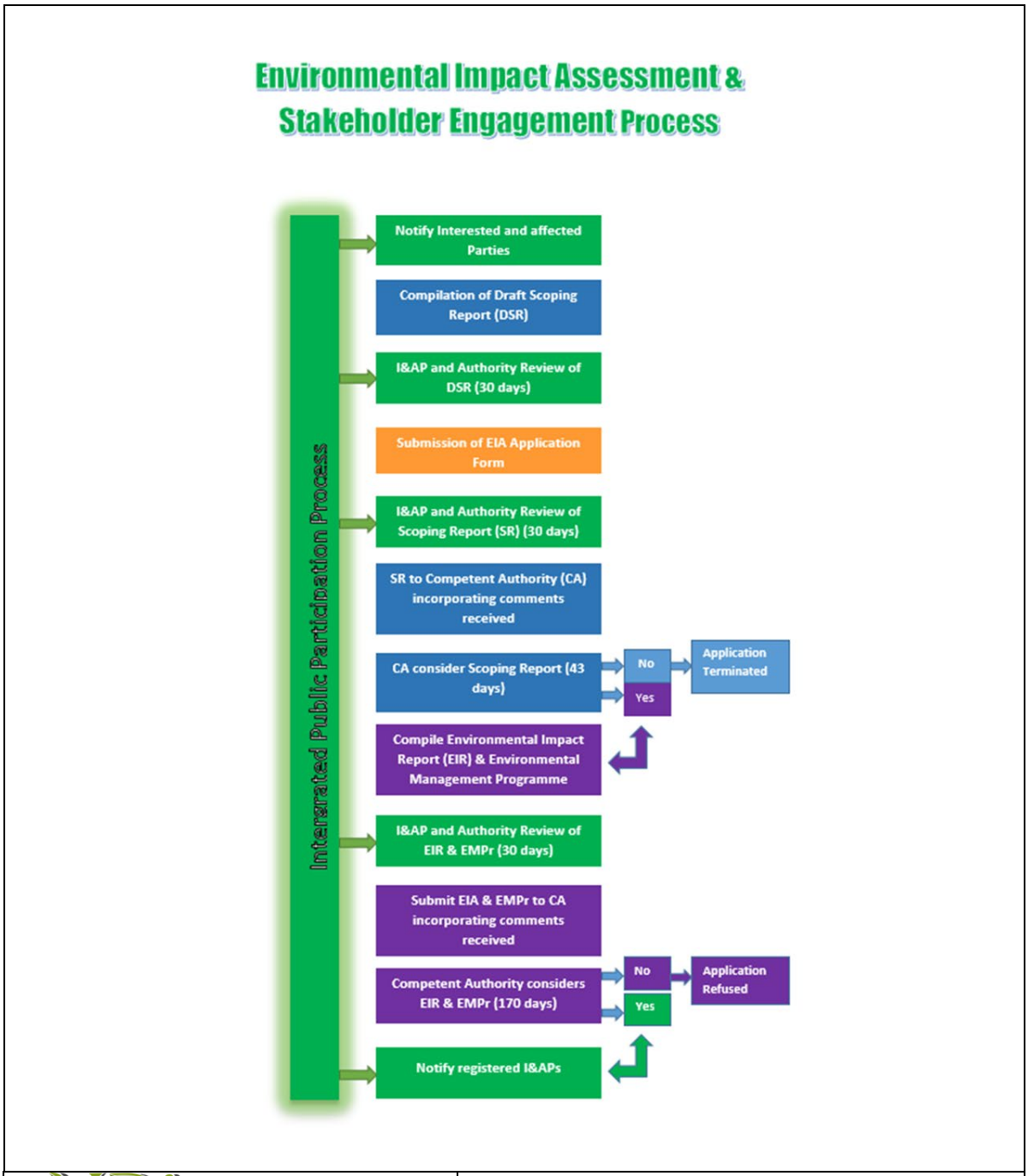


Figure 9-1: Integrated EIA and Stakeholder Engagement Process

All the above-mentioned guidelines have been incorporated into this stakeholder engagement process. The application was submitted to the DMR for authorisation as the competent authority. Identified commenting authorities on this application include:

- DWS – Regional Office;
- SAHRA – Provincial;
- Sol Plaatjie Local Municipality;
- Francis Baard District Municipality; and

- Northern Cape Department of Nature Conservation (DENC).

9.1 Scoping Phase

9.1.1 Stakeholder Identification Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified using GIS and cadastral information to identify affected and adjacent properties. The affected and adjacent property owners were identified using the surveyor general website, www.deedsweb.gov.za. In addition, registered I&AP's were also sourced from responses to the advertisements, site notices and written notification to I&AP's associated with the project.

The I&AP's register was maintained for the duration of the study where the details of stakeholders are captured and automatically was undertaken as an on-going activity.

The affected properties are provided in Table 9-2.

Table 9-2: List of Affected Farm and Farm Portions

Farm	Portions	21 Digit Survey General Code
Vooruitzicht 81	A portion of portion 1	C03700000000008100000

A map of the affected and adjacent farm portions and farm portions of the site are illustrated in Figure 9-2

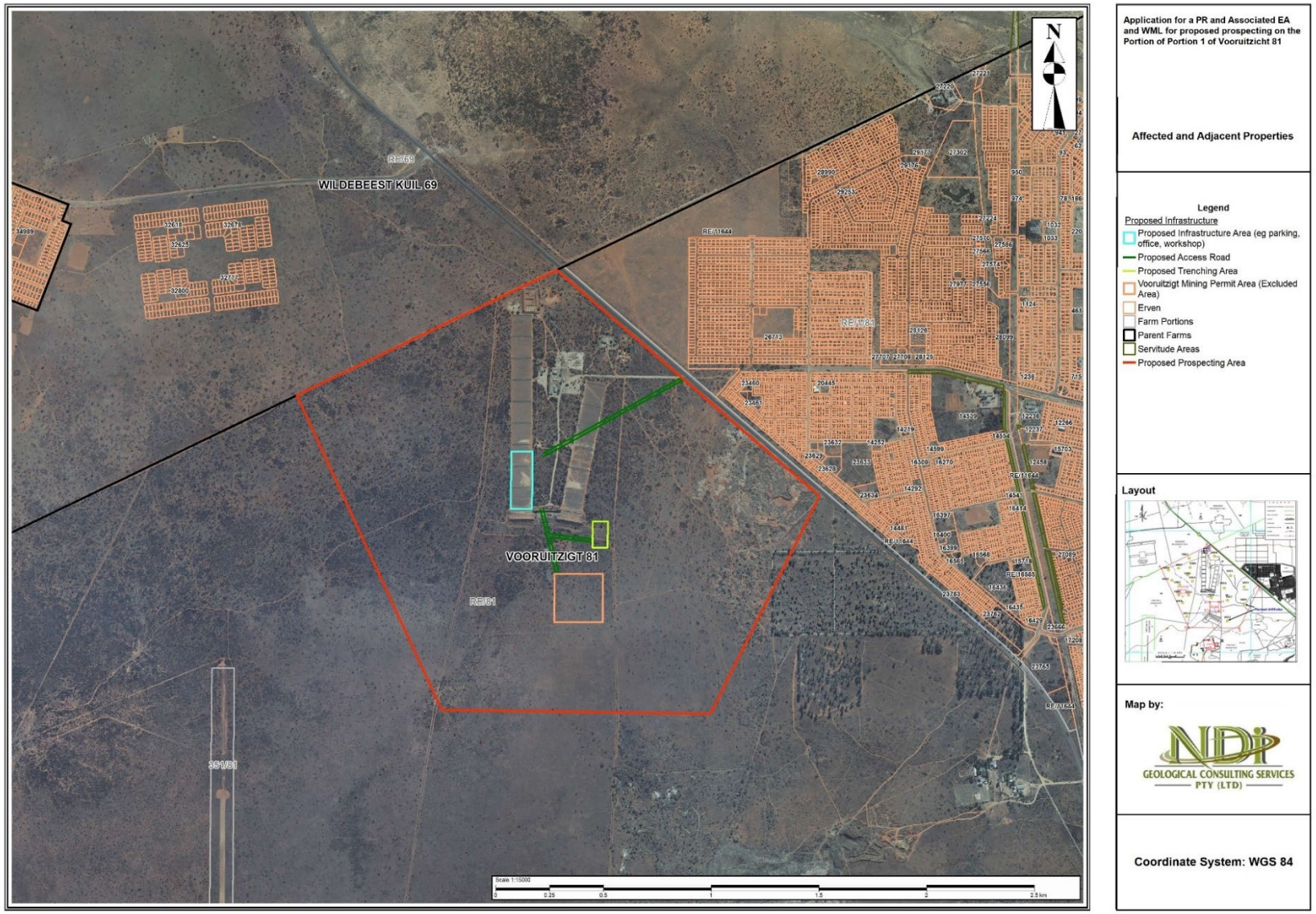


Figure 9-2: Affected and Adjacent Properties

9.1.2 Notification and Registration of the I&APs

Ndi Geological Consulting Services (Pty) Ltd made use of various methods to inform stakeholder of Misabrite's intention to undertake the required EA/WML process. Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement phase of the project.

9.1.3 Distribution of Notification Letters

Notification letters were sent to identified I&AP's, informing them of the proposed project.

9.1.4 Site Notice Placements

Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&AP's of the proposed activity were placed at conspicuous places in the project area. These areas of placement were determined according to the quantity of potential I&AP's that may pass by.

9.1.5 Newspaper Advertisements

Newspaper advertisements notifying stakeholders about the proposed project and the opportunity to participate in the EIA process were placed in the newspapers.

9.1.6 Notification of the Availability of the Draft Scoping Report

The availability of the DSR was announced by means of SMS, letters, and emails to registered I&APs. The DSR, announcement letters and comment forms were made available for public viewing and comment in the same public places as for the project announcement phase.

9.1.7 Stakeholder commenting period

The Draft Scoping Report was made available for a 30-day commenting period from 21 April 2021 to 24 May 2021.

The Scoping Report was also made available to the competent and commenting authorities during the 30-day stakeholder review and commenting period.

All comments raised by stakeholders were recorded and included in the Final Scoping Report that was submitted to the DMR for decision making.

9.2 Impact Assessment Phase

9.2.1 Notification

Newspaper advertisements notifying stakeholders of the public comment period for the Draft EIA/EMPr Report were placed in the newspapers.

9.2.2 Draft Report Commenting Period

The Draft EIA/EMPr was made available to I&APs for a 30-day comment period on the Ndi Geological's website (http://www.ndigeoservices.co.za/). Hard copies were also made available for perusal at the venues used for the Draft Scoping Report.

9.3 Summary of Issues Raised by I&APs

A summary of the comments received from the stakeholders and responses provided by the EAP is provided in Table 9-3 Comments received from the stakeholders during the announcement phase have been attached as Appendix 5.

Table 9-3: Summary of the Issues Raised by the I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**	**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES				
No comments received to date				
AFFECTED PARTIES				
Adjacent Landowner/s				
[redacted]		With reference to your mining permit application that came to our attention we wish to register as an affected party as we are holding the right next to your proposed application. We therefore need to instruct you to do the following studies on top of the ones we did as there would be a cumulative impact, as our operations will be next door to each other, we would also like to see the studies: • Noise and dust • Ecological • Heritage and palaeontological • Geohydrological	It must be noted that the current application is for a prospecting right. Ecological, heritage and palaeontology and geohydrology studies were undertaken during this impact assessment phase of the process. The EAP included as assessment of the potential dust and noise impacts. The details of the impact assessment are provided in Section 13. The impact assessment for the Prospecting Right Application included an assessment of potential groundwater, biodiversity, noise, and dust impacts during all phases of the project. The assessment also includes potential cumulative impacts that may occur due to the proposed project.	Section 12 Section 13 Appendix 6

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Municipal councillor					
No comments received to date					
Municipality					
Olebogeng Marwane	X	28 October 2021	The municipality confirms not having an objection in NDI Geological Consulting Services proceeding with the Prospecting Right application for endorsement by Department of Mineral Resources. However, we believe that a platform for further engagement should still continue between all affected parties in order to find solutions which everyone will find amicable. As such, the matter is subject to the following way forward: After a determination was done that the human settlement development project proposed by the municipality will be affected by the proposed prospecting right application by Misabrite (Pty) Ltd on the subject farm portion, the municipality requests more time to engage further with the project funder being Northern Cape	Noted, the EAP included an assessment of the proposed mining and prospecting activities on the proposed future residential area project and identified mitigation measures that Misabrite will be required to implement to minimise and/or avoid adverse impacts.	N/A

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			Department of Cooperative Governance, Human Settlement and Traditional Affairs (COGHSTA) and other important stakeholders in order to make a determination of the financial implications as well as do a quantification of the amount of erven which will be affected for the municipal human settlement project. The Sol Plaatje Municipality recommends that Misabrite (Pty) Ltd takes due consideration into the existing and proposed residential development areas in order to limit any forms of liability dynamics which could arise from future risk that could emanate from the proposed mining activities associated with blasting and vibrations within the area in question. The municipality is aware of this Scoping Report, however, the matter in relation to liability must be fully addressed in the final Environmental Impact Assessment Report.		
Organs of state (Responsible for infrastructure that may be affected Roads Department,					

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Eskom, Telkom, DWS					
No comments received to date					
Communities					
	X		When will the operations start?	Depending on the success of the applications and the granting of the rights. The expected timeline is approximately 3 to 4 months.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
			How many job opportunities will be created?	It is not as yet finalised but in total in excess of 1 500 opportunities will be created by the development project of which the quarry is a part.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			Will the local population be given preference for the job opportunities?	The company will give preference to qualified local community members.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
			How is BEE addressed by the company?	The company complies with any BEE legislation and requirements.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
			Will the company look after the community better that the current crusher, also located nearby?	We cannot comment on the activities of other businesses but assure the community that we shall fulfil our obligations as required by legislation.	N/A. The comment had no bearing on the application process and/or findings from the

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
					impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
			Where will the quarry be located?	The meeting was referred to the locality maps that were attached to the information document and explained the location of the area by referencing known landmarks.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
Platfontein Community	X	22 February 2022	We, as a community and its leaders have no objection and fully support this project as it will create jobs and empower our community members in an economic way.	Noted.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
					revision of the EIA/EMPr Report.
Phutanang Community	X	28February 2022	We, as a community and its leaders have no objection and fully support this project as it will create jobs and empower our community members in an economic way.	Noted.	N/A. The comment had no bearing on the application process and/or findings from the impact assessment process and did not contribute to the revision of the EIA/EMPr Report.
Dept. Land Affairs					
No comments received to date.					
Traditional Leaders					
No comments received to date.					
Dept. Environmental Affairs					
Ms Jacoline Mans	X	4 October 2021	The Draft Scoping Report (DSR) stated that phase 2 of the prospecting activities will consist of drilling 20 boreholes and one trench. The report stated that the trench/pit will be 50m x 30m x 4m (page 14), but	The trench will be 50m x 30m x 4m.	Section 1 Application

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
			elsewhere that the bulk sampling trench/pit will measure 100m x 50m x 20m. Which one is correct? Please amend the report accordingly to be consistent and avoid confusion.		
Ms Jacoline Mans	X	4 October 2021	The report stated that "According to the SANBI remaining vegetation type database, there is no remaining natural vegetation on the affected area." Was this verified during a site visit? An overlay on the Critical Biodiversity Areas (CBA) illustrates that only a small portion is completely transformed, most of the site falls in 'other natural areas' and thus may have scattered protected trees. The Google Earth image shows woody vegetation on site, most likely Vachellia tortilis, but scattered Vachellia erioloba may also be present. The Environmental Assessment Practitioner (EAP) and/or applicant must do some ground- truthing to confirm the nature of the woody vegetation present on site and to determine whether or not protected trees are present.	The statement "According to the SANBI remaining vegetation type database, there is no remaining natural vegetation on the affected area." was based on a desktop study of the SANBI databases. A biodiversity specialist was appointed to undertake the assessment for the proposed prospecting project. The study found that It must be noted that the proposed location for infrastructure is already impacted by the old gun range and has no flora, as such the construction of infrastructure such as office, plant, parking, and workshop will not have an impact on flora. The area ear marked for trenching is also highly disturbed and will therefore have a negligible impact on flora. Figure 13-1 shows the state of the areas ear marked for infrastructure and trenching.	Section 12 Section 13 Appendix 6 Appendix 6

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Ms Jacoline Mans	X	4 October 2021	It is not clear from the report if a biodiversity specialist study will be undertaken, because contradictory statements are made in this regard. Under legislative context, a statement is made to confirm that a biodiversity specialist study will be undertaken. In Table 10-3 (Summary of Issues raised by I&APs), Kim Crush requested an Ecological Study to assess cumulative impacts, but the response was that "it is the considered opinion of the EAP that due to the small and localised footprint of the proposed prospecting, no specialist studies will be required." Please clarify these contradictions and amend the report accordingly to be consistent. If a biodiversity/ecological impact assessment is conducted, kindly forward a copy thereof to the Forestry Office in Upington (jmans@environment.gov.za) for comments.	 Location of infrastructure  Location of proposed trenching The final layout/location of the boreholes will be such that no protected trees will be affected.	
Ms Jacoline Mans	X	4 October 2021	Under legislative context, reference is made to the National Forests Act. Protected trees such as Vachellia erioloba	Noted, the stipulation has been included in the EMPr of the project.	N/A, the stipulation has been included in the EMPr.

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
			and Boscia albitrunca are often found in Kimberley Thornveld. If any are encountered in the development footprints, a Forest Act License must be applied for an obtained prior to damaging any protected trees.		
Ms Jacoline Mans	X	4 October 2021	The applicant may also need Fauna and Flora Permits from the provincial conservation authority, issued by the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL), under the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA).	Noted, should any protected tress be affected by the proposed project, the applicant will submit application to the DAERL for Fauna and Flora Permits.	N/A. The stipulation has been included in the EMPr.
SAHRA					
Natasha Higgitt	X	1 July 2022	38(4)a – The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development.	Noted	N/A, no revision of the report is required.
Natasha Higgitt	X	1 July 2022	38(4)b – The recommendations of the specialists are supported and must be adhered to. Further additional specific	The recommendations of the specialist are included in the EIA and EMPr Report. The report has been updated to include the specific recommendation as requested by the SAHRA.	Section 13.1 Section 29.2 Section 38.5

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			conditions are provided for the development as follows: Monitoring reports detailing the results of the recommended archaeological monitoring must be submitted once the construction phase has been completed.		
Natasha Higgitt	X	1 July 2022	38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.	Noted, the stipulation is included in the mitigation measures included in the EIA and EMPr Report.	Section 13.1 Section 38
Natasha Higgitt	X	1 July 2022	38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/ Ngqabutho Madida 012 320 8490), must be alerted immediately as per	Note, the stipulation is included in the mitigation measures included in the EIA and EMPr Report.	Section 13.1 Section 13.2 Section 38

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
			section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.		
Natasha Higgitt	X	1 July 2022	38(4)d – See section 51(1) of the NHRA with regards to offences.	Noted	N/A, the comments does not require a revision of the report.
Natasha Higgitt	X	1 July 2022	38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.	Note, the stipulation is included in the mitigation measures included in the EIA and EMPr Report.	Section 13.1 Section 13.2 Section 38
Natasha Higgitt	X	1 July 2022	The Final EIA and EMPr must be submitted to SAHRA for record purposes.	The Final EIA and EMPr Report will be submitted to the SAHRA for record keeping purposes.	N/A

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Natasha Higgitt	X	1 July 2022	The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.	The decision by the DMR regarding the application will be communicated to the SAHRA.	N/A
Other Competent Authorities affected					
No comments received to date.					
OTHER AFFECTED PARTIES					

9.4 Notification of authority decision

Registered stakeholders will be advised in writing (mail, email, fax, and SMS) of the authority decision on the EIA / EMPr, and details on the procedure to appeal the decision. Notification to registered stakeholders will summarise the authorities' decision and provide information according to legal requirements on how to lodge an appeal should they so wish.

10 Baseline Characterisation

This section provides a general overview of the status quo of the environmental and social context within which the proposed project is located. All of the proposed activities will take place within the affected properties. While most of the descriptions below are focused on the site itself, where necessary the regional context of the environmental features is also explained. More detail on certain aspects of this environment includes information from specialist investigations and inputs from I&APs have been considered during the public participation process. For each environmental aspect discussed below, proposed environmental issues/impacts have been highlighted qualitatively where applicable. The impact assessment provided in Section 13 explored these issues on a quantitative level.

10.1 Geographical

The proposed project area is situated in the Sol Plaatjie Local Municipality's area of jurisdiction, within the Francis Baard District Municipality, Northern Cape Province. The wards affected by the project include Ward 16 and 27. The affected property is located approximately 5km outside Kimberley town.

10.2 Topography

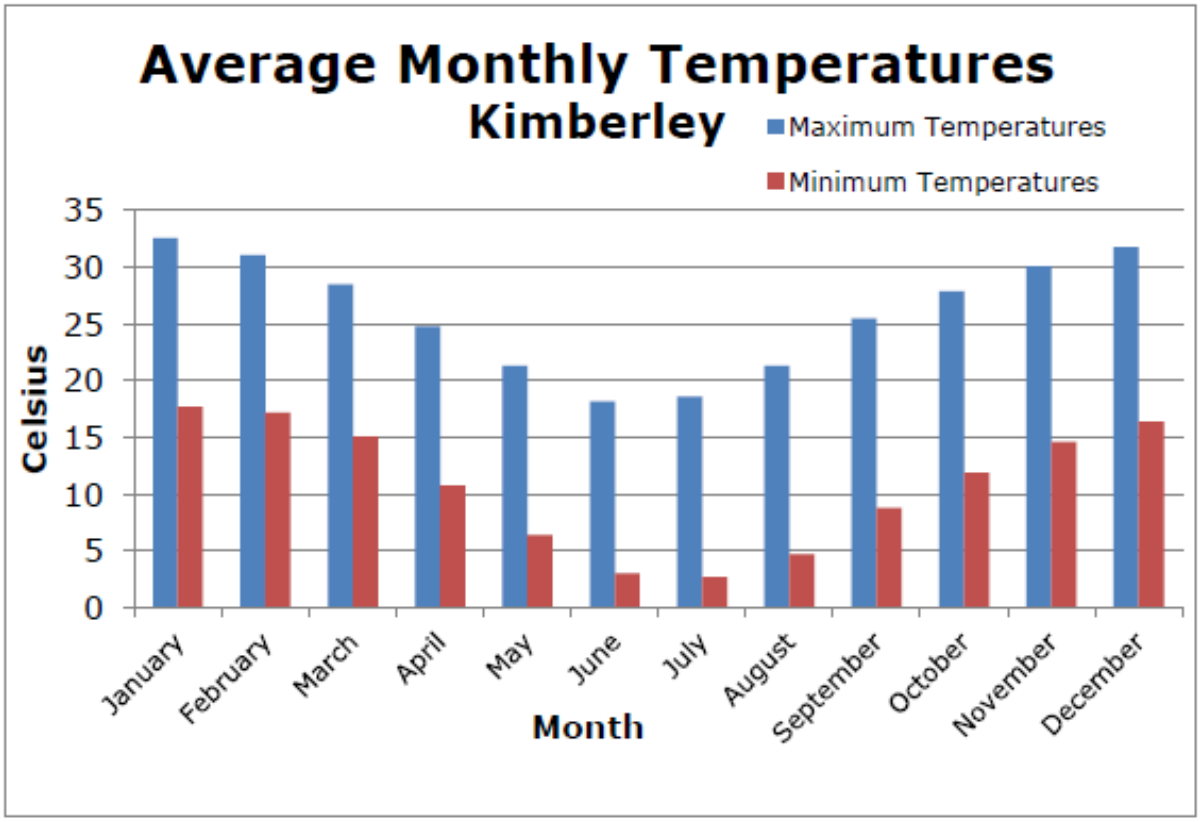
Kimberley is set in a relatively flat landscape with no prominent topographic features within the urban limits. The only "hills" are debris dumps generated by more than a century of diamond mining. From the 1990s these were being recycled and poured back into De Beers Mine (by 2010 it was filled to within a few tens of metres of the surface). Certain of the mine dumps, in the vicinity of the Big Hole, have been proclaimed as heritage features and are to be preserved as part of the historic industrial landscape of Kimberley.

The surrounding rural landscape, not more than a few minutes' drive from any part of the city, consists of relatively flat plains dotted with hills, mainly outcropping basement rock (andesite) to the north and northwest, or Karoo age dolerite to the south and east. The topography of the area is generally by slightly undulating to flat plains. The property is defined as a Plain at a Medium Level (ENPAT 2000). The topography of the area is influenced by the underlying geology of the area, as well as the climatic conditions and is located at an altitude of 1200 MAMSL.

10.3 Climate

10.3.1 Average Monthly Temperatures

The average monthly temperatures (Minimum and Maximum) as received from Kimberley are indicated in Figure 10-1.



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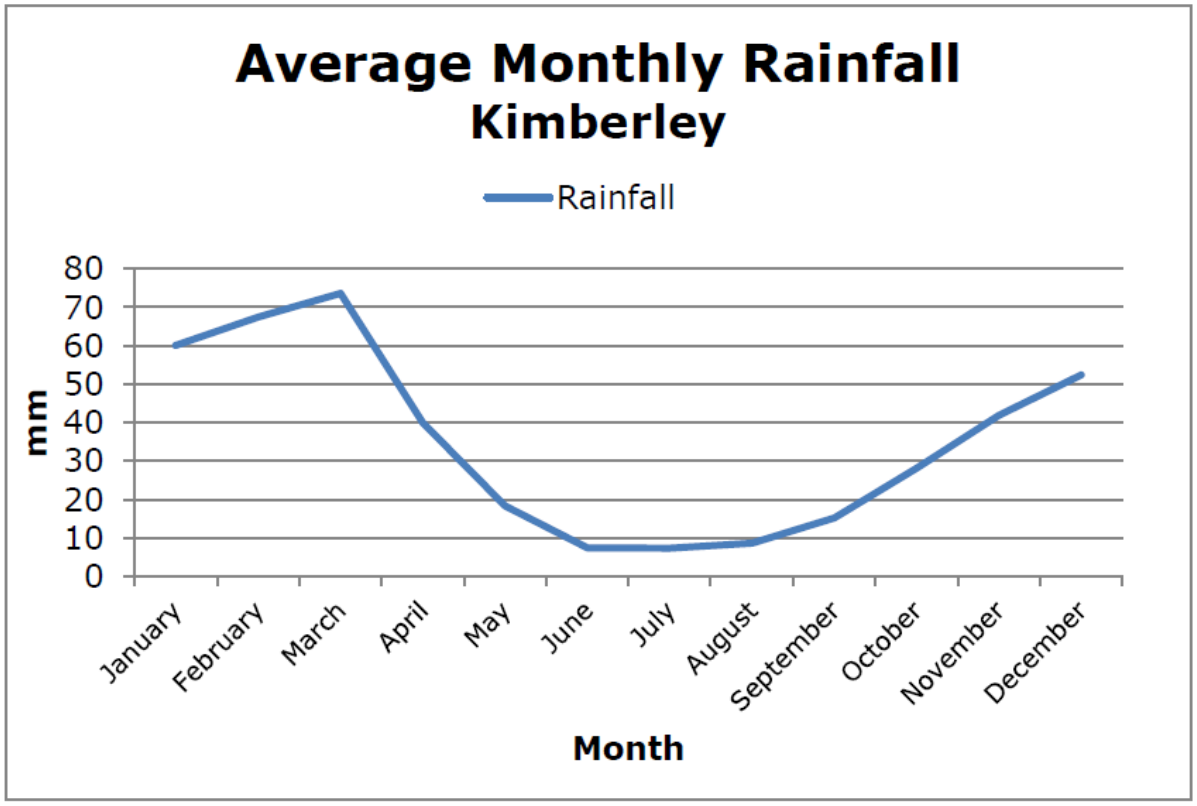
AVERAGE MONTHLY TEMPERATURES FOR KIMBERLEY

Figure 10-1: Average Monthly Temperatures for Kimberley (Source: Weather SA)

The figure indicates that:

- The highest maximum temperature is experienced during November, January, and February.
- The average maximum goes beyond 33 °C.
- The coldest months of the year are June and July, where the average temperature drops well below 20 °C.

Figure 10-2 indicates the average monthly rainfall for the region.



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AVERAGE MONTHLY RAINFALL FOR KIMBERLEY

Figure 10-2: Average Monthly Rainfall for Kimberley (Source: Weather SA.)

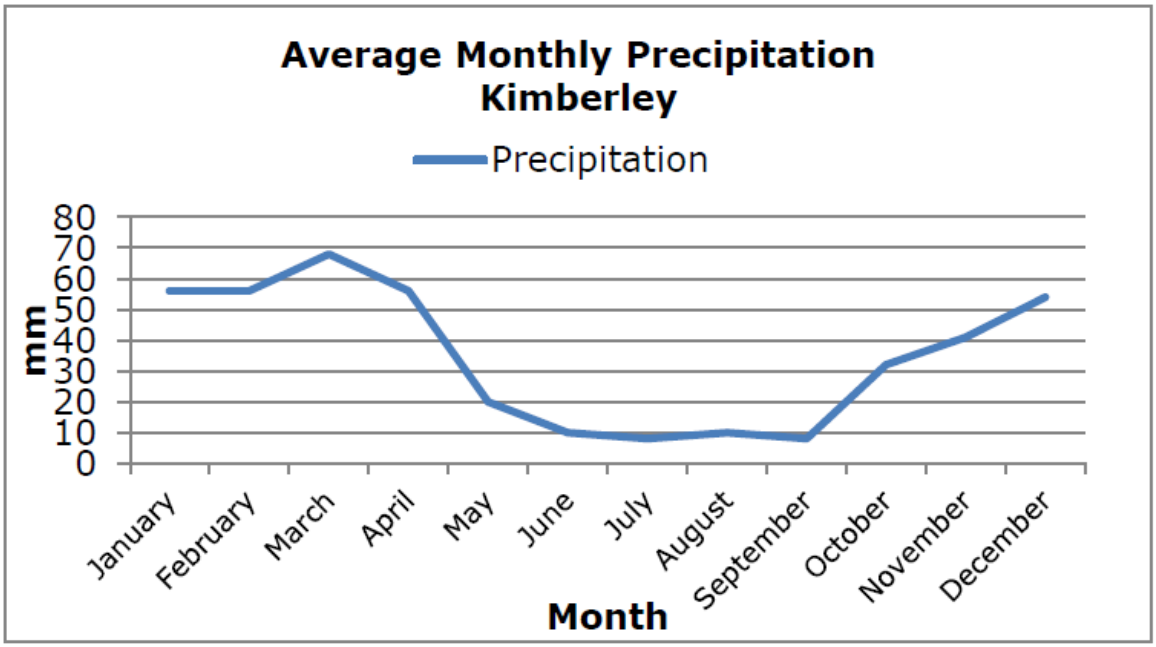
The average monthly rainfall data indicates that:

- The highest rainfall months are February to March with an average of ±75mm;
- November/December has a higher peak with just over 50mm;
- While the dry months are June and July with an average of below 10mm.

10.3.2 Average monthly Precipitation

The information available indicates the average monthly precipitation and indicates the following:

- The highest precipitation is in March (70mm) while;
- The lowest is in June to September with an average under 10mm.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	AVERAGE MONTHLY PRECIPITATION FOR KIMBERLEY

Figure 10-3: Average Monthly Precipitation for Kimberley. (Source: Weather SA)

10.4 Geology

The farm is underlain by Archaean age rocks which also include a variety of Senozoic sediments and intrusive rocks. The gneiss, pegmatite, granite, and amphibolite are some of the Archaean age rocks which outcrop in the area of study. The regional geology is characterised by:

- The Archaean age rocks which are found in the area are the Ventersdorp Supergroup, the Grinqualand West Sequence, and the Karoo Sequence.
- The Ventersdorp Supergroup: The rocks in this group are quarts porphyry and quartz-feldspar porphyry of Makwassie Formation at the base, andesitic lava, volcanic breccia, tuff and chert of the Rietat Formation which forms the top of the squence. The rocks in this group are mainly volcanic.
- The Grinqualand West Sequence: The Grinqualand West sequence unconformably follows the Ventersdorp Supergroup It comprises a concordant sequence which grades from the course to fine grained clastic rocks of the Vryburg Formation at the base through alternating stromatolitic dolomite, limestone, sandstone, and shale of the Schmidtsdrift Formation to limestone and dolomite of the Ghaaplato Formation.
- Karoo Sequence: The Karoo Sequence stratigraphically lies above the older formations unconformably. At the base the Dwyka Formation comprises glacial and fluvioglacial rocks which include tillite, varved shale, mudstone with pebbles and conglomerate. The Ecca Group, which follows concordantly on the Dwyka, consists almost exclusively of deep-water, fine grained clastic sediments and the lithological monotony of this sequence is only interrupted by the characteristic black, carbonaceous shale of the Whitehill Formation which is underlain and overlain respectively by dark grey.

10.5 Water Resources

There is a drainage line that traverses the project area (Figure 10-4). The project is located within quaternary catchments, which include C91E (located within the Lower Vaal Water Management Area(WMA)) 9Figure 10-5).

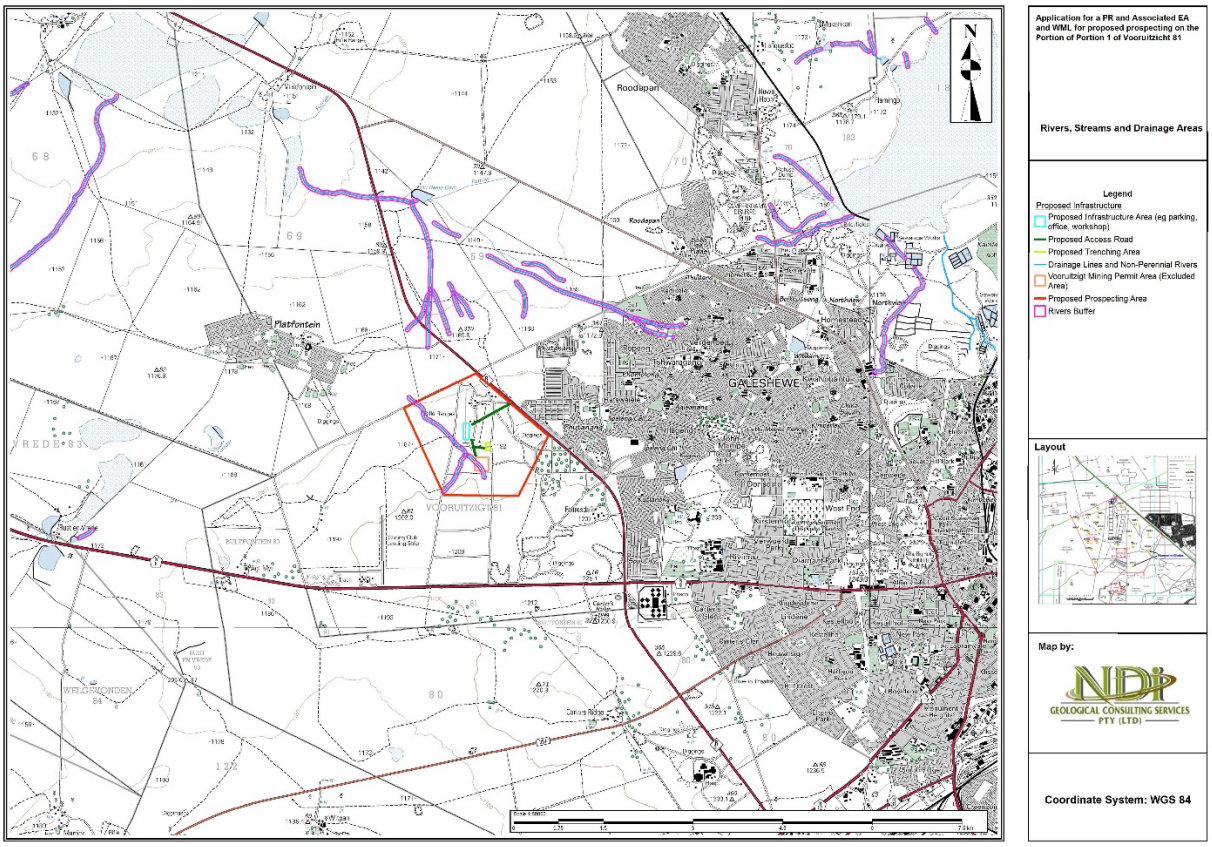


Figure 10-4: Rivers, Streams and Drainage Lines

According to the SANBI Wetland Inventory (2006) National Freshwater Ecosystem Priority Areas (NFEPA) (2011), the affected quaternary catchment areas are not regarded as important in terms of fish sanctuaries, rehabilitation, or corridors.

In addition, the project area is not considered important in terms of translocation and relocation zones for fish.

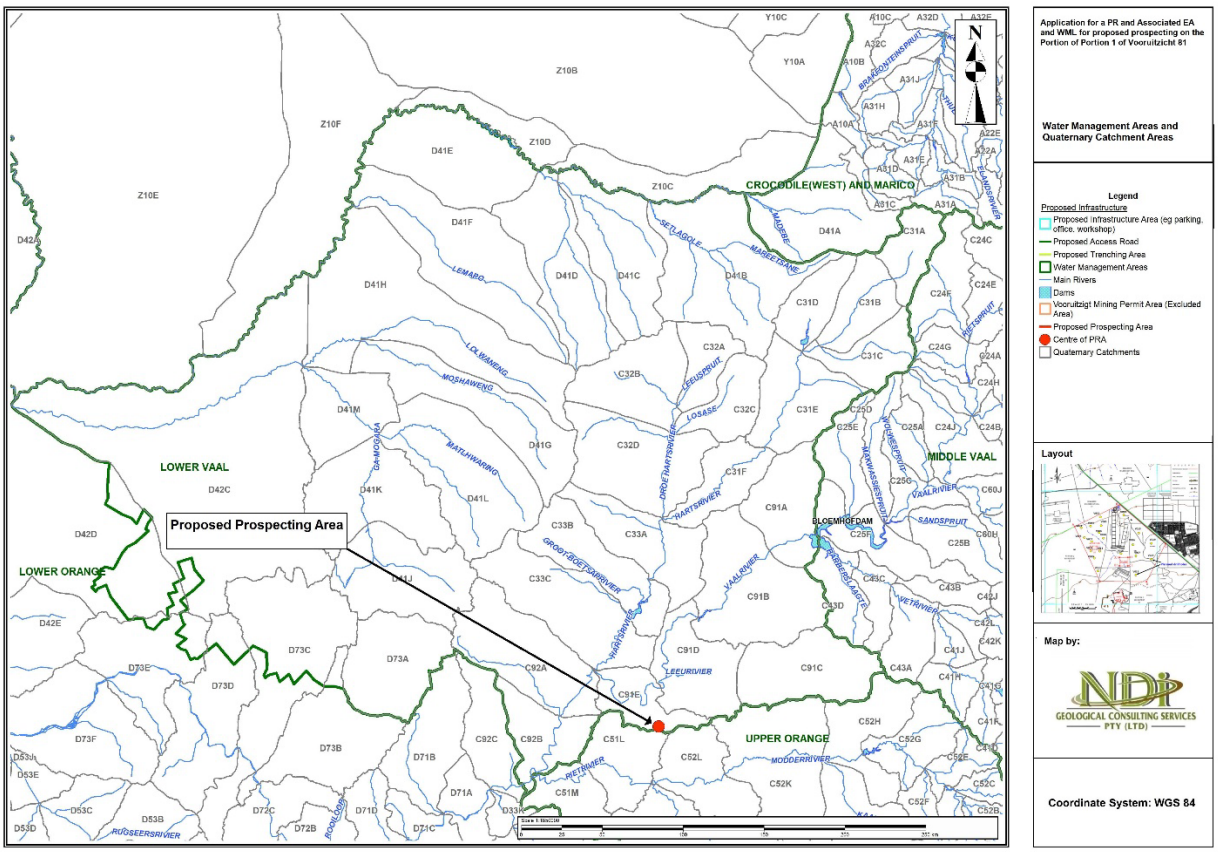


Figure 10-5: Water Management Areas and Quaternary Catchment Areas

10.6 Wetlands

The SANBI data shows that there are no wetlands occurring on the study area (Figure 10-6).

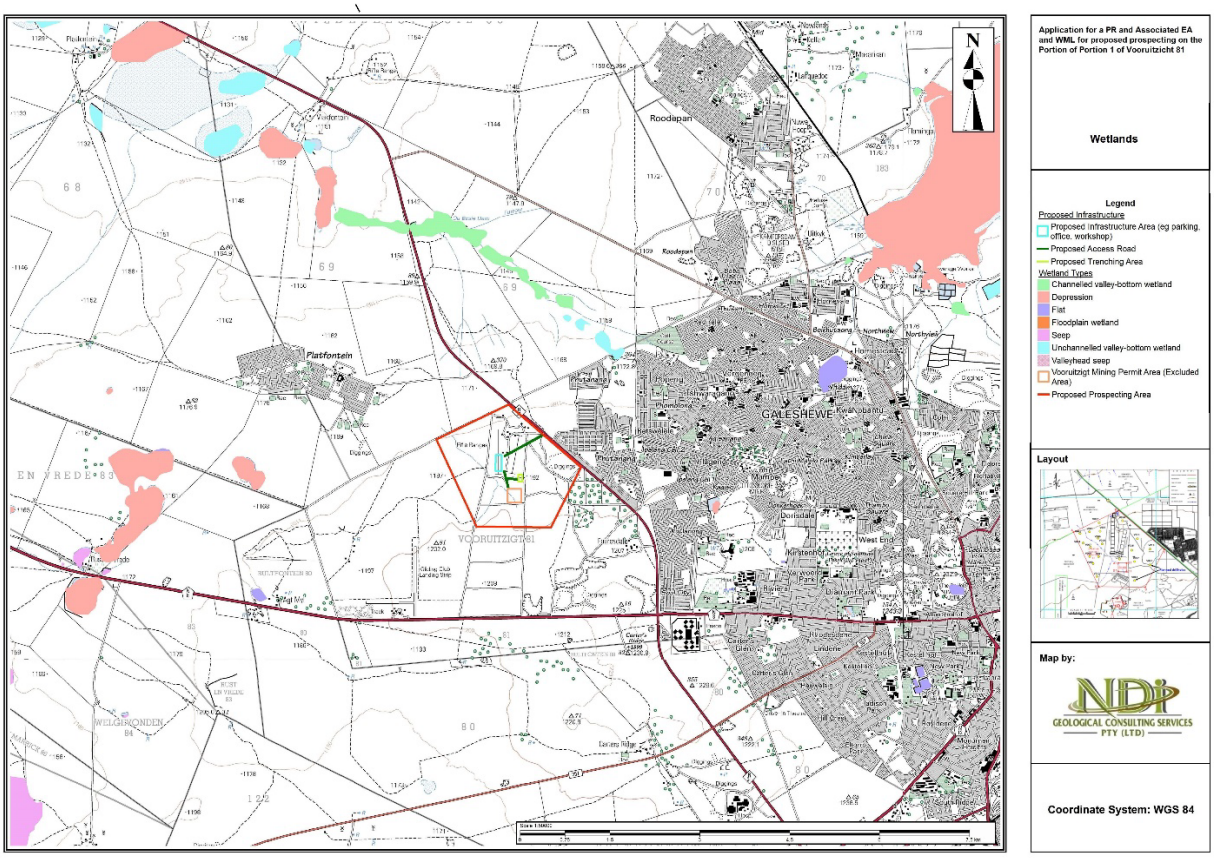


Figure 10-6: Wetland Types

10.7 Groundwater

A groundwater specialist study was undertaken as part of the EIA. The hydrogeology baseline characterisation from the assessment is summarised in the following sections.

10.7.1 Groundwater Yield

The DWS National Groundwater Archive (NGA) shows that the groundwater yield in the prospecting area is between 0.5 and 2.0l/s and that the aquifer is fractured (Figure 10-7).

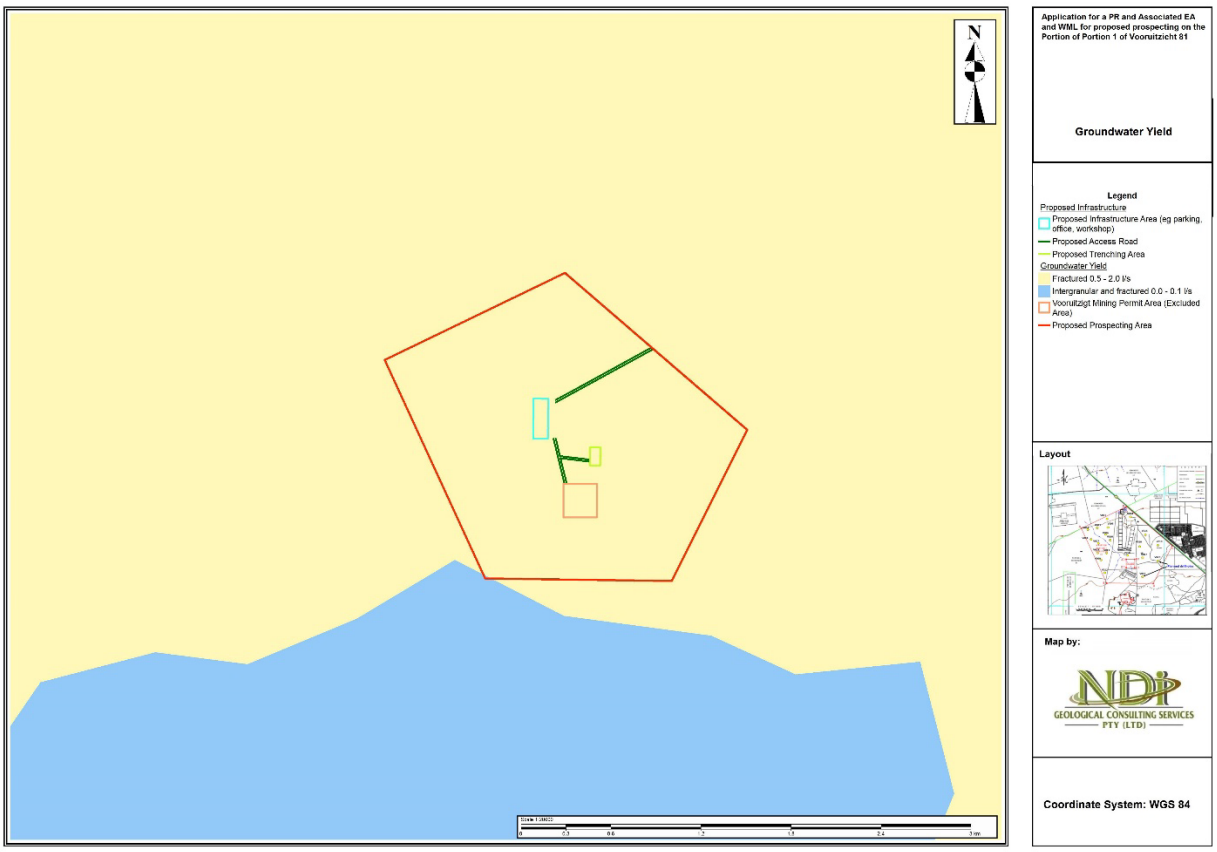


Figure 10-7: Groundwater Yield

10.7.2 Local Geohydrology

The local hydrogeology within the study area is hosted by the Karoo dolerite rock and basement rocks. The surrounding lithological units are classified as intergranular and fractured with the estimated yield of 0.5 – 2 l/s as shown in Figure 10-8.

Groundwater aquifers within the study area are potentially recharged through regional and local recharge system due to the limited rainfall in the area. Groundwater harvest potential as indicated by Baron et al, (1998) is approximately 6 000 to 10 000 m^3/km^2/annum, which is the maximum groundwater which can be sustainably abstracted per square kilometre.

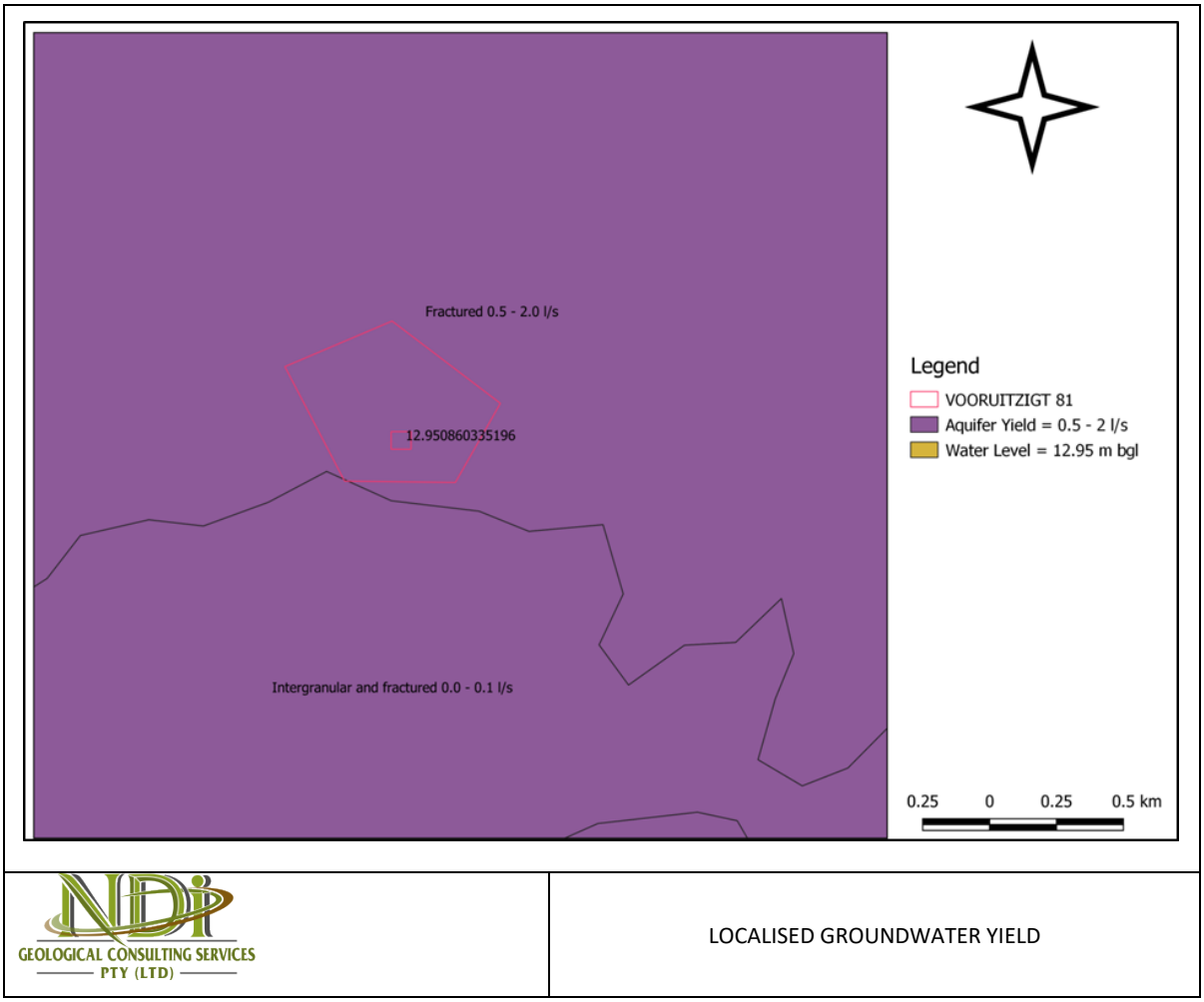


Figure 10-8: Localised groundwater yield

10.7.3 Hydro-census and Land Use

Hydro-census was conducted within a limited distance of 1 km radius of the study area to establish groundwater use information such as the registered and unregistered boreholes, borehole depth to water level, groundwater use, springs etc. The study area comprises of flat topography with no river which flows within the 1 km radius.

No registered boreholes were identified during the desktop study and also on the site visit. However, 2 monitoring boreholes were noted and visited at the site. However, these boreholes were locked and therefore water level could not be measured. The first borehole was within 1 km radius of the prospecting area on the southeastern part very close to the land fill site as indicated in Figure 10-9.

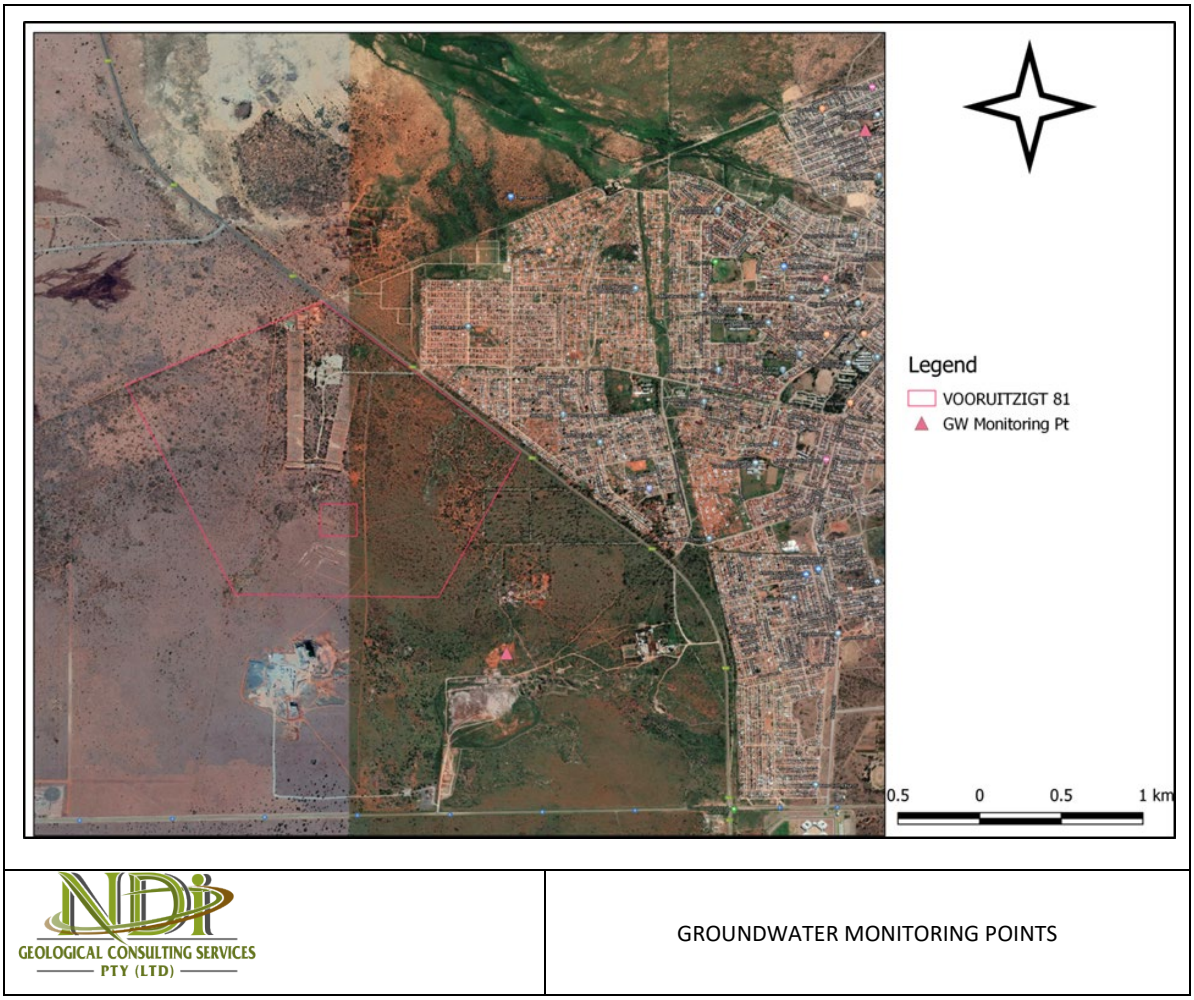


Figure 10-9: Groundwater Monitoring Points

Land use activities around the proposed prospecting site was aggregate stone-dolerite mining on the southern side, the land fill on the south-eastern side and human settlement on the northern side.

The prospecting, mining and the land fill site do have potential to contaminate groundwater which potentially flows towards the proposed prospecting right area. It is recommended that another monitoring borehole be constructed on the southern boundary of the proposed prospecting in order to monitor groundwater quality before the prospecting right site.

10.7.4 Groundwater Resource Assessment

The quaternary catchment is within the Vegter Region 30 referred to as North-eastern Pan Belt as indicated on Figure 10. Two basic types of aquifer storage are assumed to exist in this region, namely the “Weathered /Jointed" (WZ) and Fractured" Zone (FZ).

In fractured rock (FZ) aquifers the number of water-bearing fractures generally decreases with depth (Vegter, 1995) and this often results in a similar decline in aquifer storativity with depth. While saturated zone (WZ) is normally a relatively thin zone (i.e. 5 to 40m thick) with its upper surface formed by the water table, therefore making this portion of the aquifer semi-unconfined to unconfined. This zone is characterised by a large number of relatively low-yielding water-strikes.

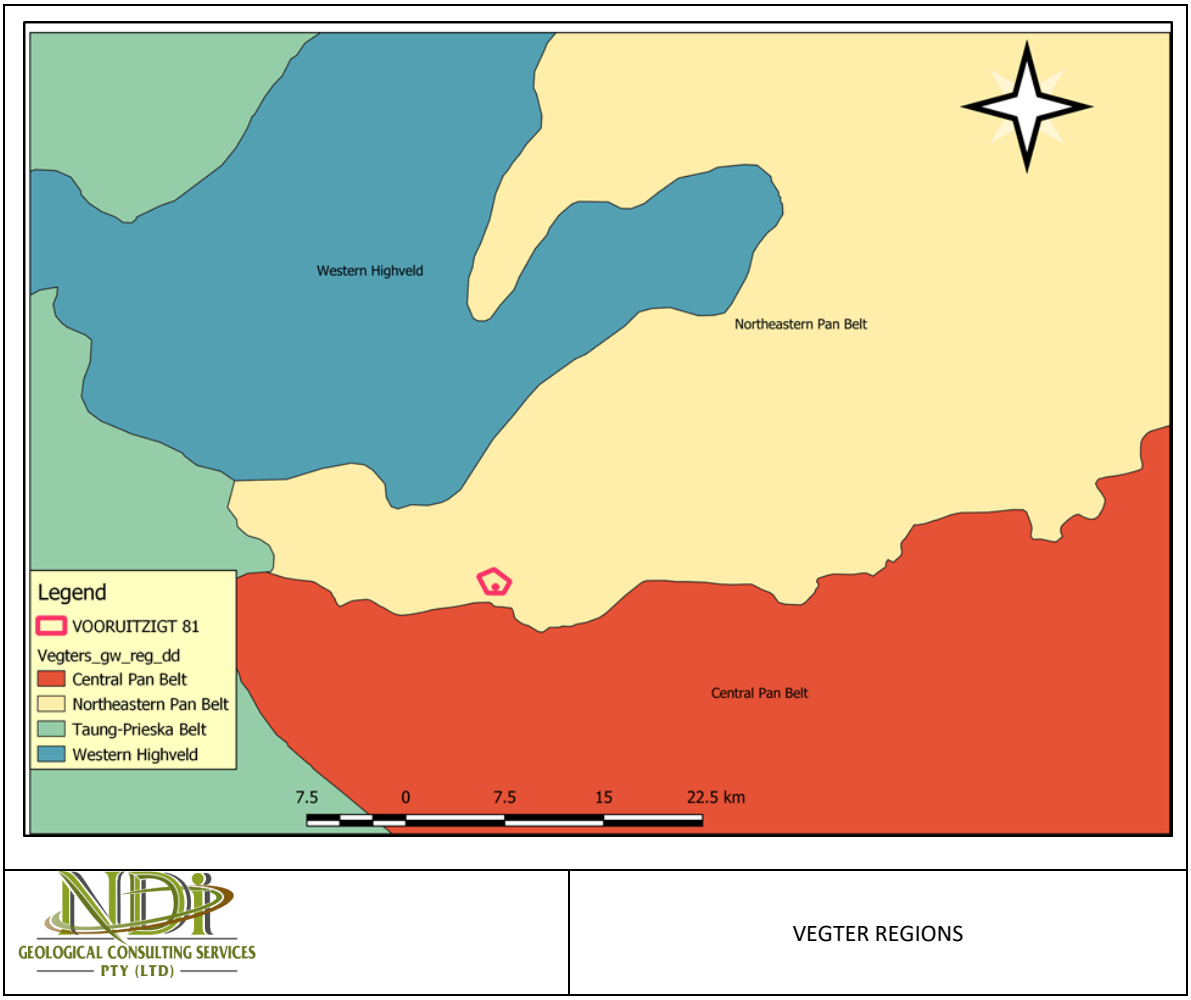


Figure 10-10: Vegter Regions

Table 10-1 indicates the estimated groundwater quantity for quaternary catchment C91E of which the proposed prospecting project is located. The total volume of water stored in both the weathered and fractured aquifer is also indicated.

Groundwater use within the quaternary catchment is very limited as indicated on the hydrocensus, this was further validated by the absence of registered groundwater users on the DWS Water Resource Management Services Database. The proposed project will also not use groundwater, but surface water will be delivered by bowsers to the project area.

Table 10-1: Groundwater Quantification

Quaternary Catchment	Area km²	Saturated Thickness (m)			Specific Yield Of WZ	Storage Coefficient Of FZ	Volume of Water Stored in Aquifer X 10^3 m^3/km^2		
		Weathered Zone (WZ)	Fractured Zone (FZ)	Aquifer			Weathered Zone	Fractured Zone	Aquifer
C91E	1507	12	149	161	2.08E-03	7.05E-05	33 827	16 630	50 457

Source: Groundwater Resource Assessment: Task 1D

10.7.5 Water Quality Sampling and Monitoring

Water quality sampling was not conducted due to the unavailability of boreholes in the proposed prospecting area. However, it recommended that some of the prospecting boreholes be used to monitoring groundwater quality mainly on the southern, eastern, western and the northern side of the proposed prospecting right area.

10.7.6 Pump Testing

The proposed prospecting area had no existing borehole and therefore pump testing was not conducted. However, it is recommended that some of the exploration boreholes be pump tested in order to determine groundwater aquifer parameters which will add to the knowledge of the site groundwater resource system.

10.7.7 Aquifer Risk and Vulnerability Assessment

The risk assessment was carried out in terms of 3 stages: evaluation of aquifer's strategic value, identification of possible contamination risk and evaluation of aquifer's vulnerability to identified contamination risk as follows:

- Aquifer classification/strategic value: Aquifer classification was conducted in terms of the "South African Aquifer System Management Classification, December 1995" manual. The following definitions of aquifer management classification were used. The aquifer has low strategic value as it does not provide water supply for households as the area is supplied by the municipality. No irrigation activities take place within 2 km radius of the proposed prospecting right project. The aquifer is therefore classified as a sole/minor aquifer (Parsons, 1995) due to less dependence.
- Aquifer Risk Level Assessment: There are many activities associated with prospecting such as such as clearing of vegetation, access roads, borehole drilling, ablution etc. These activities may have impact on the receiving environment and the groundwater system in particular. It is therefore important to assess what level of risk is, so that necessary steps can be taken to prevent and mitigate the risk.

Table 10-2 has been adopted from the "Best Practice Guideline A1.1: Small Scale Mining Practices August 2006". The potential risk is listed on Table 10-3 and their significance quantifies based on the rating provided in Table 10-2.

Table 10-2: Assessing the significance of impacts

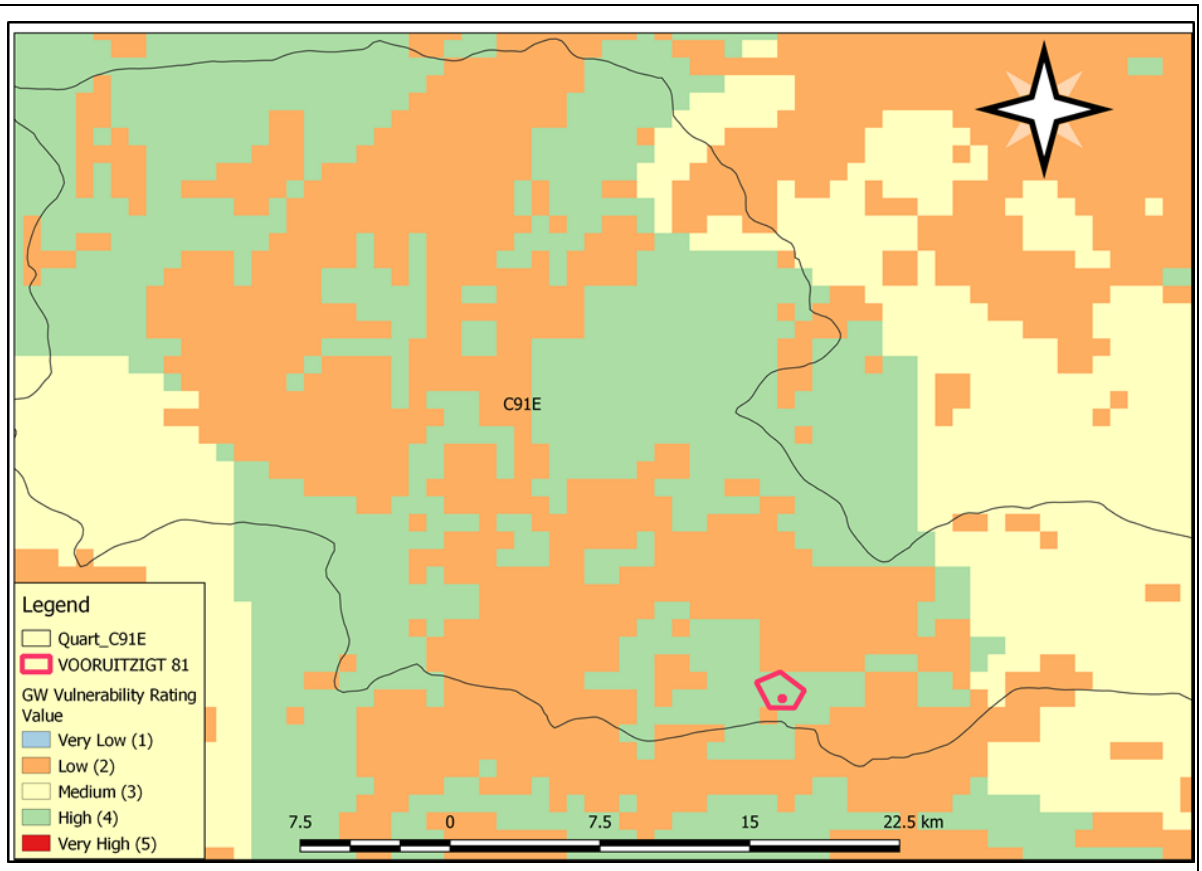
	Low impact	Medium impact	High impact	Severe impact
Frequency	Single event, unlikely to be repeated e.g. spillage	Not regular, but does happen more than once	Regular, but intermittent e.g. soakaways; drains	Continuous e.g. leaks; infiltration
Extent	Limited to only in the mining area	Local water resources. Limited to a 5 km radius of mining area.	Catchment area. Limited to a 50 km radius of mining area.	Wider (regional/national) Can spread to other provinces or regions
Duration	Short term - 0-6 month. Events that will not happen more than once in 6 months	Medium term Up to 1 year	Long term - 5 years	Permanent - No mitigation will shorten impact duration
Intensity	Negligible/Very low Minor disturbances to aquatic ecosystems or local water resources; impact temporary	Low Important but easily controlled by routine management actions	Medium Impacts experienced as temporary or continual loss of amenity or deterioration in water quality and can extend over both small and large areas.	High Impacts serious and requires frequent management attention and remedial action. Large scale effects on water resources; aquatic ecosystems and other water users
Probability	Improbable Low probability.	Probable Distinct probability.	Highly probable Most likely.	Definite Will occur regardless of prevention or mitigatory methods.

Table 10-3: Potential Risk Significance and Mitigation

Activity of concern	Risk	Risk Level	Recommended Mitigation
Access roads	Compaction of footprint area. Reduction in groundwater levels.	Medium Impact	Implement acceptable protection zones around drainage lines, riparian zones. Implement access control. Plan and regulate vehicle movement. Impellent erosion protection.
Storage of chemical and fuels	Potential spillage of fuels, oils, and lubricant contaminating groundwater	Low Impact	Train contractors and own staff on re-spills and disposal, procedure for storage, use and disposal of oils and grease. Activities monitored daily.
Exploration Boreholes	Drill chips, lubricant and mud contaminating groundwater resource. Drilled boreholes being pathways for point source pollution into groundwater resource	Low Impact	Clean drill rig after drilling each borehole and contain the mud to no flow into the boreholes. Blow each borehole after drilling to remove lubricant and other particles. Exploration boreholes will be capped after prospecting.
Ablution and waste collection	Faecal coliform and leachate from waste contaminating groundwater resource	Medium Impact	Disposable latrines should be used and emptied in the municipal sewage. Containers should be used to store waste and should be emptied and cleaned weakly depending on the rate of waste generation.

10.7.8 Aquifer Vulnerability

The aquifer is characterised as intergranular and fractured with medium to high transmissivity and porosity. The water table is estimated to be around at 30 m below ground. High transmissivity, porosity and depth to water table makes the aquifer‘s vulnerability to contamination to be high as shown in Figure 10-11. This therefore implies that aquifer contamination risk and mitigation measures should be implemented and complied with as the aquifer is already vulnerable due to its natural composition.



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AQUIFER VULNERABILITY

Figure 10-11: Aquifer Vulnerability

10.8 Biodiversity

10.8.1 Biomes

The proposed prospecting area is located in the Savanna Biome. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

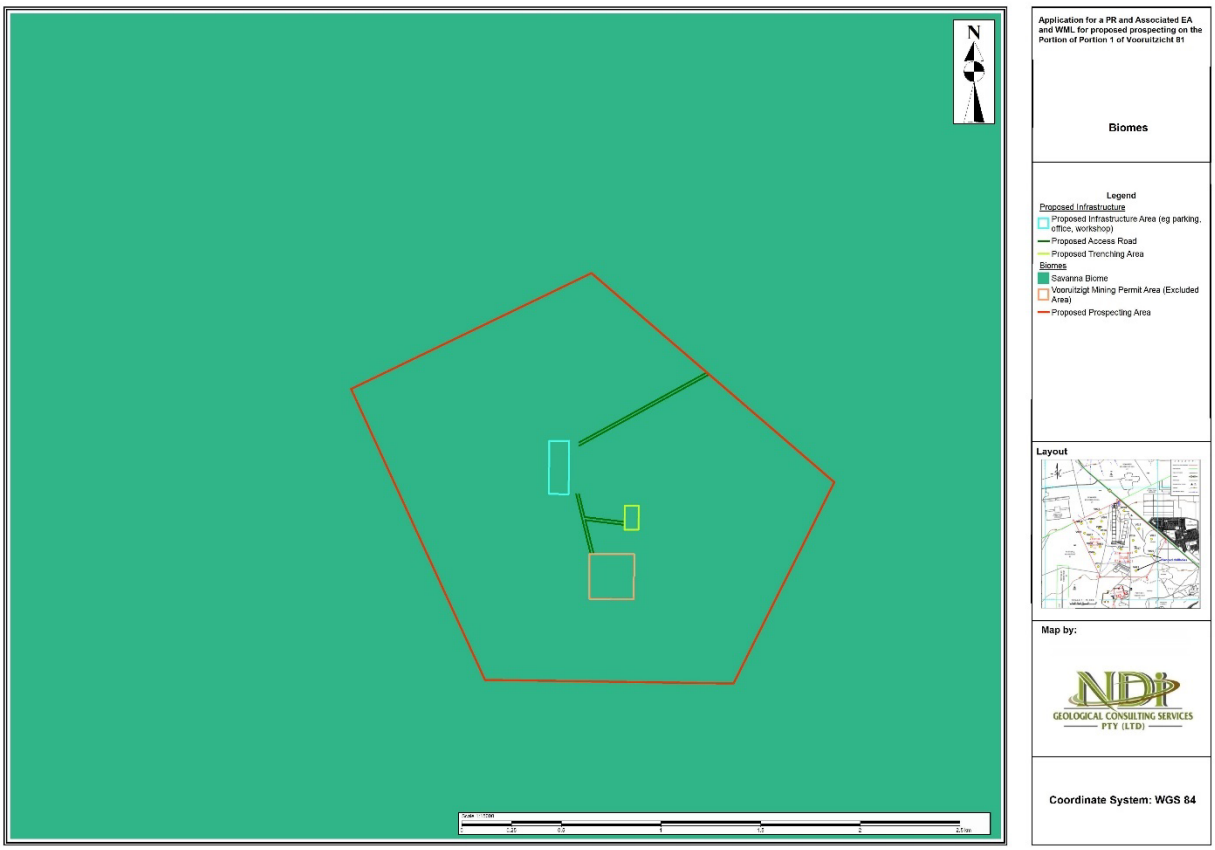

Figure 10-12: Biomes

Most of the savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost savanna types, goats are the major stock. In some types crops and subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld.

10.8.2 Bioregions

The proposed prospecting area is located in the Eastern Kalahari Bushveld Bioregion. The Eastern Kalahari Bushveld Bioregion is the largest savanna bioregion and is on average at the highest altitude. It is roughly bounded by Mafikeng, Bloemhof, Kimberley, Groblershoop and Van Zylsrus.

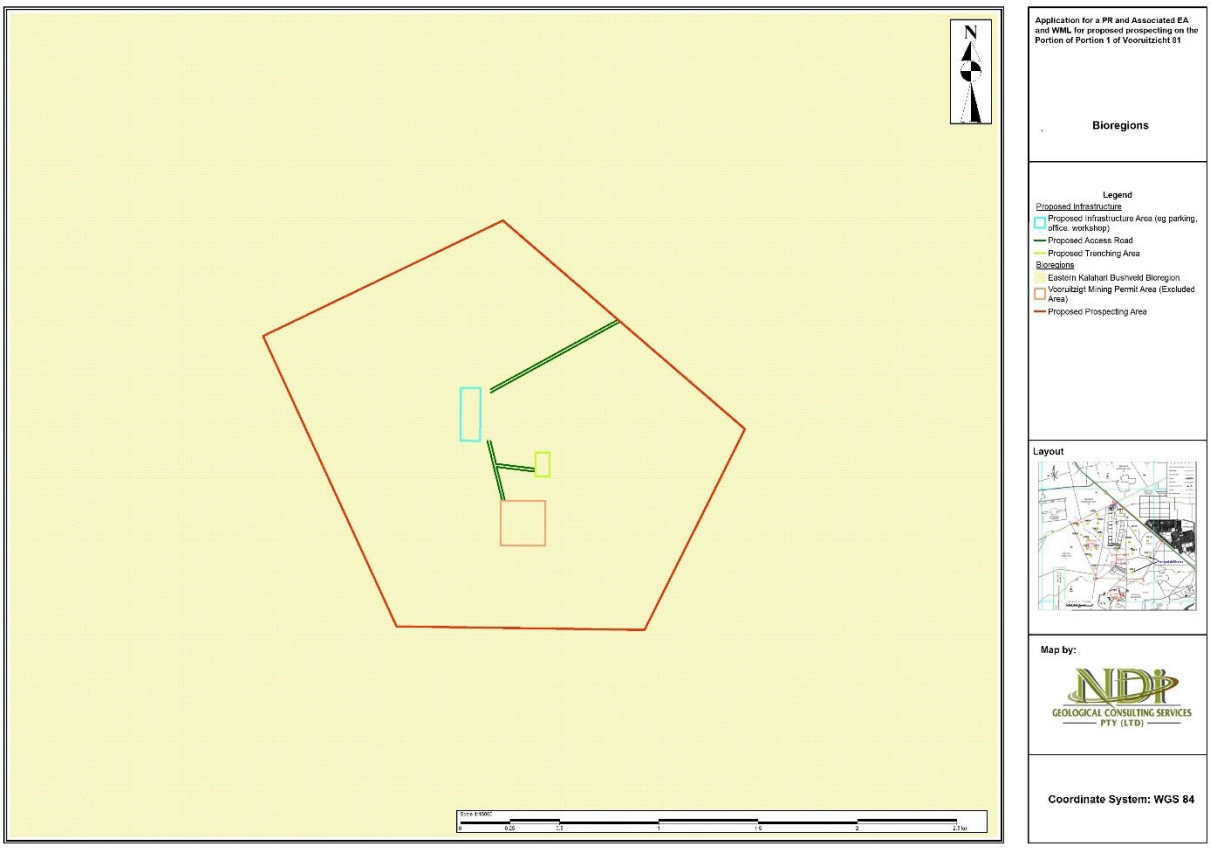

Figure 10-13: Bioregions

10.8.3 Vegetation Types

According to the SANBI remaining vegetation type database, there is no remaining natural vegetation on the affected area.

The proposed site is associated with ecosystems that are considered to be threatened (Figure 10-14). The threatened ecosystem associated with the site is the Kimberley Thornveld. According to SANBI, the ecosystem is classified at Least Threatened (Figure 10-15).

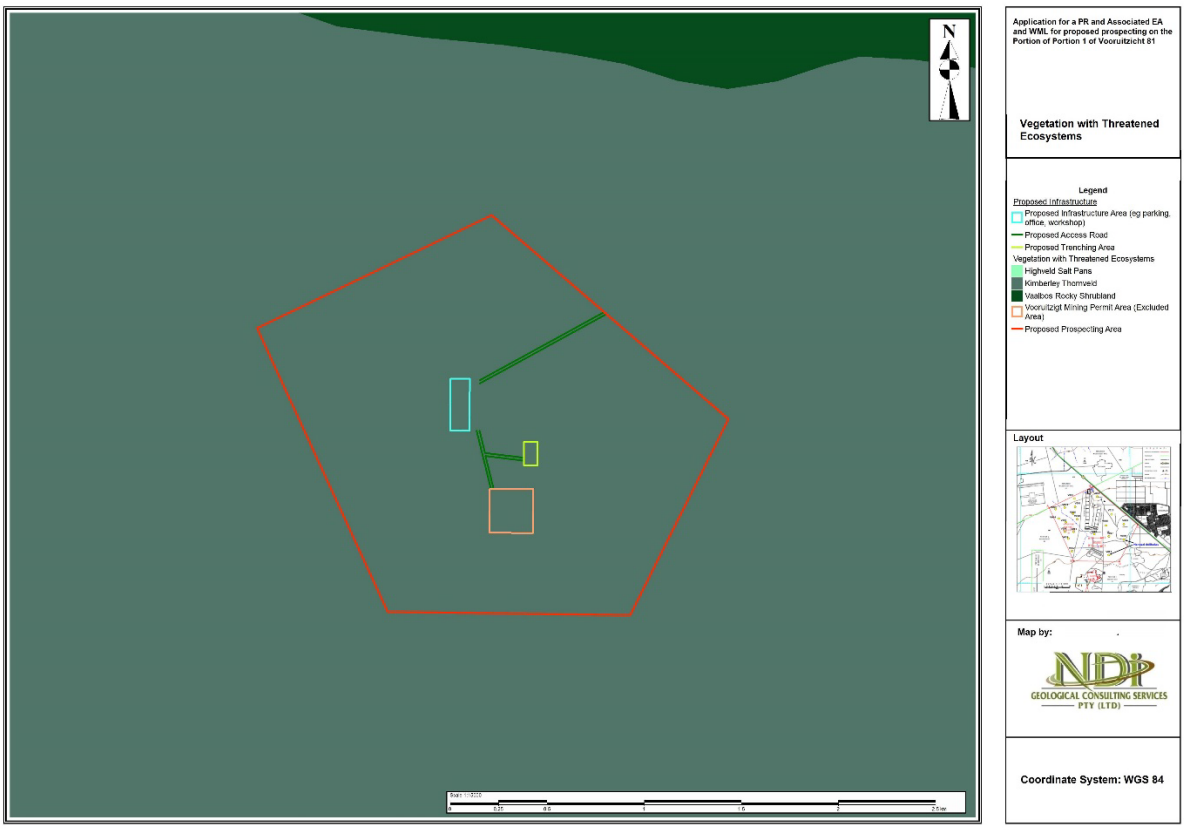

Figure 10-14: Vegetation with Threatened Ecosystems

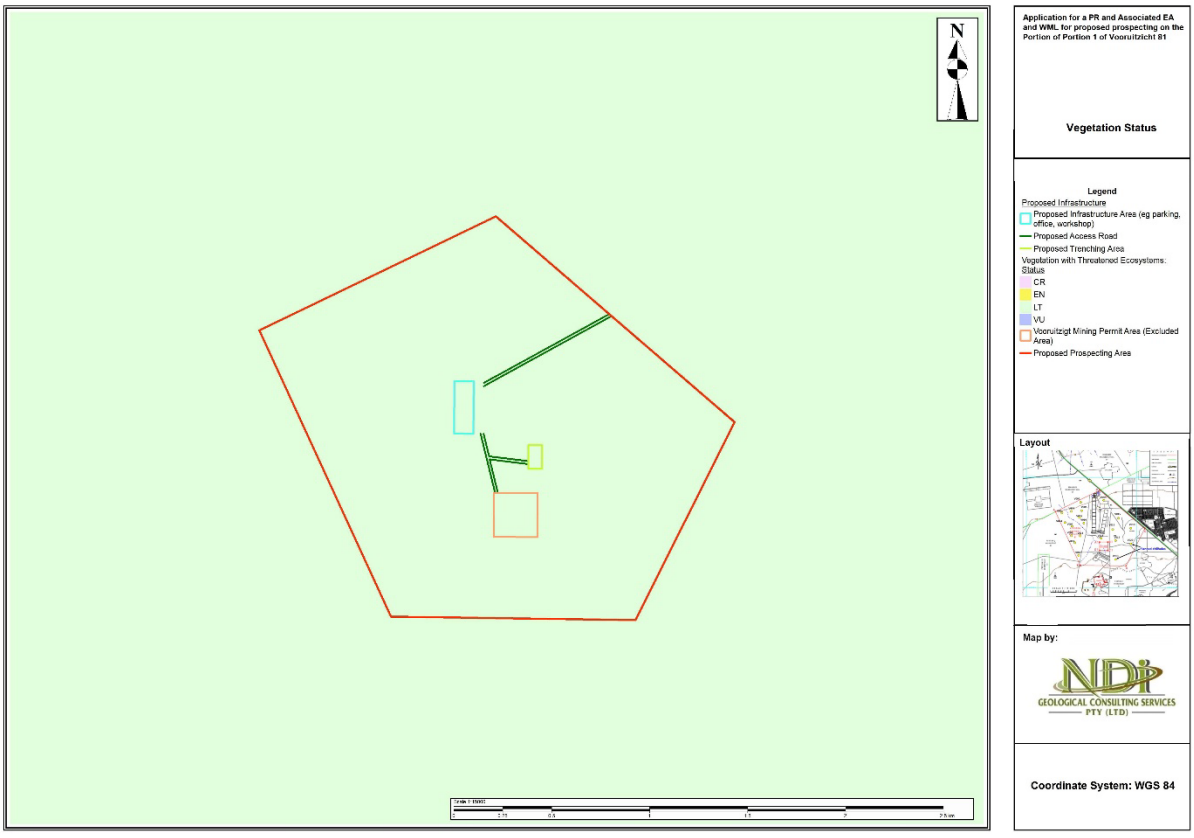

Figure 10-15: Status of Vegetation with Threatened Ecosystems

According to the ecological specialist studies, the terrain morphology is slightly undulating plains, although the natural topography has been changed by the old quarries that occur on site. The indigenous flora of area is mostly represented by the Kimberley Thornveld (Mucina & Rutherford, 2006) which occurs on slightly irregular plains with well-developed tree layer dominated by tree species such as *Vachellia erioloba, V. tortilis, V. karroo* and *Boscia albitrunca* and well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *Senegalia mellifera*. The grass layer is often open with much uncovered soil, although erosion is very low. This vegetation type has a Least Threatened conservation status with 18% transformed mostly through cultivation, while only 2% conserved.

10.8.4 Vegetation Units

Vegetation units were identified during the ecological surveys according to plant species composition, previous land-use, soil types and topography. The state of the vegetation of the proposed development site varies from completely modified to moderately degraded woodland. The study area is used as a pass-through by the local community.

The vegetation map indicates the location of the plant communities in the larger project area (Figure 10-16).

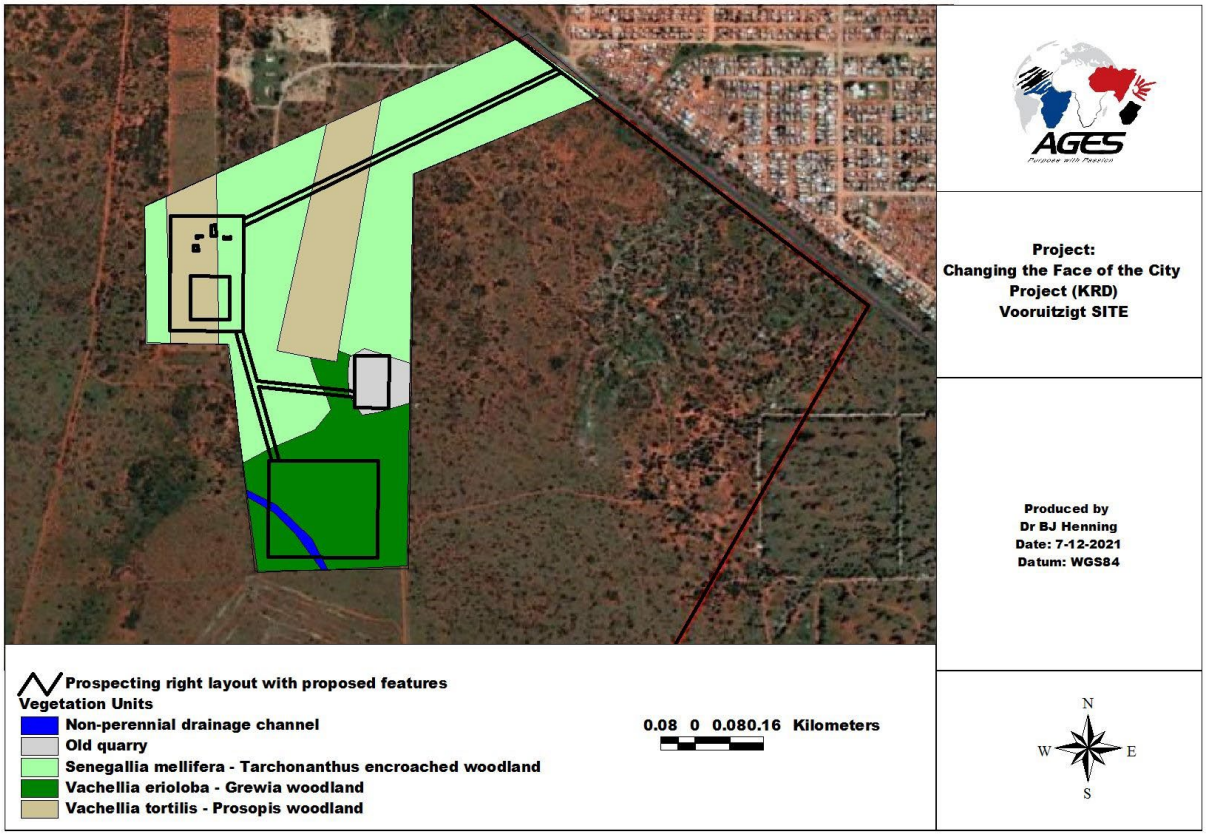

Figure 10-16: Vegetation Unit Map of the proposed development area

The vegetation communities identified on the proposed development site during the ecological surveys are classified as physiographic physiognomic units, where physiognomic refers to the outer appearance of the vegetation, and physiographic refers to the position of the plant communities in the landscape. The physiographic-physiognomic units will be referred to as vegetation units. These vegetation units are classified according to the land-use and soil differences that had the most definitive influence on the vegetation units. The aim of the study was to determine the suitability of the area from an ecological perspective for the proposed development activities.

The following vegetation units were documented on site:

- *Vachellia erioloba – Grewia* woodland: This vegetation unit occurs on most of the site for the in the southern section of the affected property. The woody structure is open woodland dominated by the protected tree species *Vachellia erioloba* and the shrub species Grewia flava. The herbaceous layer is medium dense and dominated by species such as *Stipagrostis uniplumis, Eragrostis pallens* and *Schmidtia kalaharense*. The substrate is deep, aeolian sands of the Hutton soil form.

  The *Vachellia erioloba* woodland has a Medium Sensitivity on which the dolerite and aggregate will be mined in the southern section of the Vooruitzigt site. Permit applications should be submitted to the DAFF for the eradication of the protected camel thorn tree, although the prospecting development can selectively avoid the trees and should not impact on the trees.

- *Senegalia mellifera – Tarchonanthus camphoratus* woodland: This vegetation unit occurs in the northern section of the project area on red aeolian sands that overlie calcrete bedrock. The vegetation is characterised by equal density of *Grewia flava* and *Tarchonanthus camphoratus* on the deeper sandy areas, while *Senegalia mellifera* dominate where the calcrete bedrock are closer to the surface. Where overgrazing occurred in the past, the woody layer has become encroached by *Senegalia mellifera*. Typical grass species associated with the area include *Stipagrostis species, Enneapogon scoparius* and *Schmidtia pappophoroides.*

  The vegetation unit has a Medium-low Sensitivity and unlimited development can be supported within the footprint area.

- Drainage features: non-perennial drainage channel: The wetland classification system of the National Water Act classifies the HGM unit associated with the non-perennial drainage channel as channels. These channels are not “true” wetlands as stipulated in the National Water Act due to the soils not indicating wetness in the top 50cm and therefore represent water courses.

  The drainage channel on the Vooruitzigt site is non-perennial. The band of trees that occurs along the channel can be classified as riparian vegetation. This vegetation is very important for connectivity with adjacent vegetation as well as a migratory route for riparian animals. The most abundant and most conspicuous trees in the riparian woodland are *Vachellia karroo, Grewia flava* and *Vachellia erioloba.* Typical grasses include *Panicum maximum*.

  In determining the integrity of the drainage system, the condition of the site and the indirect and direct disturbances is considered. The roads, alien invasive vegetation species, sedimentation and density roughness elements was considered in determining the PES and EIS of the non-perennial channel on site (Table 10-4). Appendix F and G indicate the scores for the PES and EIS respectively.

Table 10-4: Present Ecological State and Ecological Importance & Sensitivity of the riparian system on the proposed development site

Crossing name	Hydro-geomorphic Unit	PES	EIS
Drainage channel – prospecting site	Non-perennial channel with riparian woodland	Class C: Moderately modified	Moderate

The non-perennial drainage channels and riparian woodland have a Class C PES (Moderately Modified). The riparian woodland plays an important role as corridor for fauna in the area and

has only been impacted by upstream agricultural activities and road crossings. Considering the importance as fauna corridor as well as the red data species associated with the riverine woodland, the area has a moderate EIS. This HGM unit is therefore considered to be ecologically sensitive and important. The biodiversity of this riparian zone may be sensitive to flow and habitat modification, while the channel plays a significant role in moderating the quantity and quality of water entering downstream areas.

The following are recommended for the future prospecting application for the aggregate mine:

- The riparian areas forming part of floodlines associated with the major water courses in the area have a high sensitivity and no activities can be allowed within these areas without the necessary authorization according to the National Environmental Management Act (NEMA) 107 of 1998 and Section 21 c and i of the National Water Act 36 of 1998.
- A buffer zone of 32 meters should be applied around the drainage channel to ensure impact are limited to a minimum.

10.8.5 Species of conservation concern

A list of red data plant species previously recorded in the study area in which the proposed development is planned was obtained from the Plants of Southern Africa (POSA) database of SANBI. There are various categories for Red Data Book species, such as ‘Endangered’, ‘Vulnerable’, ‘Rare’ and ‘Near threatened’ as listed in the Red Data List of Southern African Plants (Hilton-Taylor 1996). The following red data species was listed for the project area (Table 10-5).

Table 10-5. Red data species documented during the surveys

Species Name	Conservation Status
Gallenia pallens	Data Deficient

After a detailed survey was conducted during July 2020, none of the red listed plants was found on site:

10.8.6 Protected tree species (NFA)

The National Forest Act (no.84 of 1998: National Forest Act, 1998) provides a list of tree species that are considered important in a South African perspective because of scarcity, high utilization, common value, etc. In terms of the National Forest Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased, or sold – except under license granted by DWAF (or a delegated authority). Obtaining relevant permits are therefore required prior to any impact on these individuals. Taking cognizance of the data obtained from the field surveys, the following tree species occur in the area:

- *Vachellia erioloba (*camel thorn trees)

The camel thorns were only found on one site namely the Vooruitzigt site. Isolated individuals occur on the footprint areas of the proposed plant and prospecting area, while an open woodland dominated by camel thorns occur on the proposed prospecting application site of the Vooruitzigt site. A licence application should therefore be submitted to DAFF before any of these trees can be removed during construction, although it is anticipated that none of the trees will be affected.

10.8.7 Protected Plants (NC DENC)

Plant species are also protected according to the Northern Cape Department of Environment of Nature Conservation (DENC). According to this Act, no person may pick, import, export, transport, possess, cultivate, or trade in a specimen of a specially protected or protected plant species. The Appendices to the Act provide an extensive list of species that are protected, comprising a significant component of the flora expected to occur on site. Communication with Provincial authorities indicates that a permit is required for all these species if they are expected to be affected by the proposed project. After a detailed survey was conducted during July 2020, no protected plant species was found on site:

10.8.8 Invasive alien species and exotic weeds

Invasive alien plants pose a direct threat not only to South Africa's biological diversity, but also to water security, the ecological functioning of natural systems and the productive use of land. They intensify the impact of fires and floods and increase soil erosion. Of the estimated 9000 plants introduced to this country, 198 are currently classified as being invasive. It is estimated that these plants cover about 10% of the country and the problem is growing at an exponential rate.

The Alien and Invasive Species Regulations (GNR 599 of 2014) are stipulated as part of the National Environmental Management: Biodiversity Act (10/2004). The regulation listed a total of 559 alien species as invasive and further 560 species are listed as prohibited and may not be introduced into South Africa. Below is a brief explanation of the four categories of Invasive Alien Plants as per the regulation.

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: 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 Category 2 plants to exist in riparian zones.
- Category 3: 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.

The following alien invasives and exotic plant species were recorded on site during the surveys as stipulated in the Alien and Invasive Species Regulations (GNR 599 of 2014) (Table 10-6):

Table 10-6: Declared weeds and invader plants of the study area

Species	Common name	NEMBA status
Agave sisalana	Sisal	2
Argemone ochroleuca	Mexican poppy	1b
Atriplex nummularia	Old man salt bush	2
Cirsium vulgare	Scotch thistle, spear thistle	1b

Species	Common name	NEMBA status
Datura stramonium	Common thorn apple	1b
Flaveria bidentis	Smelters bush	1b
Melia azedarach	Seringa tree	3 (in urban areas)
Nicotiana glauca	Tobacco tree	1b
Opuntia ficus-indica; Opuntia stricta	Prickly pear	1b
Prosopis glandulosa	Mesquite trees	3
Ricinus communis	Castor oil plant	2
Salsola kali	Common saltwort / tumbleweed	1b
Tipuana tipu	Tipu tree	3
Xanthium strumarium	Large cocklebur	1b

According to the amended regulations (No. R280) of March 2001 of the Conservation of Agricultural Resources Act 1983 (Act no. 43 of 1983), it is the legal duty of the land user/landowner to control invasive alien plants occurring on the land under their control. The State has the right to clear invasive plants at the landowner's expense if the landowner refuses to remove invasive plants.

10.8.9 Fauna Habitats

A survey was conducted during July 2020 to identify specific fauna habitats, and to compare these habitats with habitat preferences of the different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. The area represents mixed woodland vegetation components with a diverse vegetation structure and height class. The regional fauna has not been as extensively studied and is not known to exhibit many unique features. The area has been settled for many centuries, and the fauna is usually considered impoverished due to overgrazing and other man-induced impacts. There are three main faunal habitat types present on the site that might be impacted on by the proposed project namely open water habitat (wetlands), degraded grassland and mixed woodland (alien invasive and indigenous).

10.8.10 Common fauna documented and potentially occurring in the project area

As a result of anthropogenic disturbance in the larger area and the limitations created by game fences, only the most tolerant generalists of the larger vertebrates still occur in the project area outside the nature reserves. Examples are grey duiker, steenbok, and vervet monkey. The more sensitive habitat-specialist species like honey badger, brown hyena and caracal have retreated into areas of lower disturbance such as the surrounding woodland outside Kimberley city.

- Mammals: Large mammals that occurred historically at the site, are absent from the area, owing to anthropogenic impacts in recent centuries. This loss of large species means that the mammal diversity at the site is far from its original natural state not only in terms of species richness but also with regards to functional roles in the ecosystem.

  The use of trapping techniques was not deemed necessary due to the degraded state of the natural environment, although the development of the residential area will have a significant impact on any small mammal species that may occur within the study area.

  Antelope species such as duiker might potentially migrate through the area and are not restricted by game fences. Smaller mammal species such as honey badgers and serval can become habituated to anthropogenic influences, while other species such as brown hyena will rather move away from the construction activities and will seldom use the area. The dominant

species composition therefore comprises of widespread taxa with some species having specialised life history traits.

Mammals are sensitive to disturbances and habitat destruction and degradation and as such the anticipated species diversity of the study area would be low. Settlement areas have negated the possibility of encountering any medium to large mammals. The presence of dogs as well as poaching activities (snares observed on site), poses a threat to the presence of mammals on sites. The mammals are mostly represented by generalised species such as rodents, scrub hares and smaller antelope (steenbok, common duiker) that will move through the area while foraging. The proximity of the informal settlements does however place constant pressure on these mammal populations and many of these populations will eventually disappear from the area completely. Most mammal species are highly mobile and will move away during construction.

The connectivity1 of the project site is low. Of significance is the role of the Kamfers Dam in the larger area as zoogeographical dispersal corridors.

- Birds (avifauna): Microphyllous woodland usually supports much higher bird numbers compared to the broadleaved woodlands. The area represents microphyllous woodland and supports many smaller bird species such as Ashy Tit, Pied Babbler, Kalahari Robin, Burntnecked Eremomela, Desert Barred Warbler, Marico Flycatcher, PriritBatis, Crimsonbreasted Shrike, Longtailed Shrike, Threestreaked Tchagra, Great Sparrow, Whitebrowed Sparrowweaver, Scalyfeathered Finch, Violeteared Waxbill and Blackcheeked Waxbill.

  Degraded grasslands sometimes cover extensive areas and have become an artificial habitat that attracts a wide range of generalist species. These grasslands represent a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs, and other food sources suddenly accessible to birds and other predators; the grasses are often eaten themselves by birds or attract insects which are in turn eaten by birds.

- Herpetofauna (Reptiles and Amphibians): Typical species associated with arid and semi-arid habitat types occur in the study area. Venomous species such as the puff adder and cape cobra are expected to occur in the study area, although the presence of these snakes is dependent on the presence of their prey species (rodents, frogs etc.). The general habitat type for reptiles consists of open shrubveld and grassland with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks and other reptiles.

  The amphibians appear to be poorly represented on site and the non-perennial drainage channel is not considered suitable habitat for the few amphibian species that could occur in the area. No threatened species occur in the area.

10.8.11 Red data fauna:

Some red data fauna does potentially occur in the vicinity of the proposed developments, although it has a very low to almost zero probability of occurring on the site. Table 10-7 provides a list of potential red data species occurring in the study area.

[1] C**onnectivity (habitat connectivity)** - Allowing for the conservation or maintenance of continuous or connected habitats, to preserve movements and exchanges associated with the habitat.

Table 10-7: Red data fauna species potentially occurring in the study area

English Name	Conservation Status	Probability of occurrence on site
BIRDS		
Bustard, Kori	Near threatened	Medium
Bustard, Ludwig's	Endangered	Medium
Courser, Burchell's	Vulnerable	Medium
Courser, Double-banded	Near threatened	Medium
Crane, Blue	Near threatened	Very low
Duck, Maccoa	Near threatened	Low
Eagle, Martial	Endangered	Low
Eagle, Tawny	Endangered	Low
Eagle, Verreauxs'	Vulnerable	Low
Falcon, Lanner	Vulnerable	Low
Flamingo, Greater	Near threatened	Low
Flamingo, Lesser	Near threatened	Low
Korhaan, Southern Black	Vulnerable	Low
Painted-snipe, Greater	Vulnerable	Low
Pipit, African Rock	Near threatened	Low
Roller, European	Near threatened	Medium
Secretarybird	Vulnerable	Medium
Stork, Abdim's	Near threatened	Medium
Stork, Saddle-billed	Endangered	Low
Stork, Yellow-billed	Endangered	Low
Vulture, Lappet-faced	Endangered	Medium
Vulture, White-backed	Endangered	Medium
MAMMALS		
Bushveld Gerbil	Data Deficient	Medium
African Striped Weasel	Data deficient	Low
Southern African Hedgehog	Near Threatened	Low
African Straw-coloured Fruit Bat	Near Threatened (IUCN ver 3.1)	Low
Roan Antelope	Vulnerable	Zero – restricted to game reserves
Sable antelope	Vulnerable	Zero – restricted to game reserves

The following impacts might occur during the development phase on the fauna populations of the area:

- Destruction/permanent loss of individuals of rare, endangered, endemic and/or protected species through habitat loss or fragmentation.
- Disturbance of remnant terrestrial wild mammal, avian, amphibian and insect fauna would probably occur through physical habitat destruction, noise, traffic, and movement of people.
- Potential increase in feral animals and impact on indigenous fauna e.g., cats, rats.
- Illegal hunting or disturbance.

The following general observations with regards to the project area can be made. Recommendations and mitigating measures need to be implemented to ensure the survival of these species other fauna habitats and feeding grounds:

- Red data and other mammal species have a very low probability of occurring in the area. Probability of occurrence was determined depending on the state of the habitats. The areas where low diversity of fauna can be expected (degraded habitats) is because of the following:
    - The already degraded land as well as other anthropogenic influences in the area that stretches along roads and around infrastructure will cause fauna to migrate from the area to more natural areas with fewer disturbances.
    - The habitat of many of the red data species would be in the Kamfers Dam or rocky outcrops outside the development footprints. These areas will be preserved as corridors for fauna.
- If one considers the habitat descriptions of the red data species, some of them are limited in range or threatened as a direct result of habitat loss in the southern African sub-region, although other species with large home ranges are not directly threatened by habitat loss. The impact of development on the red data species would therefore be less than predicted.
- The development would not have a significant impact on the above-mentioned red data fauna since adequate natural habitat/vegetation would be available on the larger Southern Kalahari landscape. The mitigation measures stipulated with the impacts provides for the preservation of the sensitive habitats in the area.

The general faunal biodiversity is not expected to be adversely influenced on a measurable scale by the development of the infrastructure or rehabilitation actions proposed for the sites, especially through already impacted zones. No unique or restricted faunal habitat types occur on the Vooruitzigt site.

10.8.12 EIA Screening Tool Listed Species

No listed species occur in the EIA screening tool.

10.8.13 Ecological Sensitivity Classes

Following the ecological surveys, the classification of the study area into different sensitivity classes and development zones was based on information collected at various levels on different environmental characteristics. Factors which determined sensitivity classes were as follows:

- Presence, density, and potential impact of development on rare, endemic, and protected plant species.
- Conservation status of vegetation units.
- Soil types, soil depth and soil clay content.
- Previous land-use.
- State of the vegetation in general as indicated by indicator species.

Below included is the sensitivity map for the proposed infrastructure development (Figure 10-17). Only criteria applicable to the specific vegetation units were used to determine the sensitivity of the specific unit.

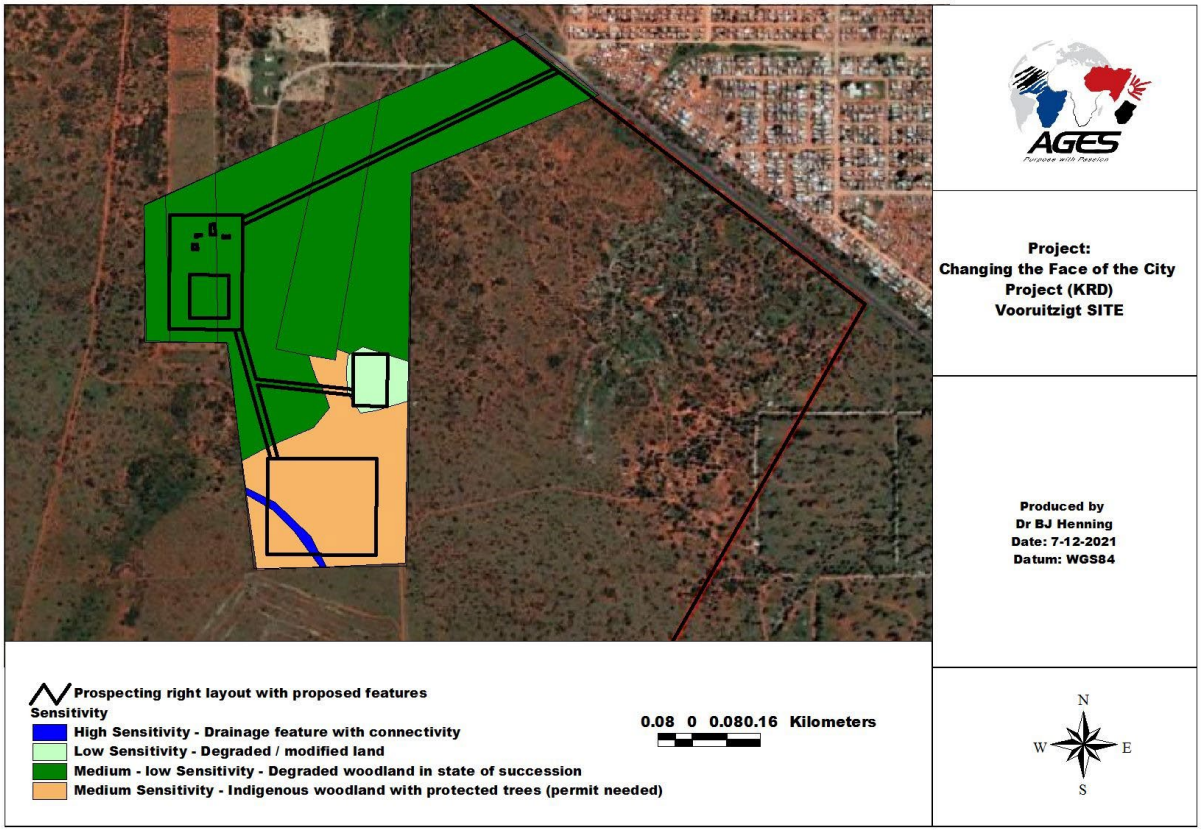

Figure 10-17: Sensitivity Map of the project area

10.9 Conservation Plan

According to the Norther Cape Provincial Biodiversity Conservation Plan (C Plan), a portion of the affected property is classified as an Ecological Support Area (ESA). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas (CBAs) and/or in delivering ecosystem services.

Figure 10-18 provides a map showing areas of conservation importance that may be affected by the prospecting activities.

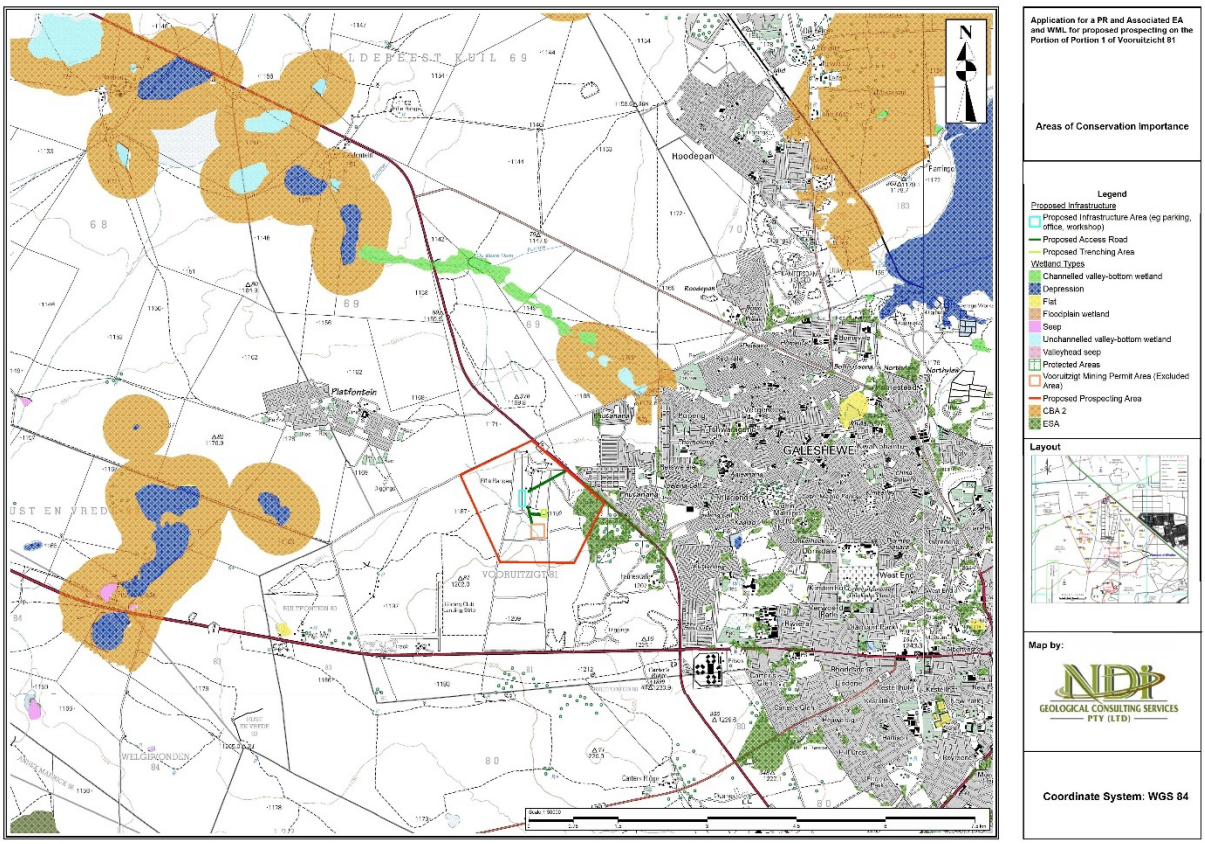

Figure 10-18: Areas of Conservation Importance

10.10 Heritage Resources

Heritage resources may be tangible, such as buildings and archaeological artefacts or intangible such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical scientific, social, spiritual, linguistic economic or technological values; their representation of a particular period; their rarity and their sphere of influence. There are a number of heritage and cultural resources in the Northern Cape Province. However, there are no major heritage resources sites that are associated with the affected properties. It is however expected that there may be graves and burial sites that may be affected by the proposed prospecting activities.

A HIA conducted by the specialist found a very low density 'background scatter' of cf. Fauresmith artefacts was noted in areas where Hutton Sands are removed, both on the prospecting site and in an immediately adjacent property (Morris 2012). No colonial era or other cultural resources were in evidence. Archaeological significance of the area is reckoned to be low. There is potential for subsurface material across the entire area, but indications are that densities would be low. Steps for reporting in the event of archaeological material being found are indicated.

Should there be any heritage sites (graves) within the prospecting area, they will be identified and fenced before any prospecting activities take place.

10.11 Blasting and Vibrations at Vooruitzigt

A desktop assessment of impacts on blasting operations at the Vooruitzigt Quarry was conducted. Various installations were identified within 1500 m from the proposed quarry area (Figure 10-19). Possible impacts at these points of interest associated with the planned operation was identified and considered. Three areas within a range of 0 to 1500 m from the pit boundaries were identified and

indicated at different levels of possible influence. The possible influences and level of influence will be investigated and if required, mitigation measures will be recommended during the impact assessment phase.

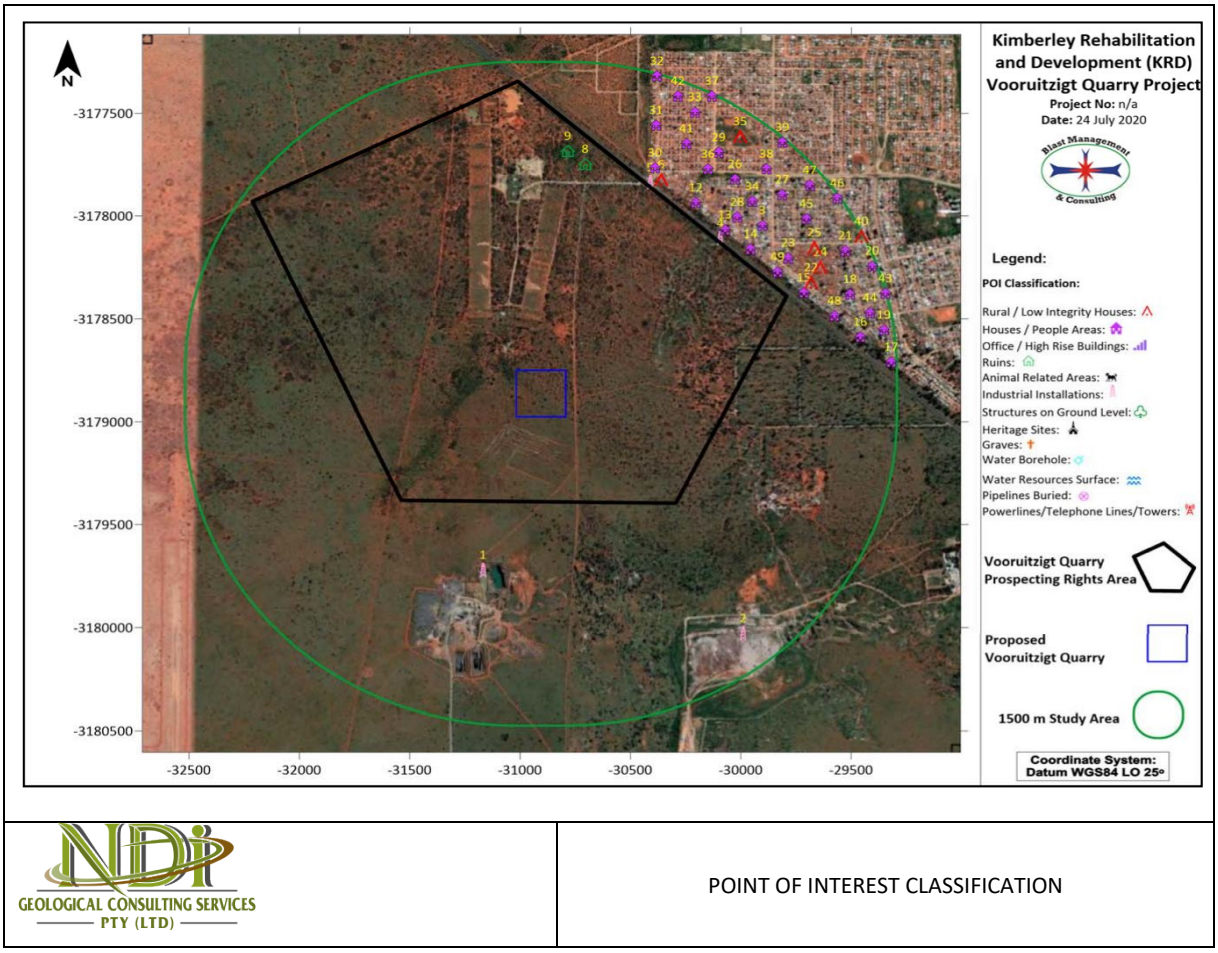

Figure 10-19: Point of Interest Classification

The sensitivity assessment found that there most of the infrastructure is located within the low sensitivity zone (Figure 10-20) except for the quarry activity. Review of the area clearly shows that various infrastructure is found around the proposed open pit area in range order of 950 m and further. The infrastructure is considered private property and not mine owned. This will require careful planning regarding drilling and blasting operations. There are various legal requirements that will need to be considered in the process going forward.

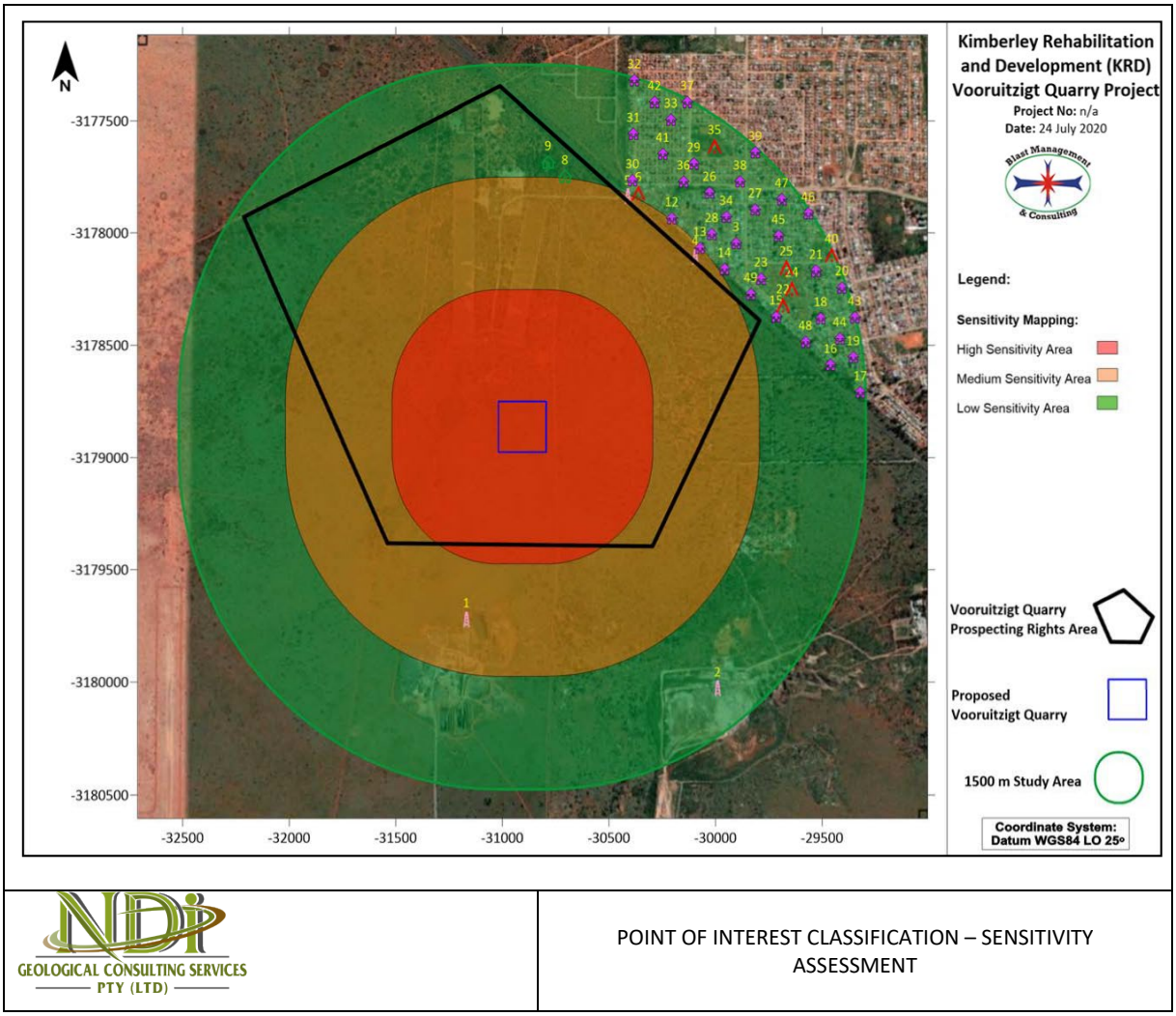

Figure 10-20: Point of Interest Sensitivity Assessment

Review of probable ground vibration and air blast levels and method applied, certain areas may experience limited negative influence. The expectation is that ground vibration levels will be low but perceptible. Air blast is expected to be below the limits at the distances observed. This is specific towards the Galeshewe Township with the Phutanang suburb being closest to the quarry operations.

10.12 Socio-Economic

The proposed prospecting project will be located within the Sol Plaatje Local Municipality which is situated in the Francis Baard District Municipality.

10.12.1 Population

The municipality has experienced negative growth (-0.3%) in the population from 1996 to 2001 and an upswing to 2% from 2001 to 2011. With almost 260 000 people, the Sol Plaatje Local Municipality housed 0.5% of South Africa's total population in 2015. Between 2005 and 2015 the population growth averaged 2.22% per annum which is slightly higher than the growth rate of South Africa as a whole (1.51%). Compared to Frances Baard's average annual growth rate (1.78%), the growth rate in Sol Plaatje's population at 2.22% was slightly higher than that of the district municipality. The population projection of Sol Plaatje Local Municipality shows an estimated average annual growth rate of 1.9% between 2015 and 2020. The average annual growth rate in the population over the projection period

for Frances Baard District Municipality, Northern Cape Province and South Africa is 1.7%, 1.5% and 1.4% respectively and is lower than that the average annual growth in Sol Plaatje Local Municipality.

The population pyramid reflects a projected change in the structure of the population from 2015 and 2020. The differences can be explained as follows:

- In 2015, there is a significantly larger share of young working age people between 20 and 34 (27.4%), compared to what is estimated in 2020 (25.4%). This age category of young working age population will decrease over time.
- The fertility rate in 2020 is estimated to be slightly higher compared to that experienced in 2015.
- The share of children between the ages of 0 to 14 years is projected to be slightly smaller (27.4%) in 2020 when compared to 2015 (27.6%).
- In 2015, the female population for the 20 to 34 years age group amounts to 14.3% of the total female population while the male population group for the same age amounts to 13.2% of the total male population. In 2020, the male working age population at 12.1% does not exceed that of the female population working age population at 13.3%, although both are at a lower level compared to 2015.

10.12.2 Level of Education

Of the population over 20 years, 30% have matric and higher education, while 10% indicate no schooling. The remaining 60% have some primary schooling and some secondary schooling. This will pose a serious problem for the future economic trajectory as skills will have to be built to suit the economic path and in the short-term skills will have to be brought in from skilled areas. Within Sol Plaatje Local Municipality, the number of people without any schooling decreased from 2005 to 2015 with an average annual rate of -3.43%, while the number of people within the 'matric only' category, increased from 32 100 to 49 200. The number of people with 'matric and a certificate/diploma' increased with an average annual rate of 3.65%, with the number of people with a 'matric and a Bachelor's' degree increasing with an average annual rate of 7.82%. Overall improvement in the level of education is visible with an increase in the number of people with 'matric' or higher education.

10.12.3 Employment Levels

In 2005, 39.7% of the total population in Sol Plaatje Local Municipality were classified as economically active which decreased to 39.6% in 2015. Compared to the other regions in Frances Baard District Municipality, Sol Plaatje local municipality had the highest Economic Active Population (EAP) as a percentage of the total population within its own region relative to the other regions. On the other hand, Magareng local municipality had the lowest EAP with 28.0% people classified as economically active population in 2015. Of the economically active people in the municipality, 31.9% are unemployed (narrow definition of unemployment). 41.7% of the economically active youth (15 – 34 years) in the area are unemployed. This figure is compelling enough to direct a special focus on youth employment. In 2015 the labour force participation rate for Sol Plaatje was at 60.0% which is very similar when compared to the 59.2% in 2005. The unemployment rate is an efficient indicator that measures the success rate of the labour force relative to employment. In 2005, the unemployment rate for Sol Plaatje was 36.6% and decreased overtime to 36.0% in 2015. The gap between the labour force participation rate and the unemployment rate decreased which indicates a negative outlook for the employment within Sol Plaatje Local Municipality.

10.12.4 Economic Statistics

The tertiary sector employs relatively little unskilled labour compared to the primary and secondary sectors. Therefore, growth in the tertiary sector does not normally have a significant impact on unemployment as the majority of unemployed people are not highly skilled. compared to the national economy of South Africa, Sol Plaatje Local municipality has a comparative advantage on community services and almost the same advantage on the transport industry. A slight advantage is also noted on financial services. However, when it comes to specifically manufacturing, Sol Plaatje has a significant comparative disadvantage relative to the country as a whole. In terms of trade the quotient of Sol Plaatje is relatively similar to that of South Africa. Generally speaking, Sol Plaatje has a very narrow economy.

10.13 Soil Types

A Land type unit is a unique combination of soil pattern, terrain and macroclimate, the classification of which is used to determine the potential agricultural value of soils in an area. The land type units represented within the project areas include the Ae45 land type (Land Type Survey Staff, 1987) (ENPAT, 2000). The land type, geology and associated soil type is presented in Table 3 below as classified by the Environmental Potential Atlas, South Africa (ENPAT, 2000).

Table 10-8: Land types, geology, and dominant soil types of the proposed development site

Land Type	Soils	Geology
Ae45	Red-yellow apedal, freely drained soils; red, high base status, > 300 mm deep (no dunes)	Tillite (Dwyka Formation), shale and mudstone (Ecca Group) covered partially by surface limestone and red wind-blown sand. Dolerite intrusions also occur.

The soils in a regional context are reddish, moderately shallow, sandy, and often overlay layers of calcrete of varying depths and thickness. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gulley erosion in areas where stormwater can concentrate.

10.14 Description of the current land uses

The majority of the affected area is currently being used for agriculture and mining.

11 Impacts identified and risks identified

Table 11-1 provides a high-level assessment of the potential impacts and associated mitigation measures which could result from the proposed prospecting during construction, operation, and decommissioning/closure.

Table 11-1: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible job opportunities during the construction and operation.
Hydrogeology	Possible groundwater contamination.
Surface water	Possible surface water contamination.
Air Quality	Possible impact on Air Quality in the area.
Climate Change	Possible contribution to climate change through emission of Green House Gases
Blasting and Vibrations	Possible impacts on private properties and fauna due to blasting and vibrations
Noise	Possible generation of noise during construction and operation.
Soils/Land Use/Land Capability	Loss of soil resource and change in land capability and land use.
Biodiversity	Disturbance and loss of biodiversity, especially SCC.
Aquatic ecology	Possible loss, sedimentation, and contamination of aquatic resources
Heritage	Possible impact on heritage and cultural resources (including graves) in the area.
Traffic	Potential safety issues due to the increased traffic.
Cumulative Impacts	Cumulative Impacts

These impacts have been further refined and assessed according to the quantitative impact assessment methodology in Section 12 and the results are presented in Section 13.

12 Methodology used in determining the significance of environmental impacts

The following methodology for determining the significance of environmental impacts was utilised for the EIA/EMPr phase.

The impact assessment methodology has been formalised to comply with Regulation 31(2) (i) of NEMA, which states the following:

> *(2) An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision …, and must include –*
> *(I) an assessment of each identified potentially significant impact, including –*
> *(i) **cumulative impacts**;*
> *(ii) the **nature** of the impact;*
> *(iii) the **extent** and **duration** of the impact;*
> *(iv) the **probability** of the impact occurring;*
> *(v) the **degree** to which the impact can be **reversed**;*
> *(vi) the **degree** to which the impact may **cause irreplaceable loss of resources**; and*
> *(vii) the **degree** to which the impact can be **mitigated**.*

All the identified potential impact were assessed according to the following Impact Assessment Methodology as described below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities[2], aspects[3] and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors[4] and resources[5], which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts[6] (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 12. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity[7], spatial scope[8] and duration[9] of the impact together comprise the consequence of the impact and when summed can obtain a maximum

[2]An ***activity*** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.
[3]An ***environmental aspect*** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact.
[4]***Receptors*** comprise, but are not limited to people or man-made structures.
[5]***Resources*** include components of the biophysical environment.
[6]***Environmental impacts*** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
[7]***Severity*** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
[8]***Spatial scope*** refers to the geographical scale of the impact.
[9]***Duration*** refers to the length of time over which the stressor will cause a change in the resource or receptor.

value of 15. The frequency of the activity[10] and the frequency of the impact11 together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in Table 12-1. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

Table 12-1: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT	RATING
Activity specific	1
PRA specific (within the PRA boundary)	2
Local area (within 5 km of the PRA boundary)	3
Regional	4
National	5

DURATION OF IMPACT	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD

[10] ***Frequency of activity*** refers to how often the proposed activity will take place.

[11] ***Frequency of impact*** refers to the frequency with which a stressor (aspect) will impact on the receptor.

Consequence

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

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

13 The positive and negative impacts that the proposed activity and alternatives will have

This section contains the assessment of potentially positive and negative environmental impacts that may occur due to the proposed project. The impacts are linked to the activities conducted for the proposed development, broadly relating to pre-construction, construction, operations, and decommissioning phases. Specific emphasis was placed on any relevant environmental, social, and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to promote mitigation measures to reduce the impacts to an acceptable level where required. Key potential positive and negative environmental issues relating to the proposed project were assessed according to the adopted methodology for assessing impacts as described in Section 12.

13.1 Pre-construction and Construction Phases

The pre-construction and construction phase of the project will entail the site establishment for the access roads, the camp site as well as surveying and pegging sites. Environmental impacts on the biophysical and socio-economic environment which are anticipated to occur throughout the construction were identified as follows:

13.1.1 Socio-Economic

The main positive impacts of the prospecting activities will be the temporary creation of jobs during the construction phase of the project. The project may also result in a temporary boost in small local businesses in the area.

Site establishment activities may result in grievance as a result of possible grave relocation. It is expected that the final site layout will take into account all the sensitive environment in the area and will avoid graves and other heritage and cultural resources in the area. Movement of construction vehicles on the roads (R31 and N8 and other farm roads) may increase the risk of accidents on these roads. Other health and safety risks may be as a result on construction workers lighting fires on site, littering and lack of housekeeping. Potential increase in social pathologies and negative health impacts due to potential squatting of job seekers and increase in nuisance dust may also occur.

13.1.2 Groundwater

The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates, thereby allowing a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints for the access roads, the boreholes, and sumps as well as the camp sites. The impact on evapotranspiration is therefore expected to be negligible.

Site clearing and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release.

13.1.3 Surface water

The potential impacts on surface water during the construction phase of the proposed project are as follows:

- Accidental spillages of hazardous substances from construction vehicles used during construction of the crossings, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or waste blocking watercourses;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality;
- Increase in turbidity of the local water streams as a result of runoff of cleared areas; and
- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

Some level of sedimentation is expected to occur in the drainage line that traverse the project area as runoff is naturally anticipated to pick up environmental debris as it crosses natural areas. Increased turbidity is reversible and surface water should return to pre-impact turbidity levels once sediment levels entering the watercourse are reduced. Settled sediments should naturally move downstream during periods of high flow flowing storm events.

13.1.4 Aquatic Ecosystems

The removal of vegetation from the construction area is also expected to have an impact on the provision of ecological and sociocultural services by aquatic ecosystems. In addition, construction waste dumping and oil leakages from construction vehicles will alter biodiversity maintenance of the aquatic ecosystems, which endangers the survival of aquatic ecosystem and riparian species inhabiting the area. Impacts on the aquatic ecosystems and will include:

- Loss of habitat and aquatic ecosystem and riparian ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem and riparian habitat degradation;
- Impact on the aquatic ecosystem and riparian systems as a result of changes to the sociocultural service provisions though site clearance, waste management and riparian disturbance;
- Potential poor planning, resulting in the placement of the access roads across aquatic ecosystem and riparian habitats, leading to altered habitat;
- Impact on the hydrological functioning of the aquatic ecosystem and riparian systems;
- Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.

13.1.5 Heritage and Archaeological Resources

The following impacts are envisaged on archaeological artefacts and graves as a result of the construction phase of the proposed project:

- The proposed project has the potential to impact on local graves within the area; and

- The proposed project has the potential to impact on sites of archaeological importance.

The final layout plan will be dependent on the location of local heritage and archaeological resources. The siting of the boreholes and infrastructure will be in such a way as to avoid sensitive environments, which include graves and archaeological resources as far as is practicable.

13.1.6 Palaeontology Impacts

Earth moving activities may result in the destruction of fossils (if any).

13.1.7 Flora

The project may result in the following impacts on the floral environment during the construction phase:

- Destruction of potential floral habitats for species of conservational concern as a result of site clearing, alien species, waste management and soil compaction;
- The construction will lead to the loss of individual plants such as grasses, forbs, trees, and shrubs that will be cleared on the footprint area. This will mostly occur during the construction phase;
- Vegetation clearance may lead to floral habitat loss of potential species of conservational concern;
- Changes in the community structure: It is expected that the faunal species composition will shift, due to an anticipated loss in habitat surface area. In addition, it is predicted that more generalist species (and a loss of functional guilds) will dominate the study area. Attempts to rehabilitate will attract taxa with unspecialised and generalist life-histories. It is predicted that such taxa will persist for many years before conditions become suitable for succession to progress.
- Impact on floral diversity as a result of site clearance, anthropogenic activity, and possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase;
- Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation; and
- Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.

It must be noted that the proposed location for infrastructure is already impacted by the old gun range and has no flora, as such the construction of infrastructure such as office, plant, parking, and workshop will not have an impact on flora. The area ear marked for trenching is also highly disturbed and will therefore have a negligible impact on flora. Figure 13-1 shows the state of the areas ear marked for infrastructure and trenching.

The final layout/location of the boreholes will be such that no protected trees will be affected.

Location of infrastructure

Location of proposed trenching

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Figure 13-1: Location of proposed Infrastructure (Left) and Trenching (Right)

13.1.8 Fauna

The project may result in the following impacts on the faunal environment during the construction phase:

- Loss of faunal habitat and ecological structure as a result of site clearing, alien invasive species, erosion, and general construction activities;
- Loss of faunal species due to collisions with construction vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping;
- Impact on faunal species of conservational concern due to habitat loss and collision with construction vehicles;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts on faunal habitat during the operation phase.

The loss of biodiversity is expected be insignificant as it will be limited to the footprints of the required infrastructure. However, mitigation and management of species of conservational concern, if any, needs to be adhered to. The infrastructure that will have the significant impact on biodiversity is expected to the access roads.

13.1.9 Geology

It is anticipated that the removal of soils as a result of construction activities will have an impact on geology are anticipated:

13.1.10 Air Quality

The movement of construction vehicles and earth moving machinery as well as the stripping of vegetation will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

13.1.11 Visual

The following impacts on the visual character as a result of the proposed project are envisaged during the construction phase:

- Scaring of the landscape as a result of the clearance of vegetation;
- Visual intrusion as a result of the movement of machinery and the erection of contractor camps; and
- Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.

13.1.12 Ambient Noise

The use of vehicles and machinery may result in an increase in ambient noise in the immediate vicinity of the project.

13.1.13 Soil Landuse and Land Capability

During the construction phase, all infrastructure and activities required for the operational phase will be established. The main envisaged activities include the following:

- Movement of construction vehicles, machinery, and workers in unprotected areas (bare) may result in compacting of the soil of the existing roads. Fuel and oil spills from vehicles may result in soil chemical pollution;
- Clearing of vegetation will result in the soils being particularly more vulnerable to soil erosion. The impact can persist long after cessation of prospecting activities depending on mitigation and rehabilitation strategies. Strategic stormwater management should be put in place to minimise soil losses.
- Soil contamination as a result of construction activities can be as a result of a number of activities (i.e. incorrect hazardous substance storage, incidental hydrocarbon leakages from construction vehicles);
- Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint. Although soils will be stripped and stockpiled, loss of seed reserve and organic matter depletion through decomposition during stockpiling will severely reduce soil quality and its ecological function if not managed appropriately. Re-vegetation should be imposed as far as is possible to maintain soil fertility through natural nutrient cycling during soil storage prior to rehabilitation phase;
- Other activities in this phase that will impact on soil are the handling and storage of building materials and different kinds of waste. This will have the potential to result in soil pollution when not managed properly; and

- In areas of permanent changes such as the borehole and sump area, access roads (tracks), the erection of infrastructure and stockpiles, the current land capability and land use will be lost permanently. This will however be localised to the footprint of the infrastructure.

13.1.14 Traffic

The movement of construction vehicles in the project area will result in an increase in traffic on the roads.

13.1.15 Climate Change

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

The above-mentioned impacts were assessed based on the quantitative impact assessment methodology described in Section 12 of this Report. For each impact assessed, mitigation measures have been proposed to reduce or avoid negative impacts and enhance positive impacts. These mitigations were also incorporated in the EMPr to ensure that they are implemented during the various phases of the proposed project.

The summary of the impact assessment during the construction phase is provided in Table 13-1.

Table 13-1: Impact Assessment Table for the Construction Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Consequence			Probability	Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity					Severity	Spatial	Duration	Frequency: Activity			
Site Establishment: Establishment of the access (tracks) to the prospecting site, Establishment of the campsite, site physical surveying and pegging of drilling sites																
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	2	3	2	2	28	Medium Low (-)	Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public; Security and safety should be emphasised; Recruitment will not be undertaken on site; Recruitment practises will favour locals, but farm labourers will not be employed unless agreed to with the farm owners; Liaise with the SAPD and existing forums in order to implement effective crime prevention strategies; and No construction workers shall be allowed to access private properties without the owner's knowledge and consent.	1	1	1	1	2	9	Low (-)
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	2	3	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the landowners and land occupiers.	2	2	3	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)
	The influx of job seekers in the area may result in an increase in petty crimes.	2	2	3	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)
	Ineffective communication channels leading to community unrest.	2	2	3	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)
	Negative impact as a result of the dissection of land by clearing and excavations for construction of infrastructure, constraints to access to cultivated land to farmers, impacting on day-to-day farm activity.	3	1	3	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)
	Possible boost in short term local small business opportunities.	3	1	3	2	2	28	Medium Low (+)		3	1	3	2	2	28	Medium Low (+)
Groundwater	Localised spillages of oils from machinery leaching to groundwater contamination.	3	2	2	2	2	28	Medium Low (-)	No washing of vehicles shall be allowed outside demarcated areas. The bays will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles; Refuelling of vehicles will only be allowed in designated areas; All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is not used for some time; On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material; Bund areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater; Contaminated water shall be pumped into a container for removal by an approved service provider; Regular inspections shall be carried out to ensure the integrity of the bundwalls; All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site; Runoff from this area shall be contained; Spill kits shall be made available, and all personnel shall be trained on how to use the kits and training records shall be made available on request.	2	1	1	2	2	16	Low (-)
	Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	3	2	2	2	2	28	Medium Low (-)		2	1	1	2	2	16	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the drill sites and associated infrastructure.	2	3	2	2	2	28	Medium Low (-)	Ensure that topsoil is properly stored, away from the streams and drainage areas; No construction activities will be undertaken within 100 metres of the nearby steams and 500 meters from riparian areas without consent from the DWS; Vehicle and personnel movement within watercourses and riparian areas shall be strictly prohibited; Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water.	1	1	1	2	2	12	Low (-)
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2	2	2	28	Medium Low (-)		1	1	1	2	2	12	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2	2	2	24	Low (-)		1	1	1	2	2	12	Low (-)
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	2	2	28	Medium Low (-)		1	1	1	2	2	12	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	3	2	2	2	2	28	Medium Low (-)		1	1	1	2	2	12	Low (-)
Aquatic Ecosystems	Localised changes to the riparian areas as a result of vegetation clearing.	2	2	2	2	3	30	Medium Low (-)	Adequate stormwater management must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; No construction activities shall be allowed within 500 m of riparian zones without consent from the DWS; No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; All disturbed areas shall be re-vegetated with indigenous species; All construction materials shall be kept out of the riparian areas; and All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystems	1	1	1	1	1	6	Low (-)
	Loss of habitat and aquatic ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem degradation.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)
	Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian habitat.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)
	Impact on the hydrological functioning of the aquatic ecosystems.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)
Heritage Resources	The proposed project has the potential to impact on local graves within the area.	2	1	2	2	2	20	Low (-)	Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or management measure for the protection of such resources must be implemented; No construction activities may be undertaken within 50 m of the heritage and/or cultural sites; If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.	1	1	1	1	1	6	Low (-)
	The proposed project has the potential to impact on sites of archaeological importance.	2	1	2	2	2	20	Low (-)		1	1	1	1	1	6	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Monitoring reports detailing the results of the recommended archaeological monitoring must be submitted once the construction phase has been completed.							
Palaeontological Resources	Drilling of exploratory boreholes has potential to impact on palaeontological resources	2	1	2	2	1	20	Low (-)	Should fossils be exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	1	1	1	1	1	6	Low (-)
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low (-)	The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint are to be relocated to areas with suitable habitat, outside the disturbance footprint; The eradication of the protected camel thorn trees would need a licence being obtained from the applicant from the Department of Forestry. Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; The proposed development footprint shall be kept to the minimum; All disturbed areas must be concurrently rehabilitated during construction; Prohibit the collection of any plant material for firewood or medicinal purposes; The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas; Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; All sensitive open space areas will be demarcated and access into these areas shall be prohibited; Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities; Monitoring of relocation success will be conducted during the operational phase; Construction related activities shall be kept strictly within the development footprint; Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project. Alien Invasive Plant Species Management plan to be implemented; Edge effects of activities including erosion and alien/ weed control will be strictly managed in the riparian area; All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants; Exotic or invasive plants shall be controlled as they emerge; An alien vegetation control program must be developed and implemented within all disturbed areas. After removal of alien vegetation, the affected areas must be re-assessed to	1	1	1	1	2	9	Low (-)
	Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									determine the success of the program and any follow up measures that may be required; The eradicated plant material must be disposed of at an approved solid waste disposal site; During post-construction, an alien vegetation removal and monitoring plan must be compiled for those areas which were not effectively rehabilitated; The extent of invasion must be established through investigation to identify priority areas; Priority species shall be identified to control and develop protocols for the removal of all alien species e.g. mechanical removal, herbicidal treatment etc. Mechanical, methods must be favoured for the removal of alien invasive species. Chemical removal shall only be undertaken by a suitably qualified and approved person; and As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) are to be implemented.							
Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	2	2	20	Low (-)	The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction. No trapping or hunting of fauna shall be permitted; Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; Should any SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist; No informal fires in the vicinity of construction areas shall be permitted; An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.	1	1	1	1	2	9	Low (-)
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	2	2	2	2	24	Low (-)		1	1	1	1	2	9	Low (-)
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	2	2	2	2	24	Low (-)		1	1	1	1	1	6	Low (-)
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$ as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	2	2	2	2	24	Low (-)	Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include spraying with water; Gravel roads must be well drained to limit soil erosion. Where practical rehabilitation should be undertaken in tandem with the construction activities; A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road; All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the	1	2	1	1	2	12	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low (-)		1	2	1	1	2	12	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									exhaust systems to reduce excessive emissions and limit air pollution; Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance, and spraying with water; Where practical rehabilitation should be undertaken progressively; Materials transported on public roads must be covered; Odours: Putrescible waste must be handled, stored, and disposed of before the probability of it generating odours; and Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.							
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	2	2	20	Low (-)	The number of construction vehicles and machinery to be used shall be kept to a minimum; Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents; Materials transported on public roads must be covered; and Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	1	1	2	9	Low (-)
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	2	2	24	Low (-)	Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.g. noise) in advance; Surrounding communities must be notified in advance of noisy construction activities; All equipment should be provided with standard mufflers; Muffling units on vehicles and equipment must be kept in good working order. Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment; Where possible, operation of several equipment and machinery simultaneously must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g. no overloading of machines); Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; and	1	1	1	2	1	9	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00).							
Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	2	2	20	Low (-)	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA, or can be removed by a service provider that is qualified to clean the soil; The time in which soils are exposed during construction activities should remain as short as possible; Erosion control measures shall be implemented where deemed necessary; In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion; Runoff from stockpiles shall be detained in order to support growth of vegetation; Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels; Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity; If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation; Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes; Topsoil stockpiles shall be monitored regularly to identify alien vegetation, which shall be removed as soon as possible to prevent further distribution of any alien vegetation.	1	1	1	2	1	9	Low (-)
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the R82 and R723 roads as well as the farm roads around the prospecting area.	2	3	2	2	2	28	Medium Low (-)	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; The number of construction vehicles and trips shall be kept to a minimum; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	2	2	2	1	2	18	Low (-)
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low (-)	All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	2	1	1	1	8	Low (-)
Geology	Removal of local geology as a result of construction activities.	2	1	2	2	2	20	Low (-)	The footprint of the construction activities shall be kept to a minimum.	1	1	1	1	2	9	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices.	2	3	2	2	2	28	Medium Low (-)	Separation of waste: All waste shall be separated into general waste and hazardous waste; Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; General waste can further be separated into waste that can be recycled and or reused; No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; Where necessary dedicate a storage area on site for collection of construction waste. Storage of waste: No stockpiling of debris shall be permitted within 100 m of any water courses and drainage lines, or within 500 m of riparian areas; General waste will be collected in an adequate number of litter bins located throughout the construction site; Bins must have lids in order to keep rainwater out; Bins shall be emptied regularly to prevent them from overflowing; All work areas shall be kept clean and tidy at all times; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from any area demarcated for waste will be contained, treated, and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; No construction rubble shall be disposed of to the riparian area; If construction rubble is not removed immediately, it shall be stockpiled outside the 1:100-year floodline and outside the sensitive riparian areas; Demolition waste and surplus concrete shall be disposed of responsibly; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. Disposal of hazardous waste: No dumping shall be allowed in or near the construction site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved service provider; A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and	2	2	2	1	2	18	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									The safe disposal certificate shall be stored and provided on request. Disposal of general waste: No dumping shall take place in or near the construction site; All general waste shall be disposed of to the nearest licensed landfill site; Demolition waste and builders rubble shall be disposed of to an appropriate licensed landfill site; and The necessary permissions must be obtained to dispose of builders' rubble to the landfill site.							

13.2 Operational Phase

The operation phase of the project will include RC drilling at 20 boreholes sites and one trench/pit for bulk sampling.

13.2.1 Social-Economic

It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. The socio-impacts expected during the operation phase include:

- Impact on the day-to-day operation by landowners in the area, which may have an impact on their livelihoods;
- Negative impacts on health and safety of the local communities as a result of additional vehicles on the roads;
- Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation; and
- Potential damage to adjacent landowners'/occupiers' infrastructure as a result of drilling activities.

The proposed prospecting, particularly the blasting and vibrations, noise and nuisance is likely to have an impact on the proposed township establishment project to be situated on a Portion of the Remainder of Portion 1 of the Farm Vooruitzigt No.(28°43'31.37"S; Longitude: 24°41'51.19"E). The blasting and vibrations specialist studies show that the proposed residential area will be located within the low intensity blasting radius. It must also be noted that, due to the nature of prospecting activities, which tend to be localised and of short duration, it is expected that the impact, should they occur and should the township development be implemented, will be of low significance.

13.2.2 Groundwater

The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater.

The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users.

Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.

13.2.3 Surface water

Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The runoff containing sediments will have negative impacts on the water quality due to increase turbidity and sedimentation of water courses. This will also have an impact on aquatic habitats.

13.2.4 Aquatic Ecology

In addition to the impacts on aquatic habitats as explained above, the operation phase of the project is expected to have the following impacts on aquatic ecosystems:

- Loss of habitat and aquatic ecological structure as a result of continual disturbance and uncontrolled degradation;
- Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and disturbance; and
- Impact on the hydrological functioning of the aquatic ecological and riparian systems as a result of reduced aquatic ecosystem and riparian footprints and uncontrolled disturbance.

13.2.5 Flora

The project may result in the following impacts on the floral environment during the operation phase:

- Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion, and sedimentation;
- Impact on floral diversity as a result of possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

13.2.6 Fauna

The project may result in the following impacts on the faunal environment during the operation phase:

- Migration of fauna from the prospecting area due to noise as a resulting of drilling activities;
- Loss of faunal species due to collisions with vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;
- Failure to initiate a rehabilitation plan and alien control plan during the operation phase may lead to further impacts during the operation phase.

13.2.7 Soils, Land Use and Land Capability

The use of vehicles during the drilling and trenching of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.

13.2.8 Air Quality

The movement of vehicles, trenching and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

13.2.9 Geology

It is anticipated that the removal of soils as a result of operational activities will have an impact on geology are anticipated:

13.2.10 Visual

The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.

13.2.11 Heritage, Archaeological Resources

The drilling and trenching operations may result in the destruction of graves and other heritage resources.

13.2.12 Palaeontology Impacts

The drilling and trenching operations may result in the destruction of fossils (if any).

13.2.13 Ambient Noise

The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.

13.2.14 Traffic

The movement of vehicles in the project area will result in an increase in traffic on the roads.

13.2.15 Climate

The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

13.2.16 Vibrations

Drilling ground vibrations may result in possible damage to infrastructure and private property.

The summary of the impact assessment during the operation phase is provided in Table 13-2.

Table 13-2: Impact Assessment Table for the Operation Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Socio-Economic	Operation may affect the day-to-day operation of the landowners hence result in direct impact on their livelihood.	2	1	2	2	3	25	Low (-)	Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public; Drill sites shall be kept to a minimum; Landowners shall be informed of the exact location of the drill sites and shall be privy to the drilling programme, indicating the days on which each site will be drilled; and The time spent at each drill site shall be kept to a minimum.	1	1	2	1	1	8	Low (-)
	Uncontrolled access of private property during operation may result in conflict with affected landowners and occupiers.	2	1	1	2	2	16	Low (-)	Security and safety should be emphasized; No construction workers shall be allowed to access private properties without the owner's knowledge and consent; Access to private property and areas outside the designated operation areas shall be strictly prohibited.	1	1	1	1	1	6	Low (-)
	Negative impact as a result of additional trucks on the roads, impacting on local communities' health and safety.	3	3	2	1	2	24	Low (-)	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; The number of vehicles on the roads shall be kept to a minimum; Materials transported on public roads must be covered.	1	2	1	1	1	8	Low (-)
	Negative impact on, local community health and safety due to potential influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.	3	3	2	1	2	24	Low (-)	Liaise with the SAPD and existing forums in order to implement effective crime prevention strategies; and The applicant will ensure that as far as possible locals will be used during the operation of the prospecting project. Recruitment will not be undertaken on site.	1	2	1	1	1	8	Low (-)
	As a result of drilling activities during operation, potential damage to adjacent landowner's/occupiers' infrastructure	2	1	1	2	2	16	Low (-)	Drill sites shall be located as far from private property as is possible to minimise damage to infrastructure; Should private property be damaged due to operation activities, property owners shall be appropriately compensated.	1	1	1	1	1	6	Low (-)
	As a result of drilling, there is potential for the occurrence of subsidence, impacting on the safety surface land dwellers and users.	2	1	1	2	2	16	Low (-)		1	1	1	1	1	6	Low (-)
Groundwater	The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils. The material removed from the drilling exercises will contain carbonaceous material, which has a potential for pollution should it be allowed stay for a prolonged period at the drilling site.	3	2	2	2	2	28	Medium Low (-)	Ensure that the drilling of the exploration boreholes is conducted in such a manner that the environment is protected from probable spillages and contamination. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to a registered disposal facility e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	2	1	2	1	2	15	Low (-)
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	3	2	2	2	2	28	Medium Low (-)		2	1	2	1	2	15	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling may leach pollutants that will result in the pollution of the surrounding groundwater regime. This may even spread beyond the backfilling site via plume migration.	2	2	2	2	2	24	Low (-)	Ensure that the landowners' borehole yields are monitored during the drilling operation. Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated.	2	1	2	1	2	15	Low (-)
Surface Water	The drilling operations may result in the generation of surface water runoff contaminated with drilling muds and cuttings should spillages occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the surrounding clean water environment. These will cause an increase in the turbidity and will decrease acidity of the water in the streams, which will affect the aquatic habitat, hence important habitats may be lost.	2	2	2	2	2	24	Low (-)	No prospecting operations will be undertaken within 100 metres from the nearby steams and 500 meters from riparian areas without consent from the DWS; Sumps will be excavated for the collection mud and excess water from the drilling sites; The sumps will be sized such that they will be able to contain the water and mud that will be generated during the prospecting operation; Storm water generated around the drilling site will be diverted away to the clean water environment; No concrete mixing and vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams.	2	1	2	1	2	15	Low (-)
Biodiversity	Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion, and sedimentation.	2	1	3	2	2	24	Low (-)	All disturbed areas must be rehabilitated in tandem with construction activities. The collection of any plant material for firewood or medicinal purposes shall be strictly prohibited.	2	1	1	1	1	8	Low (-)
	Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	2	1	3	2	2	24	Low (-)	The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the demarcated drill sites.	2	1	1	1	1	8	Low (-)
	Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	2	1	3	2	2	24	Low (-)	The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. No trapping or hunting of fauna shall be permitted. Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat shall be strictly managed. No informal fires in the vicinity of drill sites shall be permitted. An alien vegetation control plan must be implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss. Poaching of wild animals and livestock will be prohibited.	1	1	1	1	1	6	Low (-)
Soils Land use and Land Capability	Topsoil removal, storage, and replacement during the excavation of the sumps will result. This will result in the disruption of the soils profile.	2	1	2	2	2	20	Low (-)	Ensure that topsoil is properly stored, away from the streams and drainage areas. The soils must be used for the backfilling and rehabilitation of the sumps. The rehabilitated sump must be seeded with recommended seed mix consisting of indigenous species. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs.	1	1	1	1	1	6	Low (-)
	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	1	2	2	2	24	Low (-)		2	1	1	1	1	8	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Soil disturbance within the drill sites shall be kept to a minimum.							
Air Quality	The prospecting operation will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	2	3	2	2	2	28	Medium Low (-)	Dust suppression must be conducted during the operational phase of the project. Correct speed will be maintained at the proposed project site. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.	1	1	1	1	1	6	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	2	3	2	2	2	28	Medium Low (-)	Where practical possibly rehabilitation should be undertaken progressively. A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads. All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance, and spraying with water; Materials transported on public roads must be covered; and Where practical rehabilitation should be undertaken progressively. *Odours* Putrescible waste must be handled, stored, and disposed of before the probability of it generating odours; and Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.	1	1	1	1	1	6	Low (-)
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties.	2	2	3	2	3	35	Medium Low (-)	Ensure that the time period used for the drill rigs is optimised to ensure that the drill rigs are moved from one site to another over short periods Materials transported on public roads must be covered.	1	1	1	1	1	6	Low (-)
Heritage Resources	The drilling operation may result in the destruction of graves and any other heritage sites during operational phase of the project.	3	2	2	1	2	21	Low (-)	Locate exploration borehole more than 50 m from the identified heritage sites. If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.	1	1	1	1	1	6	Low (-)
Geology	Removal of local geology as a result of construction activities.	2	1	2	2	2	20	Low (-)	The footprint of the construction activities shall be kept to a minimum.	1	1	1	1	2	9	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	Ensure that proper management measures as well as technical changes are undertaken to reduce the impacts on surrounding residents and employees. This include ensuring that less noisy equipment is used, that equipment is kept in good working order and that the equipment must be fitted with correct and appropriate noise abatement measures and where possible use white-noise generators instead of tonal reverse alarms on heavy vehicles operating on roads. Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.gw. noise) in advance. Surrounding communities must be notified in advance of noisy construction activities. All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment. Where possible, operation of several equipment and machinery must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g. no overloading of machines); Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; Adjacent landowners shall be notified in writing if work needs to be carried out after hours or if any blasting will be required; and Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00).	1	1	1	1	1	6	Low (-)
	Increase in ambient noise levels as a result of the drilling activities.	2	2	2	2	2	24	Low (-)		1	1	1	1	1	6	Low (-)
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the R82 and R723 roads as well as the farm roads around the prospecting area.	2	3	1	2	2	24	Low (-)	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	1	2	1	1	1	8	Low (-)
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low (-)	The number of construction vehicles and trips shall be kept to a minimum All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	1	1	1	1	6	Low (-)
Drilling and Vibrations	Impact of drilling ground vibration on houses, boreholes, and roads, resulting in possible damage to infrastructure	2	1	1	2	2	16	Low (-)	Drill sites shall be located as far from private property as is possible. Affected property owners shall be notified of any drilling activities before commencement of the activities.	1	1	1	1	1	6	Low (-)
	Fly rock impact on houses, boreholes, and roads, resulting in possible damage to infrastructure;	2	1	1	2	2	16	Low (-)		1	1	1	1	1	6	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Should there be damage to private property as a result of drilling activities, property owners shall be appropriately compensated.							
Waste Management		2	1	1	2	2	16	Low (-)	*Storage of waste* General waste will be collected in an adequate number of litter bins located throughout the construction site; Bins must have lids in order to keep rainwater out; Bins shall be emptied regularly to prevent the bins from overflowing; All work areas shall be kept clean and tidy at all times; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from drill sites will be contained, treated, and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; No storage of waste shall be permitted within 100 m of the water courses or within 500 m of riparian areas; Demolition waste and surplus concrete shall be disposed of responsibly; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. *Disposal of hazardous waste* No dumping shall be allowed in or near the construction site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved service provider; A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and The safe disposal certificate shall be stored and provided on request. *Disposal of general waste* No dumping shall take place in or near the drill sites; and All general waste shall be disposed of to the nearest licensed landfill site.	1	1	1	1	1	6	Low (-)

13.3 Decommissioning and Closure

It is expected that the impacts for the decommissioning and closure phases will be similar to the impacts during the construction phase and have not been assessed in detail (please refer to the construction phase assessment). The most significant impacts will be:

13.3.1 Soils and Land Capability

The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed. However, should the rehabilitation of affected sites not be conducted properly, it may result in loss of usable soils and agricultural land, resulting in reduced land capability.

13.3.2 Land Use

Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.

13.3.3 Soils and Vegetation

The use of vehicles/machinery during the rehabilitation of the exploration sites may result in the compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover, soils, and groundwater.

13.3.4 Surface Water and Aquatic Ecosystems

During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water courses.

13.3.5 Air Quality

Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.

13.3.6 Noise

Noise will be generated during the removal of equipment and rehabilitation of the sites. The noise is not expected to exceed occupational noise limits and will be short lived.

The summary of the impact assessment during the decommissioning and closure phase is provided in Table 13-3.

Table 13-3: Impact Assessment Table for the Decommissioning and Closure Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Likelihood (Probability)					Consequence			Likelihood (Probability)			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency Activity	Frequency: Impact	Significance	Significance Rating
Soils, Land Capability and Land Use	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	N/A	N/A	N/A	N/A	0	N/A	Ensure that contamination of the rehabilitate area by hydrocarbon liquids is prevented. Ensure that the rehabilitation work is done in such a manner that the environment is protected from probable spillages. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid, and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Land Use	Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	N/A	N/A	N/A	N/A	0	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soils and Vegetation	The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	2	1	2	2	2	20	Low (-)		1	1	2	1	2	12	Low (-)
Surface Water	During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation, surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	2	3	2	2	2	28	Medium Low (-)	Ensure that water leaving the site does not have elevated silt load. Adequate stormwater management shall be conducted on site to ensure that dirty water is kept separate from clean water. Ensure that the rehabilitated areas are free draining and that water from these areas is clean.	2	1	2	2	2	20	Low (-)
Air Quality	Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	1	3	2	2	2	24	Low (-)	Dust suppression must be conducted during the decommissioning phase of the project whenever excessive dust is generated. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.	1	1	1	1	2	9	Low (-)
Noise	Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	2	1	2	2	2	20	Low (-)	Where necessary, provide employees with ear plugs and employees must be instructed to use the ear plugs. Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.	1	1	1	1	2	9	Low (-)

13.4 Cumulative Impact

Incomparable activities can result in several complex effects on the natural biophysical and social environment. These impacts are mainly identified as direct and immediate effects on the environment by a single entity affecting a variable of the environment. These direct impacts have the potential to combine and interact with other activities, depending on the surrounding environmental state and land use. These impacts may aggregate or interact with other impacts to cause additional effects, not easily quantified when assessing an individual entity.

The NEMA, 2014, specifically requires that cumulative impacts be assessed. This section provides a description and analysis of the potential cumulative effects of the proposed prospecting project , and past and present projects hereby considering the effects of any changes on the:

- Biophysical; and
- Socio – Economic conditions.

For the analysis of cumulative effects to be utilised as a useful tool for decision makers and I&APs, it must be limited to the effects that can be meaningfully evaluated, rather that expanding on resources or receptors that are no longer affected by the development or are not of interest to the I&APs. Two important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate spatial and temporal boundaries for evaluation of cumulative effects of the project; and
- The evaluation of relevant projects for consideration in the cumulative effects' analysis.

Spatial and temporal boundaries for analysis of cumulative effects are dependent on several factors, including:

- The size and nature of the project and its potential effects;
- The size, nature, and location of past and (known) future projects and activities in the area,
- The aspect of the environment impacted by the cumulative effect; and
- The period of occurrence of effects.

The spatial extent of the cumulative impact analysis is generally aligned with the zone of influence of the project and other projects in the vicinity. Most impact will be localised; however, others may be experienced on a regional scale. This is taken into consideration during the assessment of cumulative impacts. It is reasonably straightforward to identify significant past and present projects and activities that may interact with the proposed prospecting project to produce cumulative impacts, and in many respects, these are taken into account in the descriptions of the biophysical and socio- economic baseline.

13.4.1 Hydrological and Surface Water Impacts

The potential groundwater and surface water quality impacts associated with the construction and operation of the proposed prospecting project relate to the potential contamination because of leakages from vehicles and machinery as well as potential overflow of the infrastructure and percolation of contaminated water from waste disposal sites and waste rock dumps. Mitigation measures have been proposed for the impacts on ground water and surface water contamination. It is expected that with the implementation of the mitigation measures the impacts will be reduced to an acceptable level. The hydrological and surface water cumulative impacts resulting from the construction and operation of the proposed prospecting project will be negligible.

13.4.2 Air Quality Impacts

Most of the land use in the vicinity of the proposed prospecting is mostly agriculture and mining in nature. The potential air quality impacts associated with the construction and operation of the proposed prospecting project relate to the potential generation of $PM_{2.5}$, PM_{10} and fugitive dust emissions because of vehicular movements as well as prospecting activities.

Mitigation measures have been proposed to mitigate these adverse impacts. It is expected that the implementation of these mitigation measures will reduce this impact to an acceptable standard and that the cumulative air quality impacts from the construction and operation of the prospecting project will be negligible.

13.4.3 Noise Impacts

The potential noise nuisance associated with the construction and operation of the prospecting project relates to the movement of vehicles and operation of machinery on site as well as operation of the prospecting project. Mitigation measures have been proposed to avoid and/or reduce the nuisance noise impacts. It is expected that with the implementation of the mitigation measures this impact will be reduced to an acceptable level.

14 Possible mitigation measures that could be applied and the level of risk

Refer to Section 13 for the mitigation measures that could be applied to reduce the level of risk due to the proposed prospecting project. It is anticipated that the management measures associated with the activities will be adequate to manage the impacts associated with the project as provided in Section 13 of this report.

15 Motivation where no alternatives were considered

As discussed previously, the site is located in an area where there is dolerite, clay, and sand of good quality. The site is therefore regarded as the preferred site and alternatives sites are not considered. The alternative drill sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners.

16 Statement motivating the preferred site

The location and extent of the prospecting activities will be based on the information derived from the desktop surveys as well as the specialist studies. Where practicable, the drilling and trench sites and location of infrastructure will be selected to avoid sensitive environments such as aquatic ecosystems, riparian areas, watercourses, biodiversity of conservation importance and heritage features.

17 Description of the process undertaken to identify, assess and rank the impact and risks the activity will have on the preferred site

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

- The stakeholder consultation process was being undertaken in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any potential concerns they may have. All comments and responses provide were collated into the Comments and Responses table, which is included in this final EIA/EMPr Report and have also be incorporated into the final impact assessment.
- A detailed desktop study was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:
    - The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
    - Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) for the Vaal River and Groundwater Vulnerability Reports;
    - The Municipal Integrated Development Plan for Sol Plaatje Local Municipality; and
    - The Spatial Development Framework for the Francis Baard District Municipality.

A quantitative impact assessment process was undertaken as described in Sections 12.The rating of the identified impacts was undertaken in a quantitative manner as provided in Section 13 (impact rating). The ratings were undertaken in a manner to calculate the significance of each of the impacts. The identification of management and mitigation measures was done based on the significance of the impacts and measures included are considered sufficient, appropriate, and practical to protect the environment.

17.1 Assessment of each identified potentially significant impact and risk

A summary of potentially significant impact and risks is provided in Table 17-1. A detailed assessment of all the identified potential impacts is provided in Section 13.

Table 17-1: Impact Assessment of potentially significant impact and risk

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Data Collection and Assessment	Desktop Study	None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Geological Mapping		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Planning for Drilling Surveys		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Access Roads	Establishment of access roads, campsite, physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Low	Rehabilitation of areas cleared of vegetation and dust control	Low
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Medium Low	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	Medium Low	Monitoring through rehabilitation and management of spoil sites	Low
Fence		Aquatic Ecosystem contamination, destruction, and loss of habitat	Aquatic ecosystems	Construction	Medium Low	Control of access to aquatic ecosystems and riparian habitat areas and within the regulated 500 m buffer.	Low
Hydrocarbon storage area		Destruction of graves and cultural heritage sites	Heritage and archaeological resources	Construction	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
Mobile office		Destruction of fossils	Palaeontological resources	Construction	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low
Ablution Facility		Loss of natural vegetation in the affected areas	Flora	Construction	Low	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Low
		Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Low	Relocation of affected species of conservation importance	Low
		Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Low	Dust control measures	Low
		Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low
		Visual impacts as a result of vegetation clearance	Visual	Construction	Low	Rehabilitation of areas cleared of vegetation	Low
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Medium Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Low	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
RC Drilling and Bulk Sampling	Drilling, trenching and bulk sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Socio-Economic	Operation	Low	Control of times during which operation activities will take place	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Medium Low	Rehabilitation of affected areas and control using bunds	Low
		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation will have negative impacts on the water quality due to increase turbidity in the watercourses. This will have an impact on aquatic habitats.	Surface Water	Operation	Low	Control through management and monitoring of surface runoff	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Low	Rehabilitation of affected areas	Low
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. Lt in the reduction in nuisance dust.	Air Quality	Operation	Medium Low	Dust control measures	Low
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Medium Low	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Low
		The drilling operations may result in the destruction of graves and other heritage resources.	Heritage Resources	Operation	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers	Low
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Low	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Low
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Low	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Low
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A	N/A
Borehole capping Removal of equipment and infrastructure	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	N/A	N/A
		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	Land Use	Decommissioning and Closure	N/A	N/A	N/A
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Low	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Low
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Medium Low	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Low
		Rehabilitation and removal of the prospecting sites and equipment ill require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on	Air Quality	Decommissioning and Closure	Low	Dust control measures and rehabilitation of areas stripped of vegetation	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		surrounding properties including nearby vegetation.					
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Low

18 Summary of Specialist Reports

The summary of specialist reports is provided in Table 18-1.

Table 18-1: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Resources Assessment	A very low density 'background scatter' of cf. Fauresmith artefacts was noted in areas where Hutton Sands are removed, both on the prospecting site and in an immediately adjacent property (Morris 2012). No colonial era or other cultural resources were in evidence. Archaeological significance of the area is reckoned to be LOW. There is potential for subsurface material across the entire area, but indications are that densities would be low. Steps for reporting in the event of archaeological material being found are indicated. In summary, the proposed prospecting is not expected to have a negative impact on the heritage resources of the area. Archaeologists should be granted access to the prospecting operation at any time to inspect sections and exposed areas at the base of the Hutton Sands.	In the event that sites or features (e.g. high density of artefacts, a burial, or ostrich eggshell cache) being found during the prospecting project, SAHRA should be informed immediately to determine steps (e.g. have an archaeologist assess the find/s and recommend mitigation, if necessary). All archaeological traces are protected by legislation, as indicated above.	Section 13, 19, 35, 36, 38
Hydrogeology	Possible sources for groundwater contamination are fuels leakage and spillage from machinery and on-site latrines and waste as indicated on Table 3. DWS overarching water quality management principles are; (1) protection of human health and (2) protection of the environment. Based on these principle's objectives and the significance of this aquifer classification, if any potential risk exist, measures must be put in place to limit the risk to the environment, which in this case is the protection of the Primary Underlying Aquifer. Due to low likelihood of pollution as a result of the nature of the proposed activity, it is therefore recommended 4 of the 20 planned prospecting boreholes be used for water quality monitoring and groundwater level monitoring. These boreholes should be on the southern boundary of the farm Vooruitzicht 81 to monitor	Measures must be put in place to limit the risk to the environment, which in this case is the protection of the Primary Underlying Aquifer.	Section 13, 19, 35, 36, 38

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	possible impacts from the existing mine south of the farm, southeast boundary to monitor possible impact from the land fill and both north east and west of the farm boundary.		
Biodiversity	The proposed development should mainly focus on the rehabilitation of the site and management of stormwater on site during and after prospecting activities and the related infrastructure. This is needed to minimize impacts on the surrounding ecosystems occurring in the area. Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Plan which considers the recommendations for managing impacts detailed above. Provided that the proposed development and layout plans is consistent with the sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported.	Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Plan which considers the recommendations for managing impacts detailed above.	Section 13, 19, 35, 36, 38

Attach copies of Specialist Reports as Appendix 9

19 Environmental Impact Statement

19.1 Summary of key findings

The impacts evident from the detailed impact assessment (Section 13) of the proposed project are both positive and negative in nature. Generally prospecting activities have low impact on the environment. The planned activities negative impacts can be controlled and avoided or minimised. Mitigation measures will be used to manage and control any potential impact. The key positive and negative findings outlined below.

19.1.1 Key Positive Impacts After Mitigation

The main positive impacts identified for the project relate to socio-economic impacts that the construction and operation of the prospecting activities will have.

In terms of local economy, there is the potential for multiple low to medium significant and temporary benefits to both local and regional businesses, as well as local employment opportunities.

19.1.2 Key Negative Impacts After Mitigation

During the proposed prospecting operation impacts may occur on soils, natural vegetation, surface water, groundwater, sensitive landscapes, air quality, noise, visual aspects, and sites of archaeological and cultural importance should the EMPr not be adhered to.

Misabrite will undertake measures to ensure that the identified impacts are minimised. Assessment of the impacts with the proposed mitigation measures has shown the significance of the impacts on all affected environmental aspects to be reduced from medium and low to low and negligible significance.

Land use will not change. Landowners and land occupiers within the proposed project area may be affected although on a temporary basis due to the need to access the sites and the establishment and use of the campsite. Measures such as safety along the roads and dust suppression will be undertaken to ensure that the impacts on the landowners and land occupiers are minimised.

Storm water runoff from the dirty water areas of the drilling sites, its associated surface infrastructure (campsite) may have a detrimental impact on the surrounding water environment should this water be released to the environment. In order to prevent the occurrence of the above-mentioned impacts, dirty water collection sump will be used to collect all dirty water from the drilling site. The water collected from the sump will be re-used, evaporated and the sump will be rehabilitated once the drilling is finished. Sediments will be created from the site during the construction, operational and decommissioning phase, which may impact negatively on the surrounding water environment. The sediments will be treated should they contain hydrocarbon waste.

The employees will undergo training and will be given strict instruction not to undertake activities that will affect the environment and that may have an impact on the landowners. Waste generated from the site will be collected in proper receptacles and disposed of in registered waste disposal sites.

Key findings of the environmental impact assessment include:

- All the identified impacts will be localised, short term and will have a medium and low significance. The significance of potential environmental impacts can be reduced to low and very low significance with implementation of mitigation measures and monitoring.
- Cumulative noise, visual and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.

- Vegetation loss is unavoidable during the construction phase of the project. This will however be limited to the footprint of the infrastructure (access road, camp, boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.

19.2 Final Site Map

Please refer to Figure 19-1 for the preliminary site map which includes the environmental sensitive areas.

The final map showing the layout of the proposed project will be submitted to the DMR on granting of the prospecting right. The map will be developed to superimpose the proposed prospecting project and associated infrastructure together with the environmentally sensitive areas such as heritage sites, wetland and riparian areas, water courses and Red Data Listed floral species within the proposed project site.

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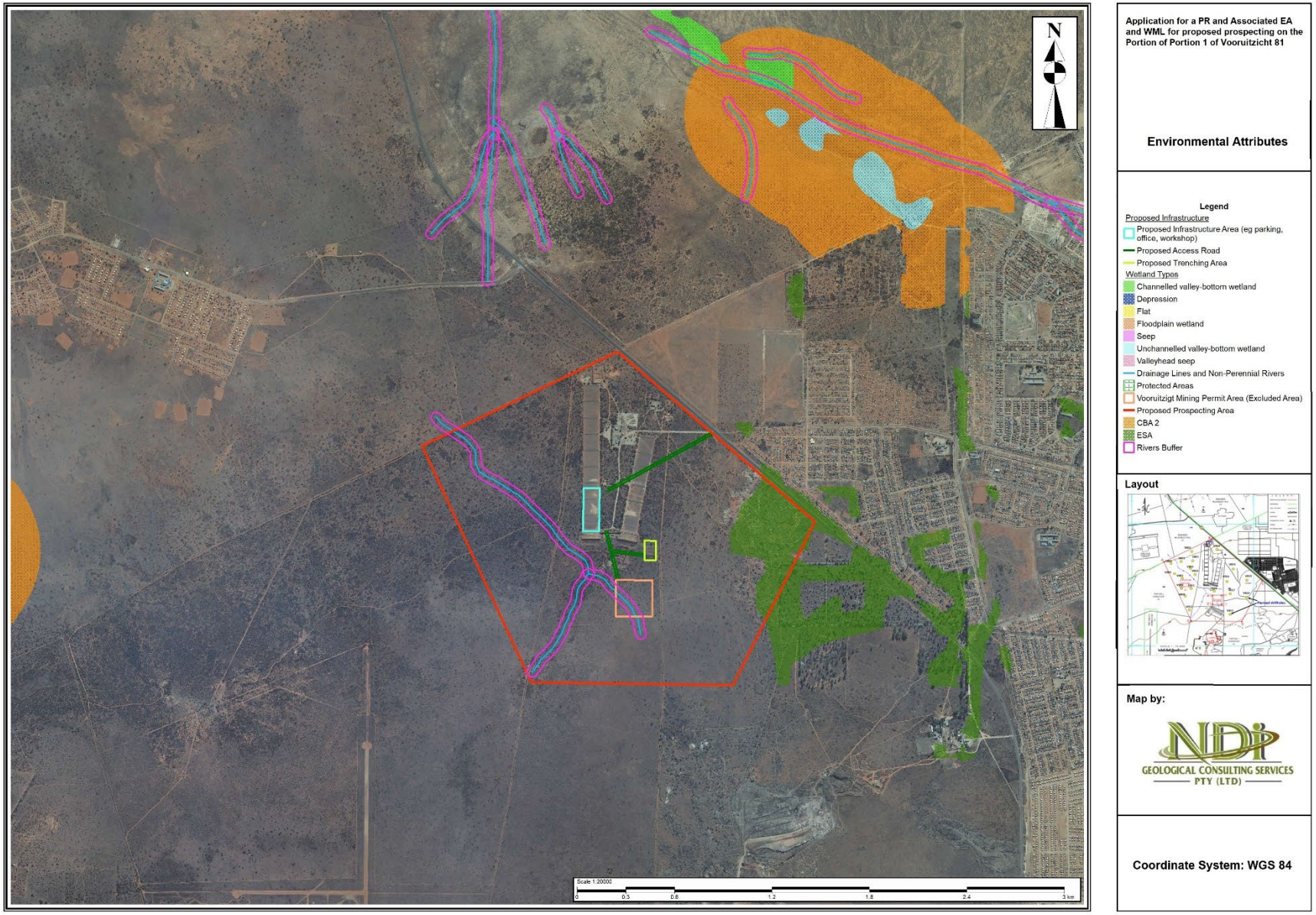


Figure 19-1: Layout Plan

19.3 Summary of the positive and negative implications and risks of the proposed activity and alternatives

The positive and negative implications were assessed according to the construction, operational and decommissioning phases of the proposed Project. A detailed description of the main impacts is provided in Section 13 and the main impacts are provided in Section 19.1.

The proposed activities have medium and low significance and will be short term activities. The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided. Generally prospecting activities have low impact on the environment. The planned activities negative impacts can be controlled and avoided or minimised. Mitigation measures will be used to manage and control any potential impact. The main impacts will include:

- Increased ambient noise levels resulting from drilling activities and increased traffic movement;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on the water resources utilised by the communities and landowners;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning;
- Increased vehicle activity within the area resulting in potential destruction and disturbance of flora and fauna;
- Poor access control to farms may impact on cattle movement, breeding and grazing practices;
- Influx of job seekers to site may result in increased opportunistic crimes;
- Potential visual impacts by drilling activities as well as vegetation clearance;
- Prospecting will be undertaken by special sub-contractors, and it is not anticipated that employment opportunities for local and/or regional communities will result from prospecting activities; and
- Short term boost for local businesses.

20 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

The objectives of the EMPr will be to:

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

Through the implementation of the identified proposed mitigation measures, it is anticipated that the identified impacts can be managed and mitigated effectively. All the impacts were assessed to have significance ranging between medium and low without the implementation of mitigation measures. All the identified impacts will have a reduced significance of low when the mitigation measures have been implemented.

21 Final Proposed alternatives

21.1 Preferred Option

The preferred option will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include 20 Reverse Circulation (RC) drilled boreholes. Non- invasive methods will include analytical desktop studies, aerial photograph interpretation, satellite interpretation, and decision-making on the viability of the project. The bulk sampling will include a trench/pit measuring 50m x 5m x 4m.

The required infrastructure will include:

- Ablution facilities;
- Boreholes and a trench/pit for bulk sampling;
- Access roads, to access drilling area;
- Chemical storage;
- Diesel storage facility;
- Domestic waste facility: General waste will have a demarcated area where the waste will be separated according to type. The rubbish bin containers will be labelled accordingly. When full, the waste will be disposed of in the right disposal area for such waste;
- Office site for storage of stationary and for the field staff to work from; and
- Vehicle parking area for vehicles and the other machinery used during prospecting as parking space.

21.2 Alternative Option

No alternative site was investigated since the preferred site is located in an area where there is dolerite, clay and sand of good quality. The site is therefore regarded as the preferred site and alternatives sites are not considered. The alternative drill sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners.

22 Aspects for inclusion as conditions of Authorisation

The following conditions should be included in the Environmental Authorisation:

- A minimum distance of 100 m from any dwellings or infrastructure must be kept;
- Landowners as well as land occupiers must be re-consulted at least 30 days prior to any prospecting activities undertaken on their properties;
- A map detailing the drilling locations should be submitted to the relevant landowners, the DWS and DMR prior to the commencement of the prospecting activities;
- No activities may be undertaken within 500 m wetland areas and/or within 100 m of watercourses and/or 32 m of riparian areas as recommended by the specialist without approval from the DWS;
- No relocation or destruction of heritage resources may be undertaken without the approval of SAHRA; and
- Mitigation measures contained in the HIA report must implemented during all project phases.

23 Assumptions, uncertainties and gaps in knowledge

Ndi Geological Consulting Services (Pty) Ltd has exercised all due care in reviewing the supplied information. Whilst Ndi Geological Consulting Services (Pty) Ltd has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data.

Opinions presented in this report apply to the information about the site and the project as it existed at the time of Ndi Geological Consulting Services (Pty) Ltd.'s investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which Ndi Geological Consulting Services (Pty) Ltd had no prior knowledge nor had the opportunity to evaluate.

All the data and information supplied to Ndi Geological Consulting Services (Pty) Ltd is assumed to be accurate and reflective of the current condition of the affected area. It is assumed that the baseline information reviewed and used to explain the environmental profile is accurate.

The public involvement process has been sufficiently effective in identifying the critical issues needing to be addressed in the EIA / EMPr by the EAP. The public involvement process has sought to involve key stakeholders and individual landowners.

Wherever possible the information requested, and comments raised by I&APs during the Initiation and Scoping Phases has been sufficiently addressed and incorporated into the EIA and EMPr that will be submitted to the DMR.

Ndi Geological Consulting Services (Pty) Ltd assumes that Misabrite will implement the measures contained in the EMPr and will adhere to any monitoring procedures. A monitoring and evaluation system, including auditing, will be established and operationalized to track the implementation of the EMPr ensuring that management measures are effective to avoid, minimize and mitigate impacts and that corrective action will be undertaken to address shortcomings and / or non-conformances. It is expected that Misabrite will comply with all legislation pertaining to the activities of this proposed project and that all permits and licenses that may be required will be identified and applied for prior to commencement of construction activities.

The following assumptions, uncertainties and gaps are applicable to this project:

- Details on the Water Use Licence requirements are not available;
- For the Heritage Impact Assessment: A background literature/museum database search provides indications of what might be expected in the region. A previous survey was conducted on an adjoining area in 2012 (Morris 2012). During the site investigation, it was noted that parts of the area are already disturbed by informal sand quarrying, as well as informal waste dumping. The extent of this activity has increased between June 2020 and November 2021. The entire area is veneered by Hutton Sands which would obscure from view some of the types of archaeological traces expected in the area (MSA/Fauresmith lithics typically rest on calcrete/decomposing dolerite which occurs between 1 and 1.5 m below the present surface (Fernando Garcao pers comm). Representative parts of the proposed prospecting area, and particularly areas where Hutton Sands have been depleted by quarrying, were inspected on foot to assess findings relative to expectations.
- For the terrestrial biodiversity and wetland delineation:
    - To obtain a comprehensive understanding of the dynamics of communities and the status of endemic, rare or threatened species in an area, ecological studies should ideally be replicated over several seasons and over a few years. However,

due to project time constraints such long-term studies are not feasible.

- Most threatened plant species are extremely seasonal and only flower during specific periods of the year,
- Most threatened faunal species are extremely secretive and difficult to survey even during thorough field surveys conducted over several seasons.
- The site has some limitations in terms of criminal activities and therefore not every area was surveyed in detail. Dense vegetation stands were avoided due to potentially being a safety risk.
- Thus, even though it might be assumed that survey findings are representative of the ecosystem of the site for the development activities, it should be stated that the possibility exists that individual plants species might have been missed due to the nature of the terrain and size of the study area. Therefore, maintaining due cognisance of the integrity and accuracy of the ecological survey, it should be stated that the ecological resources identified during the study and

- No detailed site layout is currently available due to the nature of the prospecting activities. The impact assessment was undertaken as a holistic assessment for the overall site.

24 Reasoned opinion as to whether the proposed activity should or should not be authorised

24.1 Reasons why the activity should be authorised or not

It is the considered opinion of the EAP that the activity may be authorised. The proposed prospecting area that Misabrite identified is located in an area where dolerite occurs widely spread as dykes, sills and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. The rocks are highly durable, and this are often seen capping the sandstone and mudstone hills. These dolerites (Jd) can also be seen at the bottom or south of the prospecting right. The rest of the farm is covered by sand (Qs). The site is therefore regarded as the preferred site and alternatives are not considered.

The option of not approving the activities will result in a significant loss of valuable information regarding the mineral status (in terms of Aggregate stone-dolerite, Clay and sand), present on the identified properties. In addition, should economical reserved be present and the applicant does not have the opportunity to prospect the opportunity to utilize these reserves for future phases will be lost.

According to the impact assessment undertaken for the proposed project, the impacts of the project are considered to be of medium and low significance. The significance of the impacts can be reduced to low and very low when the mitigation measures are implemented.

The project will also have positive impacts due to the employment to be created although for a short term, as well as a short boost to local businesses.

The stakeholders were also requested to provide their comments. All comments received during Public Participation Process were included in this EIA/EMPr Report. These comments were addressed as far as possible to the satisfaction of the interested and affected parties.

The management of the impacts identified in the impact assessment for all phases of the proposed project will be undertaken through a range of programmes and plans contained in the EMPr. In consideration of the layout plan and the management and mitigation measures contained within the EMPr compiled for the project, which are expected to be effectively implemented, there will be significant reduction in the significance of potential impacts.

24.2 Conditions that must be included in the authorisation

24.2.1 Specific conditions to be included into the compilation and approval of the EMPr

See Section 22 of this EIA/EMPr Report.

24.2.2 Rehabilitation requirements

The post-prospecting land use should be restored to agriculture/mining purposes and should represent the pre-mining land use, as far as possible. The rehabilitation of the project will aim to:

- Ensure that the final elevation around the site is free draining.
- Ensure that soil is replaced in the same sequence to ensure soil characteristics are retained as far as possible.
- Ensure a self-sustaining post-prospecting land capability similar to pre-prospecting of agriculture/mining.

- Ensure that the rehabilitated areas are cleared of all contaminating substances and that runoff from the area is returned to the natural catchment.
- Ensure that vegetation growth and cover on the rehabilitated areas is sustainable and local indigenous species are establishing on the site and that succession and colonisation from surrounding areas is taking place on rehabilitated areas. Ecological and ecosystem processes should function optimally after a prescribed period.
- Ensure that alien invasive species are eradicated until the closure certificate is granted.
- In order to ensure rehabilitation of the site can be undertaken responsibly, soils must be stripped and stockpiled separately. This will ensure preservation of soil for re-use in rehabilitation of the site.

The closure and rehabilitation objectives for the Project are listed below, and should be met:

- Achieve a final land use that is sustainable and meets both legislative requirements and stakeholder needs;
- Maintain and monitor all rehabilitated areas following re-vegetation and, if this monitoring shows that the objectives have been met, make an application for closure;
- Comply with local, district and national regulatory requirements; and
- Follow a comprehensive consultation and communication process with all stakeholders.

The overall closure objectives for the proposed project are provided in Section 38.1.

25 Period for which the Environmental Authorisation is required

The EA/WML will be required for a period of 2 years.

26 Undertaking

We hereby confirm 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 Environmental Impact Assessment Report and the Environmental Management Programme Report.

27 Financial Provision

The amount required to cover the rehabilitation is anticipated to be R 217 321.00 at this stage. The closure costs were calculated to be R50 000.00. A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The calculated closure estimate is provided in Table 27-1.

Table 27-1: Cost Estimate Expenditure

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	500	**15.94**	1	1	7970
2 (A)	Demolition of steel buildings and structures	m2	0	**221.99**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	20	**327.14**	1	1	6542.8
3	Rehabilitation of access roads	m2	1000	**39.72**	1	1	39720
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	**385.55**	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	**210.3**	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	**443.97**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**0**	**225957.57**	**0.52**	**1**	**0**
7	Sealing of shafts adits and inclines	m3	0	**119.17**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0.2	**155155.97**	1	1	31031.194
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	**#####**	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	**#####**	1	1	0
9	Rehabilitation of subsided areas	ha	0	**129919.76**	1	1	0
10	General surface rehabilitation	ha	0.5	**122909.7**	1	1	61454.85
11	River diversions	ha	0	**122909.7**	1	1	0
12	Fencing	m	0	**140.2**	1	1	0
13	Water management	ha	0	**46733.73**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0.5	**16356.8**	1	1	8178.4
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		154897.244

1	Preliminary and General	18587.6693	**weighting factor 2** 1	18588
2	Contingencies	15489.7244		15489.7244
			Subtotal 2	188974.64
			VAT (15%)	28346.20
			Grand Total	**217321**

27.1 Explain how the aforesaid amount was derived

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure of mining/prospecting sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

27.2 Confirm that this amount can be provided for from operating expenditure

Misabrite will fund the operation. and hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Prospecting Works Programme.

28 Deviations from the approved scoping report and plan of study

28.1 Deviations from the impact assessment methodology

There are no deviations from the impact assessment methodology that was submitted with the approved Scoping Report.

28.2 Motivation for the deviation

Not applicable.

29 Other information required by the Competent Authority

29.1 Impact on the socio-economic conditions of any directly affected person

No specific report was generated for the purposes of the socio-economic conditions. Current land uses inside the prospecting area, such as mining, farming and grazing, may be temporarily impacted through the presence of the fenced areas that drill rigs will operate within. These will, however, be small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing. Other potential socio-economic impacts will include:

- Nuisance noise due to onsite activities and drilling;
- Poor access control resulting in impacts on cattle movement, breeding and grazing practises;
- Influx of jobseekers to site, which may result in an increase in opportunistic crime;
- Uncontrolled access to private property outside of the demarcated boundaries; and
- Visual impact as a result of the vegetation clearance.

Prospecting will be undertaken by specialist sub-contractors, and it is not anticipated that employment opportunities for local and/or regional communities will result from the prospecting activities during the drilling phases.

Management and mitigation measures must be implemented to prevent environmental pollution which may impact on environmental resources utilised by communities, landowners and other stakeholders. Measures to manage the potential impacts on communities, individuals or competing land uses in close proximity include:

29.1.1 Noise due to construction activities and drilling:

- Directly affected and adjacent landowners and land occupiers must be informed of the planned dates of the drilling activities and a grievance lodging mechanism must be made available to the stakeholders.
- Site activities shall be concluded during daytime hours (0700 to 1730), to avoid night-time noise disturbances and night-time collisions with fauna.

29.1.2 Poor access control resulting in impacts on cattle movement, breeding and grazing practices:

- Access control procedures must be agreed on with the farm owners and all on site personnel shall be trained on these procedures.

29.1.3 Influx of job seekers to the site which may result in increased opportunistic crime:

- Casual labour shall not be recruited at the site. This will eliminate the incentive for people to travel to site seeking employment. Where necessary, a recruitment centre may be established in the major town areas;
- The landowners shall be notified on unauthorised persons encountered on site; and
- Where necessary, the South African Police Service (SAPS) will be notified of unauthorised persons encountered on site.

29.1.4 Visual Impact:

- Wet dust suppression will be undertaken to manage nuisance dust from construction vehicle movements and other construction activities as and when necessary;
- The portable ablution facilities and any other infrastructure will be acquired with a consideration for colour. Natural earth, green and mat black options which blend with the surrounding must be favoured;
- A waste management system will be implemented, and sufficient waste bins will be provided for on site. A fine system must be implements to further prohibit littering and poor housekeeping practices; and
- Vegetation cover shall be used where drill rigs will be located to minimise visual impacts.

29.2 Impact on any national estate referred to in Section 3 (2) of the National Heritage Resources Act

As outlined in Section 5 of this report, prospecting will be undertaken in phases. The first phase will be a desktop study, which will be followed by ground surveys and soil sampling.

The HIA found a very low density ‘background scatter’ of cf. Fauresmith artefacts was noted in areas where Hutton Sands are removed, both on the prospecting site and in an immediately adjacent property (Morris 2012). No colonial era or other cultural resources were in evidence. Archaeological significance of the area is reckoned to be low. There is potential for subsurface material across the entire area, but indications are that densities would be low. Steps for reporting in the event of archaeological material being found are indicated.

Monitoring of any potential impacts on heritage resources will be undertaken throughout the construction phase. Monitoring reports detailing the results of the recommended archaeological monitoring must be submitted once the construction phase has been completed.

In summary, the proposed prospecting is not expected to have a negative impact on the heritage resources of the area. Archaeologists should be granted access to the prospecting operation at any time to inspect sections and exposed areas at the base of the Hutton Sands.

30 Other Matters required in terms of Sections 24 (4) (a) and (b) of the Act

The proposed prospecting area is located in an area where dolerite occurs widely spread as dykes, sills and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. The rocks are highly durable, and this are often seen capping the sandstone and mudstone hills. These dolerites (Jd) can also be seen at the bottom or south of the prospecting right. The rest of the farm is covered by sand (Qs). The site is therefore regarded as the preferred site and alternatives are not considered.

The location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora and graves. All infrastructures will be temporary and/or mobile (Refer to Section 5.6 of this report).

In addition, the proposed technologies have been chosen based on long term proven success in prospecting.

Environmental Management Programme Report

31 Details of the EAP

31.1 Expertise of the EAP

31.1.1 Qualifications of the EAP

Please refer to Section 3.2.1.

31.1.2 Summary of EAPs past experience

Please refer to Section 3.2.2.

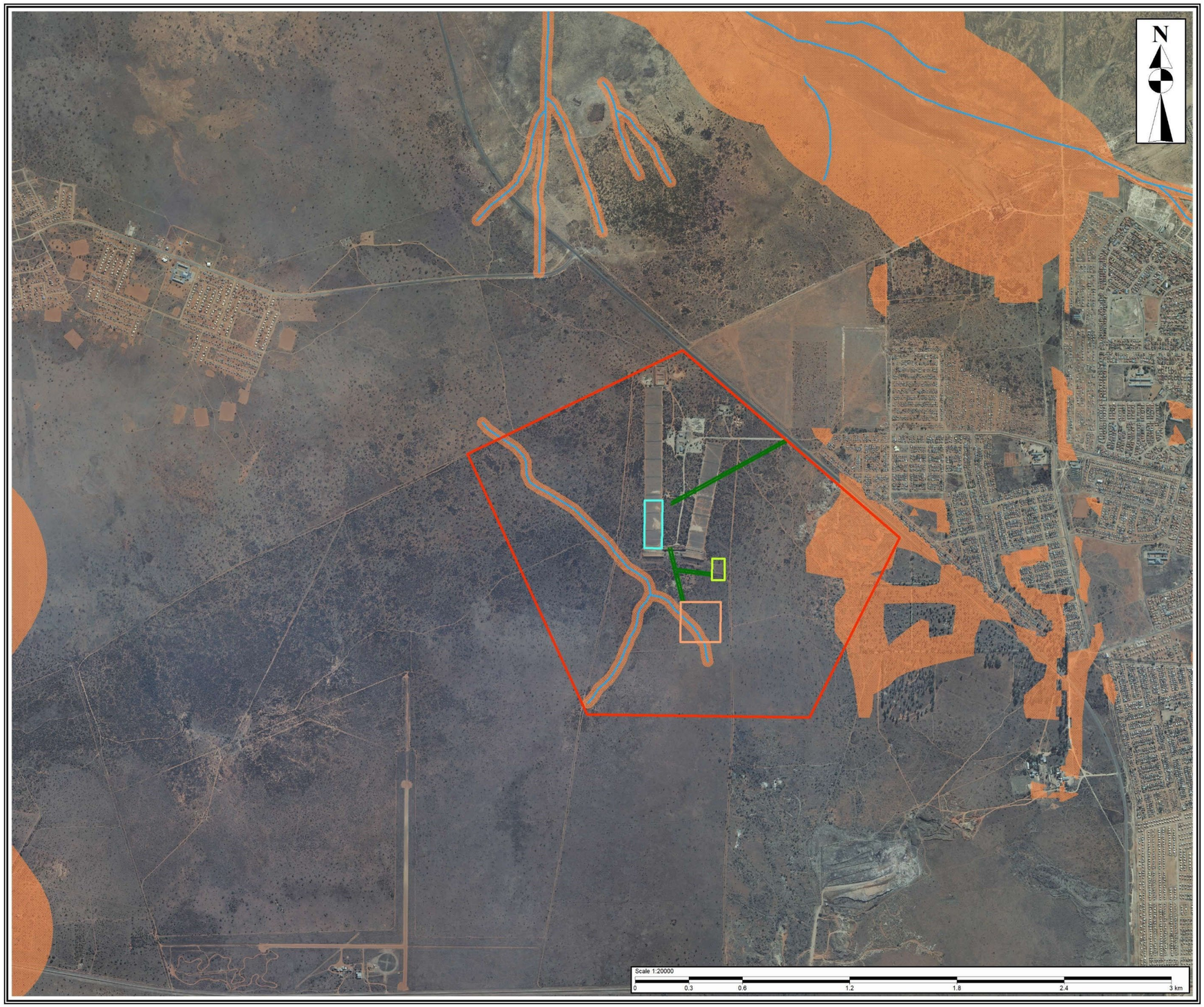
32 Description of the aspect of the activity

Please refer to Section 5 of this report.

33 Composite Map

The composite map is provided in Figure 33-1 and attached as Appendix 7. No specific heritage sites have been identified and therefore have not been included in the preliminary composite map. The composite map will be updated once all the sensitive environmental sites have been identified. The current composite map includes red flag areas which include the following:

- Water Courses and 32m buffer area;
- Wetlands and regulated 500m areas;
- Riparian Areas and the specialist recommended 32m areas;
- CBAs and ESAs; and
- Protected Area.



Application for a PR and Associated EA and WML for proposed prospecting on the Portion of Portion 1 of Vooruitzicht 81

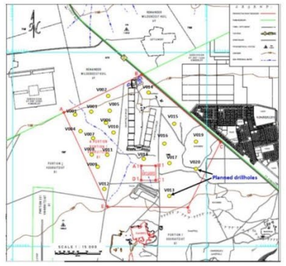
Composite Map

Legend

Proposed Infrastructure

- Proposed Infrastructure Area (eg parking, office, workshop)
- Proposed Access Road
- Proposed Trenching Area
- Drainage Lines and Non-Perennial Rivers
- Vooruitzigt Mining Permit Area (Excluded Area)
- Proposed Prospecting Area
- Red Flag Areas

Layout



Map by:

NDP GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

Figure 33-1: Composite Map

34 Description of impact management objectives including management statements

34.1 Determination of closure objectives

As previously mentioned, each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the findings from Phase 1, Phase 2 will be initiated. The location and extent of the drill sites can therefore not be determined at this stage of the process.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be made safe, stable, non-polluting and will be able to support self-sustaining ecosystems, similar to surrounding natural ecosystems.

To ensure that the rehabilitation plan is aligned with the closure objective, high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated with therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill holes, trench and sumps through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish rehabilitated areas to a state which with no susceptible to soil erosion which may result in loss of soil, pollution of water resources;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring in the area to restore the ecological function of the affected areas as far as practicable; and
- Eliminate all alien invasive plant species from the disturbed areas.

34.2 The process of managing environmental impacts

All the identified impacts shall be mitigated as provided in Section 13 of this report. An Environmental Response Plan (ERP) is a process to respond rapidly and effectively to and manage emergency situations that may arise at the prospecting project area. The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the following legislation:

- OHSAS 18001; and
- The MHSA.

In the event of an emergency, the ERP and applicable Procedure will be consulted, and the required actions implemented. To facilitate the effective implementation of the procedures, copies of the Emergency Response Plan will be placed in accessible and visible locations around the site, such as the site office and contractors' yards.

Misabrite shall ensure that employees and contractors are adequately trained regarding the implementation of the EMPr, environmental legal requirements and obligations, and the ERP.

Environmental awareness is applicable to all personnel involved in the project including part time personnel who shall be trained so that they are aware of environmental obligations by the time they access the site. An Environmental Control Officer (ECO) will be appointed to conduct training during site establishment and will be responsible for how the site will look like before the commencement of prospecting activities and how it looks like after rehabilitation. This will be to ensure that the site has

been restored to its original state or to an acceptable level, and ensure the ERP is adequately applied in case of an emergency. Accordingly, training programmes and frequent emergency simulations is suggested to ensure that all personnel are aware of safety and emergency procedures.

In addition, a list of emergency contact numbers will be displayed at various locations around the site. If the emergency has the potential to affect surrounding communities, the communities will be alerted via alarm signals or contacted in person.

Personnel that do not comply or ignore training and instruction regarding this, should be fined based on their offensive. First time offenders may only get away with a written warning, depending on the seriousness of the offence. Second time offenders may be suspended or fined depending on the decision made by the site manager who may consult with the ECO, contractor and Safety, Health and Quality Officer of the prospecting project.

34.3 Potential risk of Acid Mine Drainage

The potential risk for acid mine drainage was not determined as the proposed prospecting activities are not expected to be associate with any acid-producing wastes. Therefore, the proposed activities do not pose any potential risk of acid mine drainage.

34.4 Steps taken to investigate, assess and evaluate the impact of Acid Mine Drainage

Not applicable.

34.5 Measures to be put in place to remedy any residual or cumulative impacts from acid mine drainage

Not applicable.

34.6 Volume and rate of water use required for the prospecting operation

The water usage for the processing plant will be 10 000 ℓ/hr. It is anticipated that water will be brought onto site and trucked to the identified drill sites. Water bowsers will be deployed to the sites as and when required.

RC drilling in general does not require water. Additional water requirements relate to the potable water supply for prospecting personnel. A temporary vertical water storage tank for drinking water and general use by persons will be provided.

34.7 Has a water use licence been applied for?

It is anticipated that discussions will be held with the DWS to determine whether or not abstraction of water will be required. Based on the outcomes of the discussions with the DWS, any potential abstraction of water due to drilling activities will be clarified. At this stage it is not anticipated that abstraction will be required.

Furthermore, depending on the DWS opinion of the sampling, potentially in the riverbeds, Section 21 (c) and (i) WUL may be required. This will also be clarified with the DWS. Should it be deemed necessary, on instruction by the DWS, the applicant will submit a water use licence application.

34.8 Impacts to be mitigated in their respective phases

The full impact assessment with associated mitigation and management measures are presented in Section 13 as well as in Section 14.

35 Impact Management Outcomes

Table 35-1: Impact Management and Outcomes

Activity		Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type
Data Collection and Assessment	Desktop Study	None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Establishment of access roads, campsite, physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Rehabilitation of areas cleared of vegetation and dust control	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	Monitoring through rehabilitation and management of spoil sites	Retain topsoil integrity for the reuse in rehabilitation Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m ofd riparian zones without consent from the DWS.
Fence		Riparian area contamination, destruction and loss of habitat	Aquatic ecosystems	Construction	Control of access to riparian areas and within the regulated 500 m buffer.	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zines without approval from the DWS.
Hydrocarbon storage area		Destruction of graves and cultural heritage sites	Heritage and archaeological resources	Construction	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources
Mobile office		Destruction of fossils	Palaeontological resources	Construction	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils
Ablution Facility		Loss of natural vegetation in the affected areas	Flora	Construction	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
		Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Relocation of affected species of conservation importance	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation
		Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Dust control measures	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards

Activity		Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type
		Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Remain within the Noise Regulation Standards for Rural Areas.
		Visual impacts as a result of vegetation clearance	Visual	Construction	Rehabilitation of areas cleared of vegetation	Vegetation clearance must be limited to demarcated areas only
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles used during construction Movement of construction vehicles shall be limited to outside of busy hours
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Comply with the EMPr Minimise the number of vehicles used during construction Regular maintenance of vehicles and machinery to improve fuel efficiency Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC Drilling	Drilling and Soil Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day to day operations by affected landowners	Socio-Economic	Operation	Control of times during which operation activities will take place	Maintain a 100% crime free area within the control of the prospecting No complaints from landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Rehabilitation of affected areas and control using bunds	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA
Bulk Sampling		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This will have an impact on aquatic habitats.	Surface Water	Operation	Control through management and monitoring of surface runoff	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without consent from the DWS. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA
		Uncontrolled movement within riparian zones may have an impact on the aquatic ecological habitat, ecological functioning and structure.	Aquatic Ecosystems	Operation	Avoidance of riparian areas	NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS Comply with requirements of the NWA
		The project may result in the following impacts on the floral environment during the operation phase:	Flora	Operation	Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success.	No invasive plant species in rehabilitated areas

Activity		Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type
		Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation; Impact on floral diversity as a result of possible uncontrolled fires; Potential spreading of alien invasive species as a result of floral disturbance; and Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase				No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation and/or removal of contaminated soils
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Fauna	Operation	Rehabilitation of affected areas Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes. Drill holes must be permanently capped as soon as is practicable	No removal of vegetation outside of demarcated areas. Successful plugging of drill holes, with no faunal casualties as a result of holes being left open
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Rehabilitation of affected areas	Retain topsoil integrity for the reuse in rehabilitation.
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Air Quality	Operation	Dust control measures	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible Make use of rigs that have earthy cover to minimise the visual impact
		The drilling operations may result in the destruction of graves and other heritage resources.	Heritage Resources	Operation	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources Comply with requirements of the SAHRA
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils Comply with requirements of the SAHRA
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times

Activity		Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	No private infrastructure shall be damaged/lost due to drilling vibrations
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Vehicle movement shall be limited to areas demarcated as access tracks Comply with the requirements of the EMPr
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Maintain the water quality of water course in the project area Ensure that dirty stormwater and runoff is diverted from the water courses and riparian areas Comply with the requirements of GN704
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Air Quality	Decommissioning and Closure	Dust control measures and rehabilitation of areas stripped of vegetation	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers	Comply with the Noise Regulation Standards for Rural Areas.

36 Impact Management Actions

Table 36-1: Impact Management Actions

Activity		Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
Data Collection and Assessment	Desktop Study	None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Establishment of access roads, campsite, physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Construction	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Construction	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Monitoring through rehabilitation and management of spoil sites	Construction	Retain topsoil integrity for the reuse in rehabilitation Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of riparian zones without consent from the DWS.
Fence		Riparian Zone contamination, destruction and loss of habitat	Control of access to riparian areas and within the regulated 500 m buffer.	Construction	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zines without approval from the DWS.
Hydrocarbon storage area		Destruction of graves and cultural heritage sites	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Construction	No destruction/loss of heritage resources
Mobile office		Destruction of fossils	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Construction	No destruction/loss of fossils
Ablution Facility		Loss of natural vegetation in the affected areas	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Construction	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
		Migration of fauna due to disturbance caused by the proposed project	Relocation of affected species of conservation importance	Construction	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation
		Air pollution through nuisance dust, PM 10 and PM 2.5 as well as emissions from construction vehicles and machinery.	Dust control measures	Construction	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards
		Increase in ambient noise due to movement of construction vehicles and machinery	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers Control through the limiting of the activities to the day time and the implementation of an open and transparent channel of communication	Construction	Remain within the Noise Regulation Standards for Rural Areas.
		Visual impacts as a result of vegetation clearance	Rehabilitation of areas cleared of vegetation	Construction	Vegetation clearance must be limited to demarcated areas only

Activity		Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
		Increased traffic on the roads due to additional construction vehicles	Speed control and limitation of the times when construction vehicles may be on the roads	Construction	Minimise the number of vehicles used during construction Movement of construction vehicles shall be limited to outside of busy hours
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Construction	Comply with the EMPr Minimise the number of vehicles used during construction Regular maintenance of vehicles and machinery to improve fuel efficiency Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC Drilling	Drilling and Soil Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day to day operations by affected landowners	Control of times during which operation activities will take place	Operation	Maintain a 100% crime free area within the control of the prospecting No complaints fro landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Rehabilitation of affected areas and control using bunds	Operation	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA
Bulk Sampling		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This will have an impact on aquatic habitats.	Control through management and monitoring of surface runoff	Operation	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without consent from the DWS. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA
		The project may result in the following impacts on the floral environment during the operation phase: Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation; Impact on floral diversity as a result of possible uncontrolled fires; Potential spreading of alien invasive species as a result of floral disturbance; and Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Avoidance of riparian areas	Operation	NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS Comply with requirements of the NWA
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;	Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success.	Operation	No invasive plant species in rehabilitated areas No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation and/or removal of contaminated soils

Activity		Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
		Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.			
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Rehabilitation of affected areas Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes. Drill holes must be permanently capped as soon as is practicable	Operation	No removal of vegetation outside of demarcated areas. Successful plugging of drill holes, with no faunal casualties as a result of holes being left open
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Rehabilitation of affected areas	Operation	Retain topsoil integrity for the reuse in rehabilitation.
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Dust control measures	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Operation	No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible Make use of rigs that have earthy cover to minimise the visual impact
		The drilling operations may result in the destruction of graves and other heritage resources.	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Operation	No destruction/loss of heritage resources Comply with requirements of the SAHRA
		Earth moving activities may result in the destruction of fossils (if any).	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Operation	No destruction/loss of fossils Comply with requirements of the SAHRA
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers	Operation	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Speed control and limitation of the times when construction vehicles may be on the roads	Operation	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
Blasting	Blasting and vibrations	Drilling ground vibrations may result in possible damage to infrastructure.	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Operation	No private infrastructure shall be damaged/lost due to drilling vibrations
Processing	Crushers	The use of crushing machinery may result in an increase in noise in the immediate vicinity of the project. The drilling	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies eg noise mufflers	Operation	Remain within the Noise Regulation Standards for Rural Areas.

Activity		Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
		activities will also result in an increase in noise in the vicinity of the project.			National Noise Control Regulations, SANS10103:2008 guidelines.
		The use of crushing machinery may result in increased dust emission in the immediate vicinity of the project.	Dust control measures Ensure that the location of the crushers will be as far from receptors as possible	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A
Feasibility Studies Report		None	N/A	Operation	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Decommissioning and Closure	Vehicle movement shall be limited to areas demarcated as access tracks Comply with the requirements of the EMPr
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Decommissioning and Closure	Maintain the water quality of water course in the project area Ensure that dirty stormwater and runoff is diverted from the water courses riparian areas Comply with the requirements of GN704
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Dust control measures and rehabilitation of areas stripped of vegetation	Decommissioning and Closure	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Decommissioning and Closure	Comply with the Noise Regulation Standards for Rural Areas.

37 Financial Provision

37.1 Description of closure objectives and extent to which they align with the baseline characterisation

Each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the Desktop and geological mapping phase, the prospecting drilling will be initiated. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be left safe, stable, non-polluting and able to support a self-sustaining ecosystem similar to the surrounding natural environment. To ensure that the rehabilitation plan is aligned with the closure objective, a high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill holes, trench and sumps through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish a rehabilitated area that is not susceptible to soil erosion which may result in the loss of soil, degradation of water resources and aquatic environments;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring the area to restore the ecological function of such areas, as far as is practicable; and
- To eradicate all alien invasive plant species that may colonise the areas that have been cleared of vegetation.

37.2 Confirmation that environmental objectives in relation to closure have been consulted with landowners

The draft EIA/EMPr was made available to all registered I&APs for a 30-day review and comment period. All comments received and responses provided to the stakeholders were incorporated into the final EIA/EMPr and were collated into a Comments and Responses table to be submitted to the DMR with this final EIA/EMPr for decision making.

37.3 Rehabilitation Plan

As mentioned previously, each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the desktop and geological mapping phase, the prospecting drilling will be initiated. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for drilling and trenching purposes will be the main area experiencing impacts. The impacts will be temporary in nature, and a detailed management plan has been provided to address the potential impacts associated with these activities.

The only rehabilitation that will specifically be required is borehole capping and revegetation:

- Borehole Capping: Drill holes will be permanently capped as soon as is practicable.
- Infilling of the trench/pit: Topsoil will be used for infilling of the trench/pit.
- Re-vegetation: A suitably qualified ecologist will be appointed to determine the appropriate species that may be used for re-vegetating the area.
- Re-vegetation efforts will be monitored every second month for a period of 6 months after the initial seeding. An effective vegetation cover of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved after 6 months.

37.4 Explain why it can be confirmed that the rehabilitation plan is compatible with closure objectives

Due to the nature of the activities, the impacts will be very limited and of short duration. The management plan is in such a manner as to ensure concurrent rehabilitation. The areas for drilling purposes will be the main areas that will require rehabilitation at the end of the prospecting activities. The impacts of the drilling activities will be temporary in nature and a detailed management plan has been provided to address potential impacts.

37.5 Quantum of financial provision required to manage and rehabilitate the environment

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining/prospecting sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

The amount required to cover the rehabilitation is anticipated to be R 217 321.00 at this stage as shown in Table 37-1.

Table 37-1: Closure Cost Estimate

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	500	**15.94**	1	1	7970
2 (A)	Demolition of steel buildings and structures	m2	0	**221.99**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	20	**327.14**	1	1	6542.8
3	Rehabilitation of access roads	m2	1000	**39.72**	1	1	39720

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	**385.55**	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	**210.3**	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	**443.97**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**0**	**225957.57**	**0.52**	**1**	**0**
7	Sealing of shafts adits and inclines	m3	0	**119.17**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0.2	**155155.97**	1	1	31031.194
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	**#####**	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	**#####**	1	1	0
9	Rehabilitation of subsided areas	ha	0	**129919.76**	1	1	0
10	General surface rehabilitation	ha	0.5	**122909.7**	1	1	61454.85
11	River diversions	ha	0	**122909.7**	1	1	0
12	Fencing	m	0	**140.2**	1	1	0
13	Water management	ha	0	**46733.73**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0.5	**16356.8**	1	1	8178.4
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		154897.244

1	Preliminary and General	18587.6693	**weighting factor 2** 1	18588
2	Contingencies	15489.7244		15489.7244
			Subtotal 2	188974.64
			VAT (15%)	28346.20
			Grand Total	**217321**

The Master Rates will be updated on an annual basis, based on CPIX or a similar approved method, or should legislation change. The first of these updates will take place during 2022 and continue to the year in which the review is taking place, and the overall document will be reviewed and updated whenever necessary (minimum requirement of annual updates).

37.6 Confirmation that the financial provision will be provided as determined

The amount required to cover the rehabilitation is estimated to be R 217 321.00 at this stage. Work will be carried out by the contractors and consultant and the costs are included in the estimate provided in Table 37-1.

Misabrite will fund the operation and hereby undertakes to fund the operations and to manage the operations. The applicant (Misabrite) hereby confirms that the financial provision will be provided as determined in Table 37-1.

38 Compliance monitoring and performance assessment

Misabrite will be responsible for the implementation of all monitoring, mitigation and management measures, as well as compliance with the EMPr. The recommended monitoring for the identified impacts is detailed below. The applicant will keep a record of all environmental monitoring taken on site.

38.1 Monitoring of Impact Management Actions

Please refer to Table 38-1

38.2 Monitoring and Reporting Frequency

Please refer to Table 38-1.

38.3 Responsible Persons (Roles and Responsibilities)

Generic roles that require to be defines for the project include:

- Competent Authority;
- Project Developer;
- Environmental Control Officer;
- Environmental Health and Safety (EHS) Manager; and
- Site Manager.

The typical requirements of each of the roles are provided in the following sections.

38.3.1 Competent Authority (DMR)

The DMR plays a lead role in the implementation of environmental policies, legislation and regulations. Their role is to ensure that the construction and operation of the proposed prospecting activities are conducted in a sustainable manner, in compliance with the relevant environmental legislation. DMR is responsible for approving the EMPr for the project and any revisions and amendments thereto.

38.3.2 Project Developer

The Project Developer (Misabrite) is the ‘owner’ of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued in terms of NEMA (should the project receive such authorisation) are fully complied with, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that Misabrite will appoint the Environmental Control Officer, EHS Manager and Site Manager.

Misabrite will be responsible for:

- Ensuring that all team members are aware of their roles and responsibilities;
- Taking overall responsibility for all activities that occur in the proposed project and associated infrastructure;
- Ensuring that all commitments/conditions contained in the EA and EMPr are communicated and adhered to by Misabrite employees to all team members and contractors.

During the *construction phase* Misabrite must:

- Appoint a Project Management Team to oversee the Contractor and act as a liaison between the Environmental Control Officer (ECO) and the Contractor;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedies problems timeously and to the satisfaction of the authorities;
- Appoint an independent and suitably qualified ECO to ensure that the Contractor abides by the EMPr;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During the *operation phase* Misabrite must:

- Ensure that the Project Management Team oversees the Contractor and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During *decommissioning phase* Misabrite must:

- Ensure that the Project Management Team oversees the Contractor and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

38.3.3 Contractor

The Contractor (s) (including Sub-Contractors) will report to the Project Management Team and be responsible for:

- Appointing an Environmental Representative who will ensure that all construction activities on site are undertaken in accordance with the EMPr;
- Drafting Environmental Method Statements to mitigate environmental impacts;
- Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;
- Ensuring that all employees and sub-contractors comply with this EMPr;
- Complying with the EMPr and EA commitments and any other legislative requirements as applicable to their workings;
- Adhering to any instructions issued by the project manager on advice of the ECO;
- Submitting an environmental report at identified site meetings on the environmental incidents that have occurred within the period before the site meeting;

- Arranging that all employees and those of the subcontractors receive appropriate training prior to the commencement of construction, taking cognisance of this EMPr and EA.

The Contractor has a duty to demonstrate respect and care for the environment in which they are operating. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

38.3.4 Site Manager

The site manager will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction of the facility.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project construction.
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and ensuring that all employees and contractors and sub-contractors are aware of the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employ an Environmental Officer (or have a designated Environmental Officer function) to monitor and report on the daily activities on-site during the construction period.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented, and that sufficient plant and equipment is made available, is properly operated and maintained in order to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the EHS Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this EMPr and their responsibilities in relation to the programme.
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the EHS Manager.

38.3.5 Environmental Control Officer

An independent Environmental Control Officer (ECO) must be appointed to monitor the compliance of the proposed project with the conditions of Environmental Authorisation (should such authorisation be granted by DMR) during the construction phase (and possibly the operational phase, depending on the requirements of DMR). The ECO must also monitor compliance of the proposed project with environmental legislation and conditions of the EMPr. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project in order to monitor and record environmental impacts and non-conformances. It is recommended that weekly or bi-weekly environmental audits be undertaken by the ECO during the construction phase.
- Environmental compliance reports must be submitted by the ECO to the DMR on an annual basis or as stipulated by the DMR.

- The ECO must maintain a diary of site visits and audits, a copy of the Environmental Authorisation (should such authorisation be granted by DMR) and relevant permits for reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.
- Prior to the commencement of construction, the ECO must meet on site with the Site Manager to confirm the construction procedure and designated construction areas.

38.3.6 Safety, Health and Environmental Representative

The EHS Manager will be appointed to fulfil the roles of the Environmental Officer during the construction phase and the Environmental Manager during the operational phase. The responsibility of the EHS Manager include overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record-keeping and updating of the EMPr as and when necessary. The EHS Manager is also responsible for monitoring compliance with the conditions of the Environmental Authorisation that may be issued to Misabrite

The lead contractor and sub-contractors may have their own Environmental Officers or designate Environmental Officer functions to certain personnel.

During construction, the EHS Manager will be responsible for the following:

- Meeting on site with the Site Manager prior to the commencement of construction activities to confirm the construction procedure and sites allocated for the drill sites and infrastructure required for the project.
- Daily or weekly monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr and Environmental Authorisation (should such authorisation be granted by DMR), using a monitoring checklist that is to be prepared at the start of the construction phase.

38.4 Time Period for Implementing Impact Management Actions

Please refer to Table 38-1.

38.5 Mechanism for Monitoring Compliance

Please refer to Table 38-1.

Table 38-1: Compliance monitoring and performance assessment against EMPr

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Site Clearance and removal of vegetation Drilling of prospecting boreholes (RC) Stockpiling material from site clearance Discarding material from drill sites Construction of temp/mobile site infrastructure and access routes Stormwater management Storage of diesel and vehicle/machinery maintenance equipment. Waste generation and management. Demolition and/or removal of temporary infrastructure/equipment Rehabilitation and restoration of disturbed areas	Soil Erosion	Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation. Stockpiles must be visually inspected daily to ensure that no erosion is taking place	ECO, Site Manager	Daily Monitoring and Monthly Reporting
	Loss of Indigenous plant Species	A suitably ecologist or horticulturist will be required to make recommendations regarding the collection, propagation/storage and transplantation of plants is advised.	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Faunal Habitat Loss	Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna Where required fauna shall be relocated to an area with a similar habitat as the project area Time construction activities to minimise faunal mortality Poaching of fauna shall be prohibited Uncontrolled fires shall not be permitted on site and persecution or hunting of fauna	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Proliferation of alien invasive species	Declared weeds and alien invasive species must be eradicated. Management of alien invasive plant shall be undertaken though throughout the	ECO, Site Manager	Monthly monitoring and reporting Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed and sustainable.
	Nuisance dust and air emissions generation	During dry seasons, ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water obtained from an approved source to minimise dust generation. Set up PM 2.5 and PM10 Monitoring sites in the area to monitor dust fall.	ECO, Site Manager	Monthly monitoring and reporting
	Loss of arable land/land for grazing	Ensure proper rehabilitation measures are adhered to in order to return the soil quality to its natural state.	ECO, Site Manager	Monitor monthly and report on an annual basis. Monitoring will be required until such time that rehabilitation is completed.
	Soil and groundwater contamination	Manage through the EMPr and develop a groundwater management programme. Collection of baseline hydrochemistry samples for analysis.	ECO, Site Manager	Monthly monitoring and reporting
	Groundwater extractions	Ensure that no groundwater extraction is undertaken without approval from the DWS Monitoring water levels of the boreholes found in close proximity to the proposed prospecting site, through a flow meter and water level data logger.	ECO, Site Manager	Monthly monitoring and reporting
	Visual Intrusion and loss of sense of place	Ensure that infrastructure is kept to its most “natural” state and keep a tidy visually ordered site. Rubble/litter/waste removal and disposal to be monitored throughout construction. Complaints about night lights should be investigated and documented in a register	ECO, Site Manager	Monthly monitoring and reporting
	Increased pressure on the road network	Speed control and limitation of the times when construction vehicles may be on the roads	ECO, Site Manager	Monthly monitoring and reporting
	Soil disturbance resulting in the spread of alien	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	ECO, Site Manager	Monthly monitoring and reporting
	Surface water contamination	Monitor surface water quality upstream and downstream of the prospecting area to ensure that the prospecting activities are not contamination water resources	ECO, Site Manager	Monthly monitoring and reporting

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	Riparian Area and Aquatic Ecosystem Loss	Ensure that there are construction activities that will be located within any riparian and aquatic ecosystem areas.	ECO, Site Manager	Monthly monitoring and reporting
	Destruction of graves and cultural resources	No drilling sites shall impact graves and sites of heritage or cultural importance Monitoring reports detailing the results of the recommended archaeological monitoring must be submitted once the construction phase has been completed.	ECO, Site Manager	Monthly monitoring and reporting
	Water Use	No water may be sources from rivers and streams without approval from the DWS. No clean water shall be used for dust suppression		
	Nuisance Noise	Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	ECO, Site Manager	Monthly monitoring and reporting
	Health and safety of personnel	Routine safety checks, safety training and Inspections to be carried out during the construction and operation phase to enforce the use of Personnel Protective Equipment (PPE). This must also be included in the safety requirements of the Contract.	ECO, Site Manager	Routine inspection and Quarterly reporting
	Waste Management	Maintain a waste manifest book to record volumes of waste leaving the site, including recyclables. Keep safe disposal certificates on file on site for Hazardous waste. Way Bridge slips must be obtained for all other waste streams and kept on file on site	ECO, Site Manager	Monthly daily and report on a monthly basis
	Stormwater Management	Visual monitoring based on sediment Clean water must be kept separate from contaminated water emanating from the project sites	ECO, Site Manager	Monthly daily and report on a monthly basis
	Rehabilitation	Monitoring of the following: • Basal Cover • Arial Cover • Species diversity	ECO, Site Manager	Rehabilitation will be undertaken throughout all the project phases. The final rehabilitation will be undertaken when the prospecting activities have been finalised. The ECO shall inspect the affected areas 6 months after finalisation of rehabilitation to assess the success of the rehabilitation.

39 Frequency of submission of performance assessment report

A monthly site visit and report shall be compiled by the ECO and will include all aspects of the EMPr, as required.

Annual environmental audits must be undertaken to ensure compliance with the EMPr and EA/WML. The environmental audit reports must also include the financial provision and must be submitted to the DMR.

40 Environmental Awareness Plan

It is important to ensure that the Contractors and employees associated with the proposed project have the appropriate level of training and awareness to ensure that continual environmental due diligence and conservation is exercised at all levels of work carried out. Employees, contractors and sub-contractors must be made aware of their responsibilities in terms of relevant legislation, guidelines as well as this EMPr and EA.

Environmental conditions will be included in the contracts issued to the contractors, making them aware of the potential environmental impacts and risks associated with the proposed project. The importance of implementing the conditions in the EMPr and the necessity of good housekeeping practices will be made known to the contractors and employees of Misabrite and the contractors in order to prevent accidental spillages and avoid subsequent environmental impacts.

Training needs will be identified based on the EMPr requirements and capacity of Misabrite employees and contractors. In order to ensure environmental due diligence and protection of environmental harm, it is vital that all employees are trained to perform their designated role in alignment with the EMPr and EA.

The aim of the environmental awareness plan is to:

- Promote environmental education and conservation within the working place;
- Inform employees and contractors on the applicable environmental procedures and programmes;
- Provide job specific training on the specification of environmental conservation and protection applicable to the respective construction activities.

40.1 Communication of environmental risks

The training pertaining to the environmental awareness will include the following:

- All personnel (construction and operation staff) will undergo induction, which as a minimum will include Safety, Health and Environmental awareness;
- All attendees will sign an acknowledgement register upon receiving and understanding the induction;
- Environmental risks will be identified together with the specific job training that may be required to address these risks. Construction and operation staff will be trained on the implementation of emergency procedures where relevant.

An Environmental Awareness and Risk Assessment Schedule has been developed and is outlined in Table 40-1. The purpose of this schedule is to ensure that onsite employees are not only rained, but that the principles are continuously re-enforced.

Table 40-1: Environmental Training and Awareness Schedule

Frequency	Time allocation	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects.

Frequency	Time allocation	Objective
		Establish a basic knowledge of the environmental legal framework and consequences of non - compliance. Clarify the content and required actions for the implementation of the EMPr. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.
Monthly Awareness Talks (all staff and workers)	30 minutes awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily toolbox talks.

40.2 Mitigation and management of Environmental Risks

As prescribed in Table 40-1, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

40.2.1 Environmental Awareness Training Content

Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in all the activities at the prospecting project area:

- Description of the approved activities and content of the prospecting right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;
- Content and implementation of the approved EMPr specifically:
    - Allocated roles and responsibilities;
    - Management and mitigation measures; and

- Identification of risks and requirements adaptation.

- Sensitive environments and features:
- Description of environmentally sensitive areas and features; and
- Prohibitions as it relates to activities in or in proximity to such areas.
- Emergency Situations and Remediation:
  - Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
  - An overview of the response procedure;
  - Equipment and resources;
  - Designate of responsibilities;
- Communication, including communication with the potentially affected communities and responsible authorities; and
- Training schedule to ensure effective response.

40.2.2 Development of procedures and checklists

The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof:

- Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation will potentially affected landowners. In the even that risks are identified, which may affect adjacent landowners (or other persons), the procedure will include appropriate communication strategy to inform such persons and provide response measures to minimize the impact.
- Incident Reporting Procedure: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:
  - Provide details of the responsible person, including any person who
  - Is responsible for the incident;
  - Owns any hazardous substance involved in the incident;
  - Was in control when the incident occurred.
  - Provide details of the incident (time, date, location);
  - The details of the cause of incident;
  - Identify aspects of the environment affected;
  - The details of corrective action taken; and
  - The identification of any potential residual or secondary risks that must be monitored and corrected or managed.
- Environmental and Social Audit Checklist: An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed

and approved as part of the EMPr. Non-conformances will be identified, and corrective action taken where required.

41 Manner in Which Risks Will Be Dealt with in Order to Avoid Pollution or the Degradation of the Environment

As prescribed in Table 40-1, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

Environmental Awareness Training Content- Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in prospecting activities:

- Description of the approved prospecting activities and content of the prospecting right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;
- Content and implementation of the approved EMPr specifically:
  - Allocated roles and responsibilities;
  - Management and mitigation measures; and
  - Identification of risks and requirements adaptation.
- Sensitive environments and features:
  - Description of environmentally sensitive areas and features; and
  - Prohibitions as it relates to activities in or in proximity to such areas.
- Emergency Situations and Remediation:
  - Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
  - An overview of the response procedure;
  - Equipment and resources;
  - Designate of responsibilities;
  - Communication, including communication with the potentially affected communities and responsible authorities; and
  - Training schedule to ensure effective response.

41.1 Development of procedures and checklists

The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof:

- Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation will potentially affected landowners.

In the even that risks are identified, which may affect adjacent landowners (or other persons), the procedure will include appropriate communication strategy to inform such persons and provide response measures to minimize the impact.

- Incident Reporting Procedure: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:
    - Provide details of the responsible person, including any person who
    - Is responsible for the incident;
    - Owns any hazardous substance involved in the incident;
    - Was in control when the incident occurred.
    - Provide details of the incident (time, date, location);
    - The details of the cause of incident;
    - Identify aspects of the environment affected;
    - The details of corrective action taken; and
    - The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

Environmental and Social Audit Checklist: An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the EMPr. Non-conformances will be identified, and corrective action taken where required.

42 Specific Information Required by The Competent Authority)

All information committed to in the scoping report and as requested by the DMR to date has been incorporated in the EIA/EMPr.

The financial provision for the environmental rehabilitation and closure requirements of operations is governed by NEMA, as amended, which provides in Section 24P that the holder of a prospecting right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually as required by the DMR.

43 Conclusion and Recommendations

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed prospecting for aggregate stone-dolerite, Clay and Sand on portion of Portion 1 of Farm Vooruitzicht 81 by Misabrite in accordance with the requirements of the NEMA and National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA). This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Specialist input has been included for all key environmental aspects that were identified during the scoping phase of the process.

Specialist studies were undertaken during the EIA Phase of the proposed project with the objective of identifying and weighing anticipated impacts and risks associated with the prospecting activities as well as in accordance with all relevant legislative requirements.

The findings of the impact assessment have shown that the proposed project will have negative impacts on the receiving environment, including:

- All the identified impacts will be localised, short term and will have a medium and low significance. The significance of potential environmental impacts can be reduced to low and very low significance with implementation of mitigation measures and monitoring.
- Cumulative noise, visual and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.
- Vegetation loss is unavoidable during the construction phase of the project. This will however be limited to the footprint of the infrastructure (access road, camp, boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.

Where possible, mitigation and management measures, no-go areas, as well as further recommendations have been provided by specialists which will lead to a reduction in the significance of these impacts to medium and low significance, including:

- Ensuring the layout of the prospecting infrastructure does not impact on the water resources and regulated 100m buffer area without approval from the DWS;
- Ensuring the layout of the prospecting infrastructure does not impact on the heritage resources without approval from SAHRA;
- Stormwater management must be implemented;
- Re-vegetation of the rehabilitated areas with indigenous species;
- Where possible rehabilitation will be conducted in tandem with construction and operational phases of the project; and
- The land use and the overall land capability as the soil can be rehabilitated to be reused for agriculture and mining purposes.

Monitoring plans, which should be implemented throughout the prospecting activities, have also been provided to ensure that adverse impacts are reduced, and continuous improvements are made.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for drilling and trenching purposes will be the main area experiencing impacts. The impacts will be temporary in nature, and a detailed management plan has been provided to

address the potential impacts associated with these activities. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DEA

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed prospecting project fulfils the process requirements of the NEMA and the NEM: WA. The EAP recommends that an EA/WML be issued by the DMR and that the construction and operation should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIA/EMPr Report as well as conditions that will be included in the EA/WML by the DMR.

45 Undertaking regarding correctness of information

I Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

Signature of the EAP

DATE: 4 July 2022

46 Undertaking regarding inclusion of comments and inputs from stakeholders and I&APs

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

Signature of the EAP

DATE: 4 July 2022

47 Undertaking regarding inclusion of inputs and recommendations from the specialist reports

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the inputs and recommendation from the specialist reports have been included in the EIA/EMPr Report.

Signature of the EAP

DATE: 4 July 2022

48 Undertaking regarding the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

Signature of the EAP

DATE: 4 July 2022

49 Statement of Ndi Geological Consulting Services (Pty) Ltd independence

Neither Ndi Geological Consulting Services nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of Ndi Geological Consulting Services.

Ndi Geological Consulting Services has no prior association with Misabrite (Pty) Ltd in regard to the mineral assets that are the subject of this report. Ndi Geological Consulting Services has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

Ndi Geological Consulting Service's fee for completing this report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the report.

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Appendix 1: EAP Qualifications

Appendix 2: EAP CVs

Appendix 3: DMR Scoping Report and Plan of Study Acceptance Letter

Appendix 4: Locality Map

Appendix 5: Stakeholder Engagement Documentation

Appendix 6: Specialist Studies Reports

Appendix 7: Project Composite Map