VAN ZYL FARMS

PROSPECTING RIGHT

PROPOSED PROSPECTING OF SILLIMANITE ON THE FARMS WORTEL 42, PORTION 1 AND THE REMAINDER EXTENT, KHAI MA LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NAMAQUALAND MAGISTERIAL DISTRICT, NORTHERN CAPE PROVINCE

FINAL BASIC ASSESSMENT REPORT

NOVEMBER 2019

REFERENCE NUMBER: **NC 30/5/1/1/2/12408 PR**

PREPARED FOR:
Van Zyl Mining (Pty) Ltd
Philip Van Zyl
P.O Box 688
Keimoes
8860

Cell: 083 391 5749
Email: Philipvzyl7@gmail.com

PREPARED BY:
Greenmined Environmental (Pty) Ltd
Yolandie Coetzee
Postnet Suite 62, Private Bag X15
Somerset West,7129
Tel: 011 966 4390
Fax: 086 546 0579
Cell: 082 734 5113
E-mail: yolandie.c@greenmined.co.za

EXECUTIVE SUMMARY

Van Zyl Farms intends to apply for a prospecting right on the farm Wortel 42 (excluding a 5ha area), which falls in the Khai Ma Local Municipality, Namakwa District Municipality, and Namaqualand Magisterial District, Northern Cape Province.

The farm Wortel 42 is situated approximately 74,7km west of Pofadder and 148km east of Springbok, Northern Cape Province. The commodity of interest is Sillimanite (SI).

An application for environmental authorisation will be submitted in terms of section 16 of The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 Of 2002) And The National Environmental Management Act, 1998 (Act No. 107 Of 1998 NEMA) As Well as The Environmental Impact Assessment Regulations as Amended 2017.

Van Zyl Mining has previously, on 30th January 2019, applied for a prospecting right (12408 PR) for the prospecting right and associated activities on the farm Wortel 42, Portion 0 (Remaining Extent) and Portion 1 (excluding a 5ha area), Khai Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province

DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES:
(These activities do not disturb the land where prospecting will take place, e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.)

<u>Phase 1 (month 0 to 4)</u>

- Desktop Studies
  Desktop studies form a very important preparatory step in a new coal exploration project, and as the name suggests, this task is executed mainly from an office environment. Desktop studies will be conducted by the project geologist as part of preliminary investigations into the prospecting area by looking at all relevant published literature, geological maps, mining maps and any available evidence or records of coal findings. The outcome of the desktop studies will be a geological report of the prospecting area with a particular emphasis on the prospectively of the area. This report will also inform other subsequent prospecting steps.

- Spatial Database Compilation
  Spatial information will be compiled into a GIS database for access, correlation and evaluation. The GIS system will be used and maintained for the period of the prospecting right exploration program and regularly updated as new information is generated by the exploration program.

- Land Survey
  All spatial information accessed and collected in the field will be standardized using the WGS84 datum.

- Remote Sensing

  As part of the initial review, public domain aerial photos will be acquired and a detailed geological and structural interpretation will be done on these to aid in identifying target areas that are not readily evident on the ground and to provide an independent interpretation of the geology of the area. Satellite imagery will also be acquired to provide a more regional viewpoint of the area of interest. As before a detailed geological and structural interpretation will be done on these images to provide a more regional viewpoint on the target areas. Satellite imagery is used to complement the aerial photos interpretations as the combination of multi-spectral bands can be used to highlight certain lithology's, vegetation types, soil types, alteration minerals, etc.

DESCRIPTION OF PLANNED INVASIVE ACTIVITIES:

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

<u>Phase 2 (month 5 to 16) and Phase 3 (month 17 to 24).</u>

- Drilling:

  The exact location where drilling will be carried out will be determined by the results of geophysical and geological work carried out in Phase 1 of the prospecting programme. It will be assumed that a drill hole will be located in intervals of 350 meters (measured resource as per SAMREC code) with no more than 2 holes being actively drilled at any given time. The initial holes will be drilled on the Prospecting area that forms part of this application. All drill holes will be approved by the team's environmental manager prior to approval thereof. The environmental management plan related to this project will consider environmental sensitivities and advise on the location of drilling holes. By the quarter of exploration, there will be clearly defined targets that will warrant testing by diamond, reverse circulation or percussions drilling. It is envisaged that a combination of HQ (63.5 mm) and NQ (47.63 mm) drilling will be used to drill targets. The core will be logged, cut and sampled at a core yard to be located near the prospecting site. The samples will be crushed and milled and then analysed at an accredited laboratory in for Sillimanite quality. The resultant drill holes will be cased and capped to make it safe for people and animals, and also allow for future access by the exploration team.

- Phase 3 – Infill drilling

  All drill holes will be logged every meter containing information such as whole location, whole depth, commodity depth and other geological structure encountered within the hole. The drill samples obtained from the drilling programme will be kept within suitable trays for future referencing.

  Portions of the sample material representing the commodity body will be taken and placed in bags for sample analysis. Each sample will be marked with the whole number and the sample number. The sample number will also appear on the holes 'log sheet for accuracy purposes of the programme and results to be obtained.

  All samples obtained from the drilling programme will be sent to an independent accredited laboratory for analysis and commodity grade. The certificated obtained will be safe kept together with the log sheets for future referencing.

All data obtained during the proposes activities will be digitally captures and already existing maps updated to form more detailed and accurate models of the study area.

All findings and results of all prospecting activities will be drafted and explained within a geological report. The geological models created will be used for the purposes and also be included within the report. The report will be further included proven resources, reserve estimation, mineral economy as well as recommendations for future work to be done.

MAIN PROSPECTING ACTIVITIES:

- Dump site establishment:
  A dump site will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;
  - Earth sumps for water recycling;
  - Laydown area for screening equipment, fuel and chemical storage;
  - Chemical toilets.

- Rehabilitation of dump sites.

- Drill site establishment:
  A drill site of approximately 400 m² will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;
  - Earth sumps for water recycling;
  - Laydown area for drill rods, fuel and chemical storage;
  - Chemical toilets.

- Drilling and removal of geological cores:
  Drilling a hole of approximately 110 mm in diameter and removing of rock core. Number of boreholes will be finalised once non-invasive prospecting is completed.

- Casing of boreholes:
  1m² per borehole.

- Rehabilitation of drill sites.

DESCRIPTION OF PRE-/FEASIBILITY STUDIES:

(Activities in this section include but are not limited to: initial geological modelling, resource determination, possible future funding models, etc.)

The pre-/feasibility studies team will comprise of a diverse team of technical expertise in the field of mineral projects, including, geologists, mining engineers, metallurgical engineers, civil engineers, mechanical engineers, environmental scientists, marketing professionals and mineral project finance professionals. The list of activities under pre-/feasibility studies includes the following:

- Geological modelling and coal resource estimation;
- Sillimanite reserve estimation;
- Mine design and scheduling;
- Metallurgical processing;
- Market development;
- Infrastructure design;
- Engineering development;
- Human resourcing; and
- Project development and operational costing.

The mining site will contain the following:

- Surveying Equipment;
- Drilling equipment;
- Field Vehicles;
- Sample Analysis equipment; and
- Other relevant field equipment.

Please refer to Appendix C for a copy of the plan and schematic indication of the proposed prospecting activities. All diesel storage will be below the threshold as mentioned in the EIA regulation of the National Environmental Management Act, 1998, (Act No. 107 of 1998) as amended 2017. The proposed prospecting area will be reached via the existing gravel access roads to the farm, making use of the internal haul roads to access the material within the prospecting area.

The proposed project triggers listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended 2017) and therefore requires an environmental impact assessment (basic assessment process) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources) when considering the environmental authorisation. This report, the Final Basic Assessment Report, forms part of the departmental requirements, and presents the first report of the EIA process.

Due to the remote location of the excavation area, the potential impacts on the surrounding environment associated with prospecting is deemed of low significance. It is proposed that all prospecting related temporary infrastructure will be contained within the boundary of the prospecting area. As no permanent buildings will be established on site the layout / position of the temporary infrastructure will be determined by the prospecting progress and available space within the ±11 379.8685 (Ha) of prospecting area.

Van Zyl Farms will make use of temporary infrastructure during the prospecting operations. Prospecting only to be done in gravel roads, where no flora will need to be removed or disturbed. Workers will be transported to and from the site daily.

No alternatives regarding the preferred site, activities and technology is considered as the currently planning is to obtain the best possible option to ensure minimal environmental disturbance and cost effective prospecting operations.

Public Participation Process

Initial public participation process started on the 17th of April 2019. The stakeholders and I&AP's were informed of the project by means of I&AP comment / notification letters that were sent directly to the contact persons. A 30 days commenting period were allowed that ended on the 20th of August 2019.

A Draft Basic Assessment Report (DBAR), with reference number: **NC 30/5/1/12/12408 PR** was distributed to the stakeholders and I&APs for their perusal over a 30 days commenting period that ended on 22nd of September 2019.

All comments received on the DBAR during the commenting period was incorporated into the Final Basic Assessment Report (FBAR) and subsequently compiled and distributed to all the registered I&AP's and stakeholders. This report will be submitted to DMR for decision making.

Basic Assessment Report

The basic assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons, and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The key findings of the environmental impact assessment entail the following:

- The project entails the excavation mining of Sillimanite in an area previously used for mining. Due to the small area used for grazing and mining, mining of Sillimanite in the area was identified as a more viable use.
- The mining procedure will only entail the excavation and transporting of the Sillimanite by means of a front-end loader upon which it will be loaded onto trucks and transported from the mining site to the stockpiling site. The clients will then acquire the Sillimanite from the stockpiling site.
- The existing roads to the mine area can be used to gain access to the site. No new roads are needed.
- Mining activities will be contained within the boundaries of the permitted site. Proper storm water and waste management however needs to be implemented on the site in order to minimise the potential of pollution.

Mining and Biodiversity Conservation Areas:

- The environmental impact assessment identified a critical biodiversity area (CBA) that extends throughout the boundary of the proposed mining area. This area is also highlighted in terms of the Mining and Biodiversity Guideline as an area of high biodiversity importance with a corresponding rating of high risk for mining.

- In order to preserve the CBA and prevent mining having a negative impact on the biodiversity sensitive area, it is proposed that a 20 m no-go buffer be set from the border of the CBA line in which no mining may take place. The buffer area will reduce the mineable footprint from 4.9 ha to ±3.9 ha. Should the Applicant adhere to the proposed 20 m no-go buffer area (from the border of the CBA) the impact on the biodiversity sensitive area is deemed to be insignificant.

Other Site Specific Environmental Aspects:

- No sites of archaeological or cultural importance were identified during the site inspection located in the mining footprint area.
- The fauna at the site will not be impacts on by the proposed mining activity as they will be able to move away or through the site, without being harmed.
- There are no rivers, streams or wetlands within close proximity of the mining area.
- Although the proposed activity will have a cumulative impact on the ambient noise levels, the development will not take place in a pristine environment, and tithe impact is therefore deemed compatible with the current operations and of low significance.
- As the prevalent wind direction is in a southern direction, the hills and ridges in the surrounding environment will screen dust generated at VZF from the operations/residents. Should the applicant implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.
- View shed, as mentioned above, the mining area will be established within the hills and ridges which will also act as a visual barrier.

Upon closure the site will be rehabilitated and sloped to insure that the visual impact on the aesthetic value of the area is kept to a minimum. The site will have a neat appearance and be kept in good condition at all times.

Environmental Management Programme (EMPR)

The EMPR provides a description of the impact management outcomes and closure objectives. It presents the impacts to be mitigated in their respective phases as well as stipulates the mitigation measures to be applied on site.

The financial provision amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 17 500,14.

ABBREVIATIONS

BID	Background Information Document
DBAR	Draft Basic Assessment Report
DEAT	Department of Environment, Agriculture and Tourism
DMR	Department of Mineral and Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme
FBAR	Final Basic Assessment Report
GN	Government Notice
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP's	Interested and Affected Parties
LED	Local Economic Development
NEMA	National Environmental Management Act, 1998
NC	Northern Cape Province
MHSA	Mine Health and Safety Act
MPRDA	Minerals and Petroleum Resources Development Act, 2002
PPP	Public Participation Process
PPE	Personal Protective Equipment
Ptn.	Portion
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SHE	Safety, Health and Environmental
WMA	Water Management Area
VZF	Van Zyl Farms

TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATION IN TERMS OF THE NATIONAL ENVIRONMENTAL 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: *Van Zyl Farms*
TEL NO: *083 391 8749 / 054 464 0110*
FAX NO: 054 464 0110
POSTAL ADDRESS: *PO. BOX 688, Keimoes, 8860*

FILE REFERENCE NUMBER SAMRAD: **NC 30/5/1/12/12408 PR**

I. Important Notice

In terms of the Mineral and Petroleum Resources Development Act (Act 29 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 can be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

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

2. Objective of the Basic Assessment Process

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

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

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

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

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

(i) The nature, signification, consequence, extent, duration, and probability of the impacts occurring to; and

(ii) The degree to which these impacts –

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to –

(i) Identify and motivate a preferred site, activity and technology alternative;

(ii) Identify suitable measures to manage, avoid or mitigate identified impacts; and

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

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of: Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the aforementioned Act. Van Zyl Farms appointed Greenmined Environmental to undertake the study needed. Greenmined Environmental has no vested interest in Van Zyl Farms or the proposed project and declares its independence as required by the Environmental Impact Assessment Regulations, 2014 (as amended April 2017) (EIA Regulations).

i) Details of the EAP

Name of the Practitioner:	Greenmined Environmental
	Yolandie Coetzee
Tel No.:	011 966 4390 / 082 734 5113
Fax No.:	086 546 0579
E-mail address:	yolandie.c@greenmined.co.za

ii) Expertise of the EAP.

(1) The qualifications of the EAP

(with evidence).

Mrs. Yolandie Coetzee has a B.Sc. Degree in Microbiology and Biochemistry and an Honours Degree in Environmental Sciences. Please find full CV attached in Appendix J.

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Yolandie Coetzee is an Environmental Consultant with 8 years' experience in the environmental sector. She specialized the last 5 years in the rehabilitation of mines where she conducted the conceptual rehabilitation and management designs and the closure plans and programs. She has also been involved in a number of other environmental projects including railway sidings, filling stations, abattoir's, logistics hub, prospecting and mining sites where she compiled environmental management plans, environmental impact assessments, environmental audits, due diligences, IWULA's/IWWMP's and alien invasive encroachment programs. She studied at the University of Potchefstroom where she has successfully completed her undergraduate degree in microbiology and biochemistry and her Honours degree in environmental sciences. See a list of past project attached as Appendix J.

b) Location of the overall Activity.

Farm Name:	Wortel 42, Portion 1 and the Remainder Extent (excluding a 5ha area), Khai Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province
Application area (Ha)	±11 379.8685 (Ha) (excluding a 5ha area),
Magisterial district:	Namaqualand Magisterial District
Distance and direction from the nearest town	The farm Wortel 42 is situated approximately 74,7km west of Pofadder and 148km east of Springbok, Northern Cape Province.

21 digit Surveyor General Code for each farm portion	**PROPERTY DESCRIPTION**			
	Cadastral Code	**FARM**	**PTN**	**HA**
	C05300000000004200000	Wortel 42 NR	0 (RE)	5688.5499
	C05300000000004200001	Wortel 42 NR	1	5691,4113HA
	TOTAL AREA (HA)			**±11 379.8685 (Ha)**

c) Locality map

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

The requested map is attached as Appendix B.

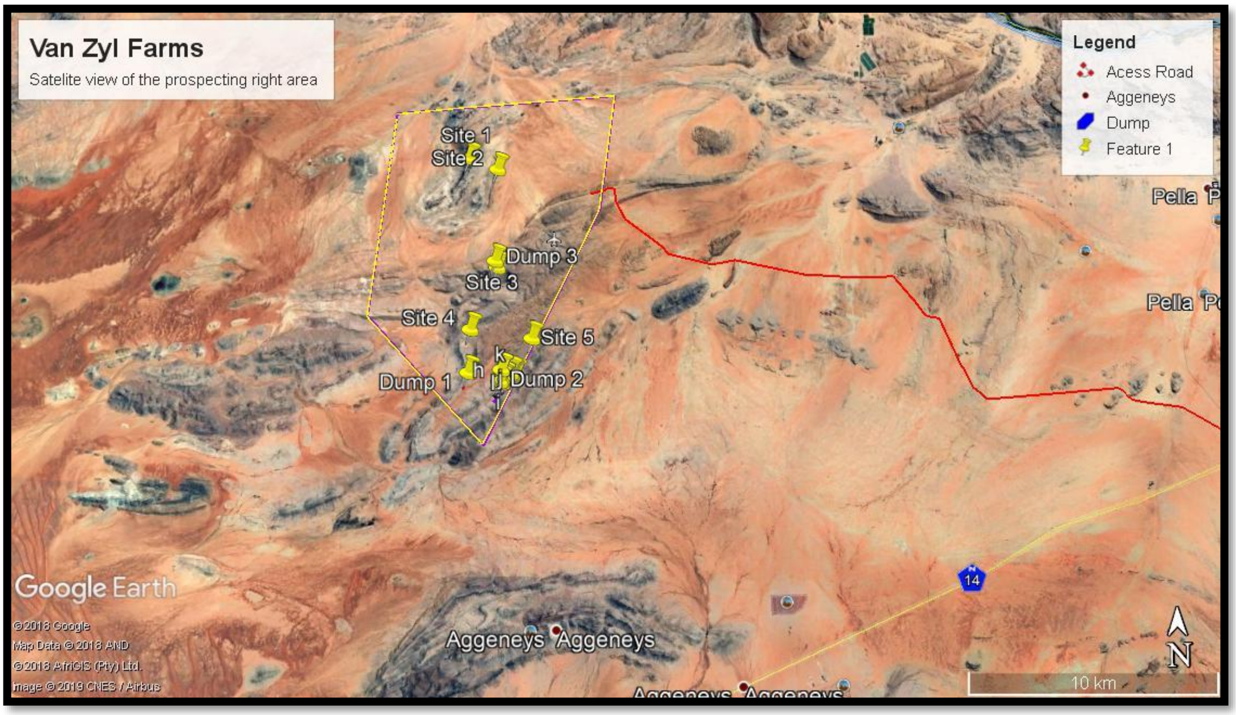

Figure 1: Satellite view of the proposed prospecting right area (yellow polygon) of Van Zyl Farms (image obtained from Google Earth).

Figure 2: Satellite view of the proposed prospecting right area (yellow polygon) of Van Zyl Farms excluding the 5ha area (image obtained from Google Earth).

d) Description of the scope of the proposed overall activity.

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

Van Zyl Farms intends to apply for a prospecting right on the farm Wortel 42 (excluding a 5ha area), which falls in the Khai Ma Local Municipality, Namakwa District Municipality, and Namaqualand Magisterial District, Northern Cape Province.

The farm Wortel 42 is situated approximately 74,7km west of Pofadder and 148km east of Springbok, Northern Cape Province. The commodity of interest is Sillimanite (SI).

Site establishment will involve the demarcation of the permitted mining area and required buffer no-go areas pertaining to areas of importance identified during the environmental impact assessment. Site establishment will also necessitate the clearing of vegetation, the stripping and stockpiling of topsoil, and the introduction of mining machinery.

DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES:

(These activities do not disturb the land where prospecting will take place, e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.)

<u>Phase 1 (month 0 to 4)</u>

- Desktop Studies
  Desktop studies form a very important preparatory step in a new coal exploration project, and as the name suggests, this task is executed mainly from an office environment. Desktop studies will be conducted by the project geologist as part of preliminary investigations into the prospecting area by looking at all relevant published literature, geological maps, mining maps and any available evidence or records of coal findings. The outcome of the desktop studies will be a geological report of the prospecting area with a particular emphasis on the prospectively of the area. This report will also inform other subsequent prospecting steps.

- Spatial Database Compilation
  Spatial information will be compiled into a GIS database for access, correlation and evaluation. The GIS system will be used and maintained for the period of the prospecting right exploration program and regularly updated as new information is generated by the exploration program.

- Land Survey
  All spatial information accessed and collected in the field will be standardized using the WGS84 datum.

- Remote Sensing
  As part of the initial review, public domain aerial photos will be acquired and a detailed geological and structural interpretation will be done on these to aid in identifying target areas that are not readily evident on the ground and to provide an independent interpretation of the geology of the area. Satellite imagery will also be acquired to provide a more regional viewpoint of the area of interest. As before a detailed geological and structural interpretation will be done on these images to provide a more regional viewpoint on the target areas. Satellite imagery is used to complement the aerial photos interpretations as the combination of multi-spectral bands can be used to highlight certain lithology's, vegetation types, soil types, alteration minerals, etc.

DESCRIPTION OF PLANNED INVASIVE ACTIVITIES:

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

<u>Phase 2 (month 5 to 16) and Phase 3 (month 17 to 24).</u>

- Drilling:
  The exact location where drilling will be carried out will be determined by the results of geophysical and geological work carried out in Phase 1 of the prospecting programme. It will be assumed that a drill hole will be located in intervals of 350 meters (measured resource as per SAMREC code) with no more than 2 holes being actively drilled at any given time. The initial holes will be drilled on the Prospecting area that forms part of this application. All drill holes will be approved by the team's environmental manager prior to approval thereof. The environmental management plan related to this project will consider environmental sensitivities and advise on the location of drilling holes. By the quarter of exploration, there will be clearly defined targets that will warrant testing by diamond, reverse circulation or percussions drilling. It is envisaged that a combination of HQ (63.5 mm) and NQ (47.63 mm) drilling will be used to drill targets. The core will be

logged, cut and sampled at a core yard to be located near the prospecting site. The samples will be crushed and milled and then analysed at an accredited laboratory in for Sillimanite quality. The resultant drill holes will be cased and capped to make it safe for people and animals, and also allow for future access by the exploration team.

- Phase 3 – Infill drilling

  All drill holes will be logged every meter containing information such as whole location, whole depth, commodity depth and other geological structure encountered within the hole. The drill samples obtained from the drilling programme will be kept within suitable trays for future referencing.

  Portions of the sample material representing the commodity body will be taken and placed in bags for sample analysis. Each sample will be marked with the whole number and the sample number. The sample number will also appear on the holes 'log sheet for accuracy purposes of the programme and results to be obtained.

  All samples obtained from the drilling programme will be sent to an independent accredited laboratory for analysis and commodity grade. The certificated obtained will be safe kept together with the log sheets for future referencing.

  All data obtained during the proposes activities will be digitally captures and already existing maps updated to form more detailed and accurate models of the study area.

  All findings and results of all prospecting activities will be drafted and explained within a geological report. The geological models created will be used for the purposes and also be included within the report. The report will be further included proven resources, reserve estimation, mineral economy as well as recommendations for future work to be done.

<u>MAIN PROSPECTING ACTIVITIES:</u>

- Dump site establishment:

  A dump site will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;
  - Earth sumps for water recycling;
  - Laydown area for screening equipment, fuel and chemical storage;
  - Chemical toilets.

- Rehabilitation of dump sites.

- Drill site establishment:

  A drill site of approximately 400 m² will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;

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- Laydown area for drill rods, fuel and chemical storage;
- Chemical toilets.

- Drilling and removal of geological cores:
  Drilling a hole of approximately 110 mm in diameter and removing of rock core. Number of boreholes will be finalised once non-invasive prospecting is completed.

- Casing of boreholes:
  1m² per borehole.

- Rehabilitation of drill sites.

DESCRIPTION OF PRE-/FEASIBILITY STUDIES:

(Activities in this section include but are not limited to: initial geological modelling, resource determination, possible future funding models, etc.)

The pre-/feasibility studies team will comprise of a diverse team of technical expertise in the field of mineral projects, including, geologists, mining engineers, metallurgical engineers, civil engineers, mechanical engineers, environmental scientists, marketing professionals and mineral project finance professionals. The list of activities under pre-/feasibility studies includes the following:

- Geological modelling and coal resource estimation;
- Sillimanite reserve estimation;
- Mine design and scheduling;
- Metallurgical processing;
- Market development;
- Infrastructure design;
- Engineering development;
- Human resourcing; and
- Project development and operational costing.

The mining site will contain the following:

- Surveying Equipment;
- Drilling equipment;
- Field Vehicles;
- Sample Analysis equipment; and
- Other relevant field equipment.

Please refer to Appendix C for a copy of the plan and schematic indication of the proposed prospecting activities.

All diesel storage will be below the threshold as mentioned in the EIA regulation of the National Environmental Management Act, 1998, (Act No. 107 of 1998) as amended 2017. The proposed prospecting area will be reached via the existing gravel access roads to the farm, making use of the internal haul roads to access the material within the prospecting area. The existing access road to be used is called the Klein Pella –Good house Road 8891. This road leads from the N14 towards the farms Wortel, Good house, Haramoep, and Korries.

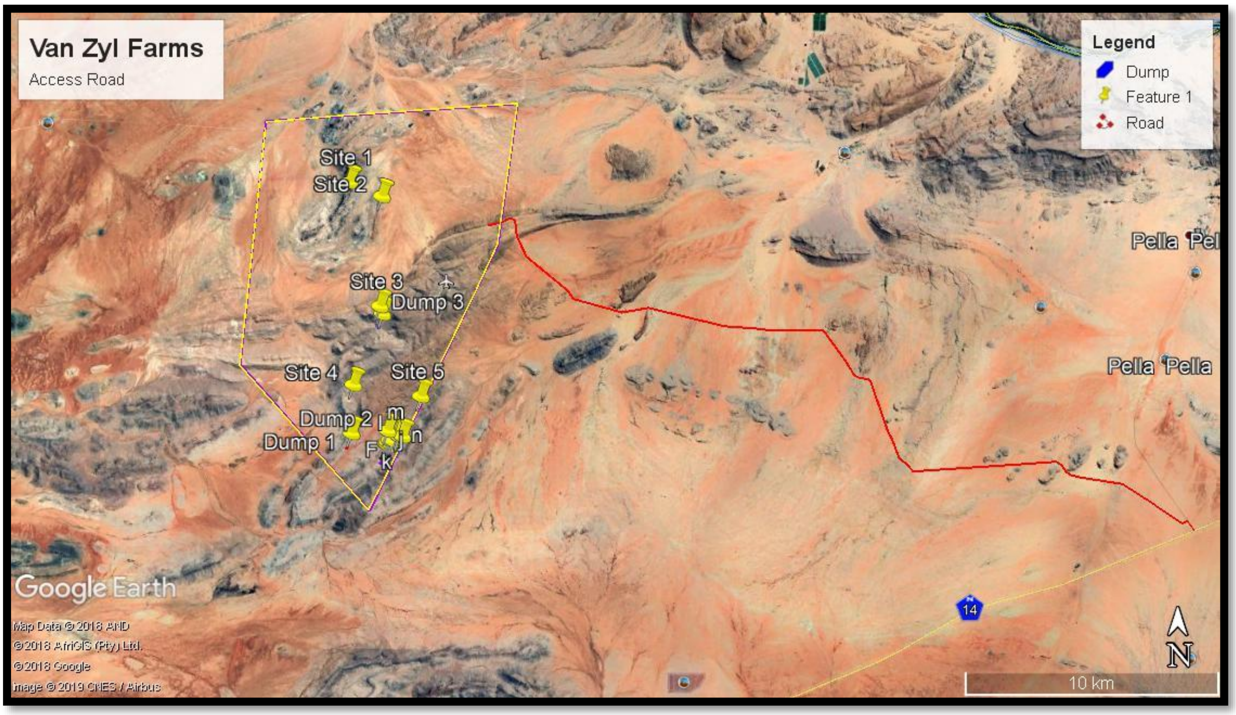

Figure 3: Access Roads to the Proposed prospecting Right Area

Any water required for the implementation of the project will be brought to site daily for the use on site.

Table 1: Proposed Prospecting Activities.

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 Prospecting** Desktop study: Literature Review / Survey	Qualified Geologist (B.Sc. (Hons) a minimum qualification)	Month 0 -2	Geological report based on literature survey (historical records and historical data) of records or evidence of findings in the Kathu / Sishen Iron Field.	Month 0 - 3	Geologist
1	**Non-invasive Prospecting** Geological Field Mapping	Geologist & Field Crew	Month 3	Geological report accompanied by maps & plans of ground trothing of initial geological targeting.	Month 3	Geologist
1	**Non-Invasive Prospecting** Ground Magnetic Survey	Geophysicist / Geologist / Field Crew	Month 4	Survey report detailing possible targets for further exploration, report supported by maps, plans & cross sections.	Month 4	Geologist
2	**Invasive Prospecting** Exploration Boreholes Drilling of the first three boreholes in optimal positions. Detailed geological logs and interpretations (combined with regional information).	Geologist, surveyor, field crew, laboratory technicians, geophysicist and drilling contractor	Month 5 to 8	First phase exploration drilling for detailed information. Borehole cored data. Lithological logs, geophysical down hole surveys (if required), assays results for mineralized intercepts	Month 5 -8	Geologist
2	**Invasive Prospecting** Second phase drilling using diamond coring (4x) and additional RC drilling (10x). Laboratory test work on recovered core samples. Boreholes to confirm continuity of mineralisation & potential deposit size	Geologist, surveyor, geophysicist, drilling contractor and laboratory contractor	Month 9 - 16	Second phase exploration drilling report based on first phase interpretations, geological logs and geophysics. Optimal borehole placement, diamond drilling, collection of samples for analysis.	Month 9 - 16	Geologist
3	**Non-Invasive Prospecting** 3D geological modelling and resource estimation	Geologist / Geophysicist	Month 17 to 18	3D geological model and inferred resource statement. Generation & ranking of mineralised targets for further work.	Month 17 - 18	Geologist

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.)
3	**<u>Non-Invasive Prospecting</u>** Prefeasibility study	Geologist, Mining Engineer, Environmental practitioner, Metallurgist, Marketing specialist, Accountant	Month 18 - 19	Geological and Prefeasibility report, maps & plans	Month 218 - 19	Geologist and Mining Engineer
4	**<u>Invasive Prospecting</u>** Infill drilling for detailed resource definition and mine design	Geologist, surveyor, geophysicist, drilling contractor and laboratory contractor	Month 22 - 24	3D geological model and indicated to measured resource statement. Closely spaced borehole cored data: lithological lots, geophysical down hole surveys, assay results for mineralised intercepts, metallurgical test work. Resource estimation work producing an inferred mineral resource	Month 22 - 24	Geologist
4	**<u>Non-Invasive Prospecting</u>** Bankable feasibility Study	Geologist, Mining Engineer, Environmental practitioner, Metallurgist, Marketing specialist, Accountant	Month 23 - 24	Bankable feasibility report	Month 23 - 24	Geologist and Mining Engineer

i) Listed and specified activities

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
whether listed or not listed	**(volumes, tonnages and hectares or m^2)**	**Mark with an X where applicable or affected**	**(GNR 324, GNR 325, GNR 326 OR GNR 327)**
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc. Etc.)			
Site Visits By Various Specialist	±11 379.8685 (Ha)	N/A	Not Listed
Demarcation Of Site With Visible Beacons.	400 m^2	N/A	Not Listed
Establishment of Temporary Office and Ablution Infrastructure Within Boundaries of Site.	400 m^2	N/A	Not Listed
Stripping And Stockpiling Of Topsoil	400 m^2	X	GNR 327 Listing Notice 1: Activity 20
Drilling for continues resource evaluation	400 m^2	X	GNR 327 Listing Notice 1: Activity 20
General Activities	400 m^2	X	GNR 327 Listing Notice 1: Activity 20
Sloping, Landscaping and Replacement of topsoil over disturbed area (final rehabilitation)	400 m^2	X	GNR 327 Listing Notice 1: Activity 20

ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to the prospected/mined and for a linear activity, a description of the rout of the activity)

Van Zyl Farms intends to apply for a prospecting right on the farms Wortel 42 (excluding a 5ha area), which falls in the Khai Ma Local Municipality, Namakwa District Municipality, and Namaqualand Magisterial District, Northern Cape Province. The prospecting methods will entail exploration drilling of the proposed footprint area.

The proposed borehole locations are provided in the figure below.

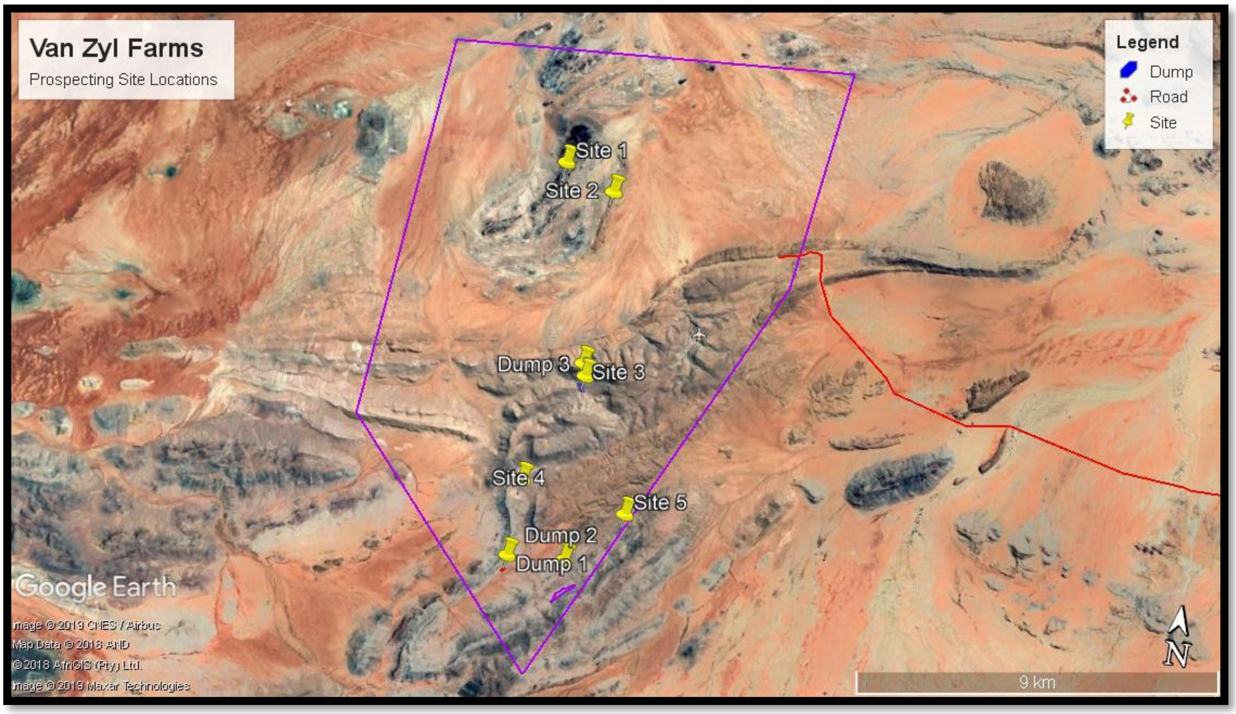

Figure 4: Proposed Exploration Boreholes

The prospecting methods will entail exploration drilling of the proposed footprint area, and is described below:

Table 2: Proposed prospecting borehole locations.

Site Co-ordinates				
	Decimal Degrees		Degrees, Minutes, Seconds	
Label	**Latitude**	**Longitude**	**Latitude**	**Longitude**
Site 1	-29.020115°	18.809274°	29° 1'12.41"S	18°48'33.39"E
Site 2	-29.025068°	18.822269°	29° 1'30.24"S	18°49'20.17"E
Site 3	-29.063849°	18.821445°	29° 3'49.86"S	18°49'17.20"E
Site 4	-29.091551°	18.810702°	29° 5'29.58"S	18°48'38.53"E
Site 5	-29.095624°	18.837969°	29° 5'44.25"S	18°50'16.69"E

Table 4: Proposed prospecting dump locations.

Site Co-ordinates				
	Decimal Degrees		Degrees, Minutes, Seconds	
Label	**Latitude**	**Longitude**	**Latitude**	**Longitude**
Dump 1	-29.108678°	18.809961°	29° 6'31.24"S	18°48'35.86"E
Dump 2	-29.107739°	18.824514°	29° 6'27.86"S	18°49'28.25"E
Dump 3	-29.066558°	18.822492°	29° 3'59.61"S	18°49'20.97"E

DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES:

(These activities do not disturb the land where prospecting will take place, e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.)

Phase 1 (month 0 to 4)

- Desktop Studies
  Desktop studies form a very important preparatory step in a new coal exploration project, and as the name suggests, this task is executed mainly from an office environment. Desktop studies will be conducted by the project geologist as part of preliminary investigations into the prospecting area by looking at all relevant published literature, geological maps, mining maps and any available evidence or records of coal findings. The outcome of the desktop studies will be a geological report of the prospecting area with a particular emphasis on the prospectively of the area. This report will also inform other subsequent prospecting steps.

- Spatial Database Compilation
  Spatial information will be compiled into a GIS database for access, correlation and evaluation. The GIS system will be used and maintained for the period of the prospecting right exploration program and regularly updated as new information is generated by the exploration program.

- Land Survey
  All spatial information accessed and collected in the field will be standardized using the WGS84 datum.

- Remote Sensing
  As part of the initial review, public domain aerial photos will be acquired and a detailed geological and structural interpretation will be done on these to aid in identifying target areas that are not readily evident on the ground and to provide an independent interpretation of the geology of the area. Satellite imagery will also be acquired to provide a more regional viewpoint of the area of interest. As before a detailed geological and structural interpretation will be done on these images to provide a more regional viewpoint on the target areas. Satellite imagery is used to complement the aerial photos interpretations as the combination of multi-spectral bands can be used to highlight certain lithology's, vegetation types, soil types, alteration minerals, etc.

DESCRIPTION OF PLANNED INVASIVE ACTIVITIES:

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

Phase 2 (month 5 to 16) and Phase 3 (month 17 to 24).

- Drilling:
  The exact location where drilling will be carried out will be determined by the results of geophysical and geological work carried out in Phase 1 of the prospecting programme. It will be assumed that a drill hole will be located in intervals of 350 meters (measured resource as per SAMREC code) with no more than 2 holes being actively drilled at any given time. The initial holes will be drilled on the Prospecting area that forms part of this application. All drill holes will be approved by the team's environmental manager prior to approval thereof. The environmental management plan related to this project will consider environmental sensitivities and advise on the location of drilling holes. By the quarter of exploration, there will be clearly defined targets that will warrant testing by diamond, reverse circulation or percussions drilling. It is envisaged that a

combination of HQ (63.5 mm) and NQ (47.63 mm) drilling will be used to drill targets. The core will be logged, cut and sampled at a core yard to be located near the prospecting site. The samples will be crushed and milled and then analysed at an accredited laboratory in for Sillimanite quality. The resultant drill holes will be cased and capped to make it safe for people and animals, and also allow for future access by the exploration team.

- Phase 3 – Infill drilling

  All drill holes will be logged every meter containing information such as whole location, whole depth, commodity depth and other geological structure encountered within the hole. The drill samples obtained from the drilling programme will be kept within suitable trays for future referencing.

  Portions of the sample material representing the commodity body will be taken and placed in bags for sample analysis. Each sample will be marked with the whole number and the sample number. The sample number will also appear on the holes ‘log sheet for accuracy purposes of the programme and results to be obtained.

  All samples obtained from the drilling programme will be sent to an independent accredited laboratory for analysis and commodity grade. The certificated obtained will be safe kept together with the log sheets for future referencing.

  All data obtained during the proposes activities will be digitally captures and already existing maps updated to form more detailed and accurate models of the study area.

  All findings and results of all prospecting activities will be drafted and explained within a geological report. The geological models created will be used for the purposes and also be included within the report. The report will be further included proven resources, reserve estimation, mineral economy as well as recommendations for future work to be done.

MAIN PROSPECTING ACTIVITIES:

- Dump site establishment:

  A dump site will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;
  - Earth sumps for water recycling;
  - Laydown area for screening equipment, fuel and chemical storage;
  - Chemical toilets.

- Rehabilitation of dump sites.

- Drill site establishment:

  A drill site of approximately 400 m² will be established that will require:
  - Clearing of vegetation for sumps and the drill entrance point;

- Earth sumps for water recycling;
- Laydown area for drill rods, fuel and chemical storage;
- Chemical toilets.

- Drilling and removal of geological cores:
  Drilling a hole of approximately 110 mm in diameter and removing of rock core. Number of boreholes will be finalised once non-invasive prospecting is completed.

- Casing of boreholes:
  1m² per borehole.

- Rehabilitation of drill sites.

DESCRIPTION OF PRE-/FEASIBILITY STUDIES:

(Activities in this section include but are not limited to: initial geological modelling, resource determination, possible future funding models, etc.)

The pre-/feasibility studies team will comprise of a diverse team of technical expertise in the field of mineral projects, including, geologists, mining engineers, metallurgical engineers, civil engineers, mechanical engineers, environmental scientists, marketing professionals and mineral project finance professionals. The list of activities under pre-/feasibility studies includes the following:

- Geological modelling and coal resource estimation;
- Sillimanite reserve estimation;
- Mine design and scheduling;
- Metallurgical processing;
- Market development;
- Infrastructure design;
- Engineering development;
- Human resourcing; and
- Project development and operational costing.

The mining site will contain the following:

- Surveying Equipment;
- Drilling equipment;
- Field Vehicles;
- Sample Analysis equipment; and
- Other relevant field equipment.

Please refer to Appendix C for a copy of the plan and schematic indication of the proposed prospecting activities.

A mobile site office, workshop and service area and chemical ablution facility will be present on the site. A generator will be used to supply power for the Temporary Infrastructure on site. Potable water will daily be transported to site. The solid waste produced during the operational phase of the project will be transported from site to the local municipal landfill site. Approximately 6 workers will be employed at the site. Prospecting will be done in daylight hours. From time to time it may be required to work an alternative Saturday.

Site vehicles will use the existing gravel farm roads that leads to Wortel. The site can be accessed via the unnamed road from Klein Pella (Good house) to Pofadder. These roads are gravel roads accessing the farms in the area. The existing farm roads/tracks will be used as far as practically possibly. The farms roads need to be upgraded and constructed where needed, with landowner consent.

The primary objective is to obtain a closure certificate at the end of the life of the mine at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act. To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPR and of the Provincial Department of Mineral Regulation;
- Demolish / rehabilitate all roads with no post -prospecting use potential;
- Clear all carbonaceous material from site;
- Clear boulders form site;
- Remove all waste from site;
- Any wetlands in the area should not be compromised or destructed;
- Future public health and safety are not compromised;
- Ensure that no threat to surface and underground water quality remains;
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff;
- Shape and contour all disturbed areas in compliance with the EMPR;
- The stockpiled topsoil will be spread over the disturbed area to a depth of at least 500 mm;
- Make safe any dangerous excavations or subsidence on the surface;
- Rehabilitate all disturbed areas in compliance with the EMPR and of the Provincial Department of Mineral Regulation;
- Ensure that all rehabilitated areas are safe, stable and self-sustaining in terms of vegetation;
- Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area;
- The applicant will comply with the minimum closure objectives as prescribed by DMR;
- Any adverse socio-economic impacts are minimised; and
- All socio-economic benefits are maximised.

Table 3: Planned phases and activities that will be conducted for the proposed prospecting right application.

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 Prospecting** Desktop study: Literature Review / Survey	Qualified Geologist (B.Sc. (Hons) a minimum qualification)	Month 0 -2	Geological report based on literature survey (historical records and historical data) of records or evidence of findings in the Kathu / Sishen Iron Field.	Month 0 - 3	Geologist
1	**Non-invasive Prospecting** Geological Field Mapping	Geologist & Field Crew	Month 3	Geological report accompanied by maps & plans of ground trothing of initial geological targeting.	Month 3	Geologist
1	**Non-Invasive Prospecting** Ground Magnetic Survey	Geophysicist / Geologist / Field Crew	Month 4	Survey report detailing possible targets for further exploration, report supported by maps, plans & cross sections.	Month 4	Geologist
2	**Invasive Prospecting** Exploration Boreholes Drilling of the first three boreholes in optimal positions. Detailed geological logs and interpretations (combined with regional information).	Geologist, surveyor, field crew, laboratory technicians, geophysicist and drilling contractor	Month 5 to 8	First phase exploration drilling for detailed information. Borehole cored data. Lithological logs, geophysical down hole surveys (if required), assays results for mineralized intercepts	Month 5 -8	Geologist
2	**Invasive Prospecting** Second phase drilling using diamond coring (4x) and additional RC drilling (10x). Laboratory test work on recovered core samples. Boreholes to confirm continuity of mineralisation &	Geologist, surveyor, geophysicist, drilling contractor and laboratory contractor	Month 9 - 16	Second phase exploration drilling report based on first phase interpretations, geological logs and geophysics. Optimal borehole placement, diamond drilling, collection of samples for analysis.	Month 9 - 16	Geologist

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.)
	potential deposit size					
3	**Non-Invasive Prospecting** 3D geological modelling and resource estimation	Geologist / Geophysicist	Month 17 to 18	3D geological model and inferred resource statement. Generation & ranking of mineralised targets for further work.	Month 17 - 18	Geologist
3	**Non-Invasive Prospecting** Prefeasibility study	Geologist, Mining Engineer, Environmental practitioner, Metallurgist, Marketing specialist, Accountant	Month 18 - 19	Geological and Prefeasibility report, maps & plans	Month 218 - 19	Geologist and Mining Engineer
4	**Invasive Prospecting** Infill drilling for detailed resource definition and mine design	Geologist, surveyor, geophysicist, drilling contractor and laboratory contractor	Month 22 - 24	3D geological model and indicated to measured resource statement. Closely spaced borehole cored data: lithological lots, geophysical down hole surveys, assay results for mineralised intercepts, metallurgical test work. Resource estimation work producing an inferred mineral resource	Month 22 - 24	Geologist
4	**Non-Invasive Prospecting** Bankable feasibility Study	Geologist, Mining Engineer, Environmental practitioner, Metallurgist, Marketing specialist, Accountant	Month 23 - 24	Bankable feasibility report	Month 23 - 24	Geologist and Mining Engineer

Due to the remote location of the excavation area, the potential impacts on the surrounding environment associated with prospecting is deemed of low significance. It is proposed that all prospecting related temporary infrastructure will be contained within the boundary of the prospecting area. As no permanent buildings will be established on site the layout / position of the temporary infrastructure will be determined by the prospecting progress and available space within the ±11 379.8685 (Ha) of prospecting area.

Van Zyl Farms will make use of temporary infrastructure during the prospecting operations. Prospecting only to be done in gravel roads, where no flora will need to be removed or disturbed. Workers will be transported to and from the site daily.

No alternatives regarding the preferred site, activities and technology is considered as the currently planning is to obtain the best possible option to ensure minimal environmental disturbance and cost effective prospecting operations.

An application for a prospecting right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [MPRDA] will be submitted to the Department of Mineral Resources (DMR).

The proposed project triggers the following listed activities in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) [NEMA] and the Environmental Impact Assessment (EIA) Regulations (as amended by GNR 326 effective 7 April 2017), and therefore requires a basic assessment process to obtain environmental authorisation:

- <u>GNR 327 Environmental Impact Assessment Regulations Listing Notice 1 of 2017 Activity 20:</u>

  Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including —
  (a) associated infrastructure, structures and earthworks, directly related to the prospecting of a mineral resource [,]; or [including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)]
  (b) The primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;
  But excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.

Other legislation triggered by the proposed project includes:

- An application for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) has been submitted to the Department of Mineral Resource.

e) Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
(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)		(E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) Section 16	Part A(d) Description of the scope of the proposed overall activity. Application for a prospecting Right Ref No: **NC 30/5/1/12/12408 PR**	Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) - Section 16 – Application for a prospecting right submitted to DMR-NC.
National Environmental Management Act 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2017, GNR 326 effective 7 April 2017) - GNR 327 Listing Notice 1 Activity 20	Part A(d)(i) Listing and specified activities. Application for environmental authorisation Ref No: **NC 30/5/1/12/12408 PR**	Application for environmental authorisation submitted to DMR-NC. GNR 327 Activity 20
National Environmental Management: Air Quality Control Act, 39 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827	Part A(iv)(1)(a) Type of environment affected by the proposed activity – *Air and Noise Quality.*	
National Water Act, 36 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.	Part A (iv) (1) (a) Type of environment affected by the proposed activity – *Aquatic Features.*	No prospecting will be conducted within 100m from a watercourse.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) and amendments	Biophysical Environment	Weed / Alien vegetation clearing. Should the proposed mitigation measures be implemented no aspects of the project could be identified that triggers the NEM: BA, 2004. Threatened and Protected species (Red Data) list.
National Environmental Management: Waste Act, 59 (Act No 59 of 2008) read together with applicable amendments and regulations thereto. NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)	Part A(ii) Description of the activities to be undertaken: *Operational phase – Waste Handling*	The mitigation measures proposed for the site take into account the NEM:WA.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996)	The mitigation measures proposed for the site includes specifications of the MHSA. Part A (iv) (1) (viii) The possible mitigation measures that could be applied on the level of risk –	The operational phase of the site will trigger the MHSA. The mitigation measures proposed for the site includes specifications of the MHSA, 1996

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.**
	Management of Health and Safety Aspects.	
National Heritage Resources Act No. 25 of 1999	Cultural and Heritage Environment. Part A(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment*	No aspects of the project could be identified that triggers the NHRA. A Notice of Intent to Develop in terms of Section 38(8) of the NHRA, 1999 was submitted to SAHRA on 17 April 2019 to determine the action required for the proposed project. SAHRA requested that a HIA and Paleontological Study be conducted. The mitigation measures proposed for the site includes specifications of the NHRA, 1999. The HIA has been conducted in October 2019 and has been incorporated into this FBAR.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Part A (iv) (1) (a) Type of environment affected by the proposed activity: *Physical Environment – Geology and Soil.* Part A (iv) (1) (viii) The possible mitigation measures that could be applied on the level of risk – *Management of weeds- or invader plants*.	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Land Use Planning Ordinance (Ordinance 15 of 1985)	Land use zoning requirements	Land Use Planning Ordinance (Ordinance 15 of 1985)
Northern Cape Nature Conservation Ordinance 8 of 1969 Northern Cape Nature Conservation Act No. 9 of 2009 Cape Nature and Environmental Conservation Ordinance 9 of 1974 The National Forest Act, Act 84 of 1998	Biophysical Environment	No aspects on site could be identified that needs protection. Red data plants do occur in the area. A botanist will conduct a site walkthrough before prospecting commences to indicate if any plants are observed. If plants are observed. The necessary permits will be obtained from DENC.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Khai-Ma Local Municipality Spatial Planning and Land Use Management By-law 2013	Description of the current land uses	Land Rezoning will be conducted once the Prospecting Right application has been converted to a Mining Right application.
Northern Cape Planning and Development Act No 7 of 1998		
Northern Cape Spatial Planning and Land Use Management Bill 2012		
Khai-Ma Local Municipality Integrated Development Plan		
Spatial Planning and Land Use Management Act, Act 16		
Public Participation Guideline in terms of the NEMA EIA Regulations	Part A(ii) Details of the Public Participation Process Followed Application for a prospecting Right Ref No: **NC 30/5/1/12/12408 PR** Application for a Environmental Authorisation Ref No: **NC 30/5/1/12/12408 PR**	Public Participation Guideline in terms of the NEMA EIA Regulations

f) Need and desirability of the proposed activities.

(Describe Methodology or technology to be employed, including the type of commodity to the prospected/mined and for a linear activity, a description of the rout of the activity)

The proposed prospecting will also contribute to the diversification of activities on the property, extending it from agriculture to include small scale mining. The need is to find Sillimanite, qualify and quantify the Sillimanite to develop a business model.

This area, close to Pella, are well known for their rehabilitated historic diamond mining operations and socio-economic poverty.

g) Motivation for the overall preferred site, activities and technology alternative.

Due to the remote location of the excavation area, the potential impacts on the surrounding environment associated with prospecting is deemed of low significance. It is proposed that all prospecting related temporary infrastructure will be contained within the boundary of the prospecting area. As no permanent buildings will be established on site the layout / position of the temporary infrastructure will be determined by the prospecting progress and available space within the ±11 379.8685 (Ha) of prospecting area.

Van Zyl Farms will make use of temporary infrastructure during the prospecting operations. Prospecting only to be done in gravel roads, where no flora will need to be removed or disturbed. Workers will be transported to and from the site daily.

No alternatives regarding the preferred site, activities and technology is considered as the currently planning is to obtain the best possible option to ensure minimal environmental disturbance and cost effective prospecting operations.

h) Full description of the process followed to reach the proposed preferred alternatives within the site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

iii) Details of The Development Footprint Alternatives Considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) The option of not implementing the activity.

Van Zyl Farms intends to apply for a prospecting right on the farms Wortel 42 (excluding a 5ha area), which falls in the Khai-Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province. The farm Wortel 42 is situated approximately 74,7km west of Pofadder and 148km east of Springbok, Northern Cape Province. Please refer to Appendix C for a copy of the plan and schematic indication of the proposed prospecting activities.

The land use is currently under grazing and mixed farming. No buildings will not be impacted by prospecting and are situated in the exclusion zones on the prospecting plan.

No alternatives sites where considered during this prospecting drilling. If drill sites where found unfeasible due to the natural environment, these drill sites will be relocated to a position possible with minimal impacts associated. Please refer to Appendix C for the proposed exploration boreholes and dump sites to be prospected. Product stockpiles to be prospected are old mining stockpiles. No other alternative sites where investigated due to limited stockpiles on site.

However, the applicant considered two activity alternatives during the planning phase of this project:

1. Temporary Infrastructure (Preferred Alternative) vs. Permanent Temporary Infrastructure:
    a. The use of temporary Infrastructure will entail the use of machinery that is either track-based or can be removed without difficulty. Temporary Infrastructure to be used in the prospecting mining method will entail some temporary offices, storage facility and chemical toilet, with servicing of vehicles and equipment being done off-site at the existing workshop on the applicant’s farm.

        i. **Positive Aspects**: The positive aspects associated with the use of temporary infrastructure firstly enable the applicant to move the temporary infrastructure within the boundaries of the prospecting mining area as prospecting mining of the mineral progresses. Secondly the decommissioning phase is facilitated as the removal of temporary infrastructure from the prospecting mining area during the rehabilitation of the site is easy and highly effective.

b. The use of permanent infrastructure will entail the construction of an office building with ablution facilities, and installation of a permanent vehicle service area.

   i. The use of permanent Infrastructure will increase the impact of the proposed project on the environment as it will entail the establishment of more structures, lengthen the period required for rehabilitation as well as increase the rehabilitation amount as the permanent Infrastructure will either have to be decommissioned or be maintained after the closure of the site.
   ii. The construction of permanent Infrastructure at the site will also increase the visual impact of the proposed project on the surrounding environment and additional mitigation measures will have to be implemented to address the impact.

In the light of the above the use of temporary Infrastructure is deemed to be the most viable preferred alternative.

No-go Alternative:

The no-go alternative entails no change to the status quo and is therefore a real alternative that needs to be considered. The 'No Go' option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of minimal vegetation in the area. The no-go alternative entails no change to the status quo and is therefore a real alternative that must be considered. In the event that the no-go alternative is implemented it will prevent the prospecting of the study area.

The no-go alternative was not deemed to be the preferred alternative as:

- The applicant will not be able to supply in the demand of road or construction contractors,
- The application, if approved, would allow the applicant to utilize the available Sillimanite as well as provide employment opportunities to local employees. Should the no-go alternative be followed these opportunities will be lost to the applicant, potential employees and clients,
- The applicant will not be able to diversify the income of the property.

The proposed rehabilitation of the area that includes:

- The preservation of the topsoil to cover disturbed areas;
- Implementation of measures to monitor the natural establishment of plants growth and to re-vegetate with representative seed mixes in the case of poor plant establishment;
- The proposed program to combat invader weeds on a regular base; and
- Will ensure that the land use will remain almost the same when prospecting operations cease.

Not proceeding with the proposed operation will entail that a mineral which if prospected will contribute towards the local and provincial social and economic structures of the area, will not be mined, and that this opportunity will be lost.

It is important to note that as previously discussed, that execution of the prospecting operation will not leave the land unproductive, so that the proposed prospecting operation can be considered to be a sustainable land-use option for the area. If the prospecting project does not go ahead the farm will be used for cultivating grazing and mixed farming. This is also the current use of the land in question.

iv) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

An application for environmental authorisation will be submitted in terms of section 16 of The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 Of 2002) And The National Environmental Management Act, 1998 (Act No. 107 Of 1998 NEMA) As Well as The Environmental Impact Assessment Regulations as Amended 2017.

Van Zyl Mining has previously, on 30th January 2019, applied for a prospecting right (12408 PR) for the prospecting right and associated activities on the farm Wortel 42, Portion 0 (Remaining Extent) and Portion 1 (excluding a 5ha area), Khai Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province

Initial public participation process started on the 17th of April 2019. The stakeholders and I&AP's were informed of the project by means of I&AP comment / notification letters that were sent directly to the contact persons. A 30 days commenting period were allowed that ended on the 20th of August 2019.

A Draft Basic Assessment Report (DBAR), with reference number: **NC 30/5/1/12/12408 PR** will be distributed to the stakeholders and I&APs for their perusal over a 30 days commenting period ending on 22nd of September 2019.

All comments received on the DBAR during the commenting period will be incorporated into the Final Basic Assessment Report (FBAR) and subsequently compiled and distributed to all the registered I&AP's and stakeholders. This report will be submitted to DMR for decision making.

The following I&AP's and stakeholders were contacted to obtain their comments:

Table 4: Stakeholders

Department	Physical Address	Postal Address	Contact	Tel Number	Fax Number	Email	Date Contacted
Kai-Ma Local Municipality		PO Box 106 Pofadder 8890	Municipal Manager Mr Obegang PA: Natasha	(054) 933 1022 (054) 933 1017	054 933 0252	munman@kaima.gov.za	17 April 2019 18th July 2019
Kai-Ma Local Municipality *Ward 4*		PO Box 106 Pofadder 8890	Ward Councillor: Mr. Quincy	054 971 0062 073 590 3617	054 971 0062	Ron.quincy@gmail.commailto:novilitytswere@gmail.com	17 April 2019 18th July 2019
Namakwa District Municipality		PO Box 1480 Kuruman 8460	Municipal Manager: Mr Christiaan Fortuin PA: Chrisinte	053 712 8700		munmansec@namakwa-dm.gov.za	17 April 2019 18th July 2019
Department of Agriculture, Land Reform and Rural Development		Private Bag X5018 Kimberley 8300	Head of Department: Mr W D Mothibi	(053) 838 9102 083 448 9151	(053) 831 3635	fortunec@ncpg.gov.za alexander@hantam.co.za ACloete@ncpg.gov.za ngoltz@ncpg.gov.za	17 April 2019 18th July 2019
Department of Environment and Nature Conservation	Sasko Building 90 Long Street Kimberley 8301	Private Bag X6102 Kimberley 8300	Director for Environmental Quality Management Mr B Fisher Mr. Denver van Heerden	053-8077431 0824630224 0538077305	0866543050 0538321035	bfisher@ncpg.gov.za, tmakaudi@ncpg.gov.za	17 April 2019 18th July 2019
Department of Economic Development and Tourism	Cnr Knight & Stead Street Market Square Post Office Building NetlifeTowers 13th Floor Room 1313 Kimberley	Private Bag X6108 Kimberley 8300	Head of Department: Mr S Mabilo Miss U Ngomane	(053) 839 4002	(053) 832 6805	npaulse@ncpg.gov.za ungomane@ncpg.gov.za	17 April 2019 18th July 2019

Department	Physical Address	Postal Address	Contact	Tel Number	Fax Number	Email	Date Contacted
	8300						
Department of Roads and Public Works	9-11 Stokroos Street, Squarehill Park, Kimberley 8300	PO Box 3132 Kimberley 8300	Head of Department: Mr Kholekile Nogwili PA: Ms. Natasha Corns	(053) 839 2241 (053) 839 2109	(053) 839 2291	KNogwili@ncpg.gov.za ncorns@ncpg.gov.za	17 April 2019 18th July 2019
Department of Water and Sanitation		PO Box 3132 Kimberly 8300	Chief Director: Mr. A Abrahams	(053) 830 8803 082 883 6741	(053) 831 4534	AbrahamsA@dwa.gov.za	17 April 2019 18th July 2019
Department of Labour	Labria House Cnr Pniel & Compound Road Kimberley 8301		Head of Department Zolile Albanie	(053) 838 1500	(053)832 9386	zolile.albanie@labour.gov.za	17 April 2019 18th July 2019
South African Heritage Resource Agency		PO Box 4637 Cape Town	Katie Smuts	021 462 4502	021 462 4509	ksmuts@sahra.org.za	17 April 2019 18th July 2019
Regional Land Claims Commissions Northern Cape		PO Box 2458 Kimberly 8300		053 075 700	053 831 6501	omvula@ruraldevelopment.gov.za	17 April 2019 18th July 2019
SANRAL		Private Bag X19 Belville 7535	Ms Nicola Abrahams	021 957 4600		abahamsn@nra.co.za	17 April 2019 18th July 2019
SANBI			M Mokonoto	021 843 5000		m.mokonoto@sambi.org.za	17 April 2019 18th July 2019
Succulent Karoo Ecosystems Programme (SKEP)			Mr. Abe Koopman			a.koopman@sanbi.org.za E. Marinus2@sanbi.org.za	17 April 2019 18th July 2019

Department	Physical Address	Postal Address	Contact	Tel Number	Fax Number	Email	Date Contacted
WESSA							17 April 2019 18th July 2019
Endangered Wildlife Trust		Private Bag X11 Modderfontein 1609	Head of Conservation and Business Dr. Ina Little	011 372 3600	011 608 4682	ianl@ewt.org.za	17 April 2019 18th July 2019
Botanical Society of South Africa			Mr Mark Botha	021 799 8800	021 797 2376	info@botanicalsociety.co.za Mark@botanicalsociety.co.za conmeyer@megaserve.net	17 April 2019 18th July 2019
Agri Namakwa and Associated Farmers Associations			Mr Danie Jacobs	054 983 2785 071 499 1167		kammasoas@vodamail.co.za	17 April 2019 18th July 2019

Table 5: Registered landowners

PROPERTY DESCRIPTION				I&AP / Landowner	TITLE DEED
Cadastral Code	FARM	PTN	HA		
C05300000000004200000	Wortel 42	0 (RE)	5688.5499H	VAN DEN HEEVER PIETER ANDRIAS	T35898/2007CTN
C05300000000004200001	Wortel 42	1	5691,4113HA	VAN DEN HEEVER PETRONELLA CATHARINA	T60530/2014

Table 6: Interested and Affected Parties

I&AP	POSTAL ADDRESS	PHYSICAL ADDRESS	TELEPHONE	CELL	EMAIL	Date Contacted
Pieter Andrias van Den Heever Wortel 42 (Ptn 0) RE			054 933 0817	082 535 3408	renosterkopdruiwe@oseiland.co.za	18th April 2019 18th July 2019

I&AP	POSTAL ADDRESS	PHYSICAL ADDRESS	TELEPHONE	CELL	EMAIL	Date Contacted
Petronella (Petru) Catharina Van Den Heever Wortel 42 Ptn 1	Posbus 167 Pofadder 8890		054 933 0177	071 897 1637	Pcvdheever50@gmail.com	18th April 2019 18th July 2019
Izak Jacobus van Niekerk		1 Penge Road, Aggeneys, Northern Cape, RSA	054 983 9202			18th April 2019 18th July 2019
Black Mountain Mining /Vendanta Resources Pieter Venter			054 983 9802		Pventer@vendataresources.co.za	18th April 2019 18th July 2019
Oonab Boerdery CC Mr. Edmund Agenbach	Posbus 235 Springbok 8240		054 983 2283	083 5444 632	Edmund.agenbach@gmail.com	18th April 2019 18th July 2019
Sophia Luyt						18th April 2019 18th July 2019
Albertus Van Den Heever						18th April 2019 18th July 2019
JC Straus Agriculture (Pty) Ltd						18th April 2019 18th July 2019
Gemeenskapsontwillkeltrust Witbank						18th April 2019 18th July 2019
Pella Plaaslike Oowerheid						18th April 2019 18th July 2019
Haramoep Boerdery CC						18th April 2019 18th July 2019
Pofadder Municipality	PO Box 106 Pofadder 8890	Municipal Manager Mr Obegang PA: Natasha	(054) 933 1022 (054) 933 1017		munman@kaima.gov.za	18th April 2019 18th July 2019
Frank Nassigtwaighte Agenbach						18th April 2019 18th July 2019

I&AP	POSTAL ADDRESS	PHYSICAL ADDRESS	TELEPHONE	CELL	EMAIL	Date Contacted
Klein Pella Guesthouse Karsten Boerdery					piet@karsten.co.za Kpgastehuis@karsten.co.za	18th April 2019 18th July 2019

On-site notices were placed at the site entrance onto the farm Wortel 42 as well as the Khai Ma Local Municipality in Pofadder on the 10th of July 2019. The project was also advertised in the Gemsbok Newspaper on the 18th of July 2019. The stakeholders and I&AP's was notified of the availability of the Draft Basic Assessment Report (DBAR) for their perusal. A 30 days commenting period will be allowed for the perusal of the document. Comments received on the document will be added to the Final Basic Assessment Report (FBAR) to be submitted to DMR for review. See attached as Appendix H proof that the stakeholders and I&AP's were contacted.

v) Summary of issues raised by I&AP's

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

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES				
Landowner/s				
Mr Pieter van Den Heever	N/A	No objections received. Please refer to Appendix H for the landowner agreement and comments letter.	N/A	N/A
Petru Van Den Heever	N/A	No objections received. Please refer to Appendix H for the landowner agreement and comments letter.		
Lawful occupier/s of the land				
Landowners or lawful occupiers on adjacent properties				
Isak Jacobus van Niekerk	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Black Mountain Mining	20 August 2019	Registered as an I&AP in the name of Vendanta Resources	No Response needed.	N/A
Oonab Boerdery CC	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Sophia Luyt	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Albertus Johannes van den Heever	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
JC Strauss Agriculture (Pty) Ltd	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Gemeenskapsontwikkelintrust Witbank	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Pella Plaaslike Ontwikkeling	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Haramoep Boerdery CC	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Frank Bassigtwaighte Aggenbach		No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A

Interested and Affected Parties List the name 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				
Khai Ma Local Municipality *Ward 4 Mr. Quincy*	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Municipality				
Khai Ma Local Municipality Municipal Manager Mr Obegang	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Namakwa District Municipality Mr. Christiaan Fortuin	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS				
Department of Economic Development and Tourism Head of Department: Mr. S Mabilo	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Department of Roads and Public Works Head of Department: Mr Kholekile Nogwili	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
SANRAL Me Nicole Abrahams	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Department of Labour Head of Department Mr Albanie	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Communities				
Dept. Land Affairs				
Department of Agriculture, Land Reform and Rural Development Head of Department: Mr W D Mothibi	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Regional Land Claims Commissions Northern Cape	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Traditional Leaders				

Interested and Affected Parties List the name 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.**
Dept. Environmental Affairs				
Department of Environment and Nature Conservation Director for Environmental Quality Management Mr B Fisher	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Other Competent Authorities affected				

South African Heritage Resource Agency Natasha Higgit	2 August 2019	Thank you for notifying SAHRA of the Environmental Authorisation (EA) and Mining Permit (MP) Application on farm Wortel 42, Portion 1, Khai Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province (NC 30/5/1/3/2/10771 MP). As the proposed development is undergoing an EA Application process in terms of the National Environmental Management Act, 107 of 1998 (NEMA), NEMA Environmental Impact Assessment (EIA) Regulations for activities that trigger the Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA)(As amended), it is incumbent on the developer to ensure that a **Heritage Impact Assessment** (HIA) is done as per section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by section 24(4)b(iii) of NEMA. This must include an archaeological component and any other applicable heritage components. The HIA must be conducted **as part of the** EA Application in terms of NEMA and the NEMA EIA Regulations. The quickest process to follow for the archaeological component would be to contract a qualified archaeologist (see www.asapa.co.za or www.aphp.org.za to provide an Archaeological Impact Assessment (AIA). The AIA must comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Component of Impact Assessments. No further assessment of the impact to palaeontological resources is required as the proposed mining right is located in an area of low sensitivity as per the SAHRIS PalaeoSensitivity map. Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed. The draft Basic Assessment Report (BAR) appendices must be submitted at the start of the public review process so that an informed comment can be issued.	A Heritage Specialist (HCAC) was appointed to conduct the HIA assessment. The larger geographical area (Bushmanland) in which the current study area is located is marked by a low-density background scatter of lithics (Beaumont *et al*. 1995). In the Aggeneys area, however, this scatter tends to be quite ephemeral (e.g., Halkett 2010; Morris 2011a, 2011b, 2013; Orton 2015, 2016; Webley & Halkett 2012, Van der Walt & Orton 2019). Field assessments closer to the current area of investigation yielded no sites of significance (e.g., Rossouw 2013 & Orton 2015) and the cultural heritage of the study area interpreted within this context. Areas around dump 1 -3 have been impacted on by existing mining, dating to 1961 and the dumping of topsoil, clearing and levelling characterise these areas. All of these activities would have impacted on surface indicators of heritage resources if these ever existed in the areas of dump 1 -3. In terms of the prospecting boreholes that would result in a very small impact where borehole one, two and four is sited in Greenfields areas the remaining two boreholes (three & five) are in locations disturbed from a heritage perspective by previous mining activities. The proposed prospecting boreholes are all located on steep slopes of the mountains and ridges in the area of mica-sillimanite schists which do not seem to have been conducive to the formation of rock shelters and no rock art or archaeological sites of significance were recorded in the study areas. The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Human impact (apart from the existing mining and dumps) is limited to isolated farming infrastructure like farm fences, wind pumps and tracks. The cultural landscape (mining and farming activities) is generally modern without significant cultural landscape elements of concern and impacts are deemed to be of low significance. The impact of the proposed project on heritage resources is considered to be low, and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented and based on approval from SAHRA - Implementation of a chance finds procedure as outlined below. **Chance Find Procedure** The possibility of the occurrence of subsurface finds or previously unknown sites cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place for the project. A short summary of chance find procedures is discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. 1. If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must	Please refer to: Part A h) iv) (1) (a); and Part A t) i)

Interested and Affected Parties List the name 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.
			cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. 2. It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. 3. The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. **Reasoned Opinion** The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits associated with the project also outweigh the possible impacts of the development on heritage resource if the correct mitigation measures (i.e. chance find procedure) are included in the EMPr. **Potential risk** Potential risks to the proposed project are the occurrence of unknown and unmarked graves. Thee possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earthworks. These risks can be mitigated to an acceptable level with the implementation of a chance find procedure as outlined above.	
Department of Water and Sanitation Mr A Abraham	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
SANBI M Mokonoto	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Succulent Karoo Ecosystem Programme (SKEP) Mre . Abe Koopman	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
WESSA	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Endangered Wildlife Trust	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Botanical Society of South Africa Mr. Mark Botha	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A

Interested and Affected Parties List the name 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.**
Agri Namakwa and Associated Farmers Associations Mr. Danie Jacobs.	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
INTERESTED PARTIES				
Karsten Boerdery	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A
Klein Pella Guesthouse	N/A	No objections received. Please refer to Appendix G for the PPP Process and Comments and response Report.	N/A	N/A

vi) The Environmental attributes associated with the alternatives.

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

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

(Its current geographical, physical, biological, socio-economic, and cultural character)

(i) Climate

Aggeneys normally receives about 34 mm of rain per year, with most of the rainfall occurring mainly during autumn. Figure 5 shows the average rainfall values for Aggeneys per month. It receives the lowest rainfall (0 mm) in December and the highest (9 mm) in March. The monthly distribution of average daily maximum temperatures in Figure 6 shows the average midday temperatures for Aggeneys range from 17.7 ºC in July to 31.6 ºC in January. The region is coldest during July when temperatures drops to 3 ºC on an average during the night. Refer to Figure 7 below for an indication of the monthly variation of average minimum daily temperatures.

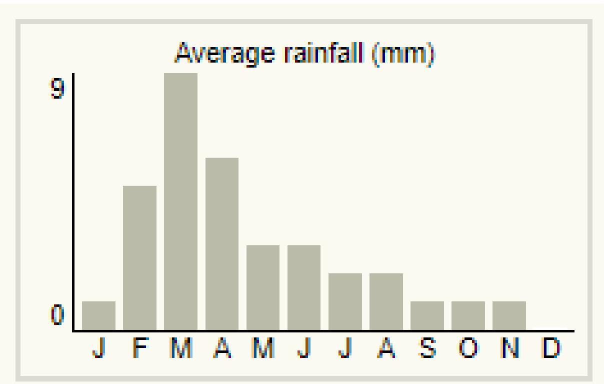

Figure 5:Average rainfall for Aggeneys

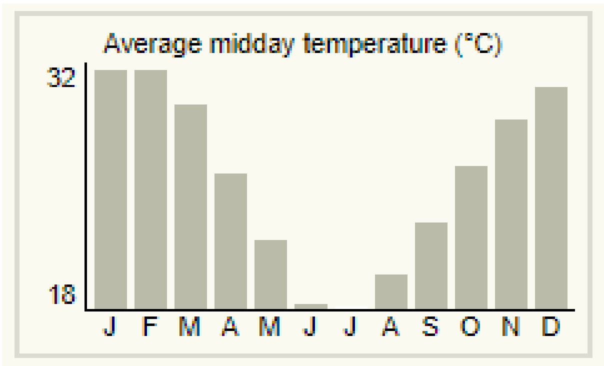

Figure 6:Average midday temperature

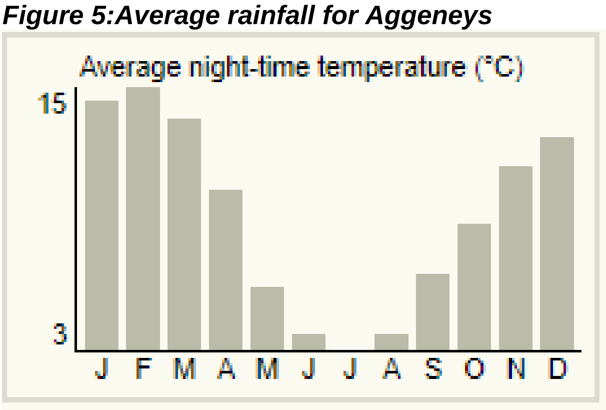

Figure 7: Average night-time temperature

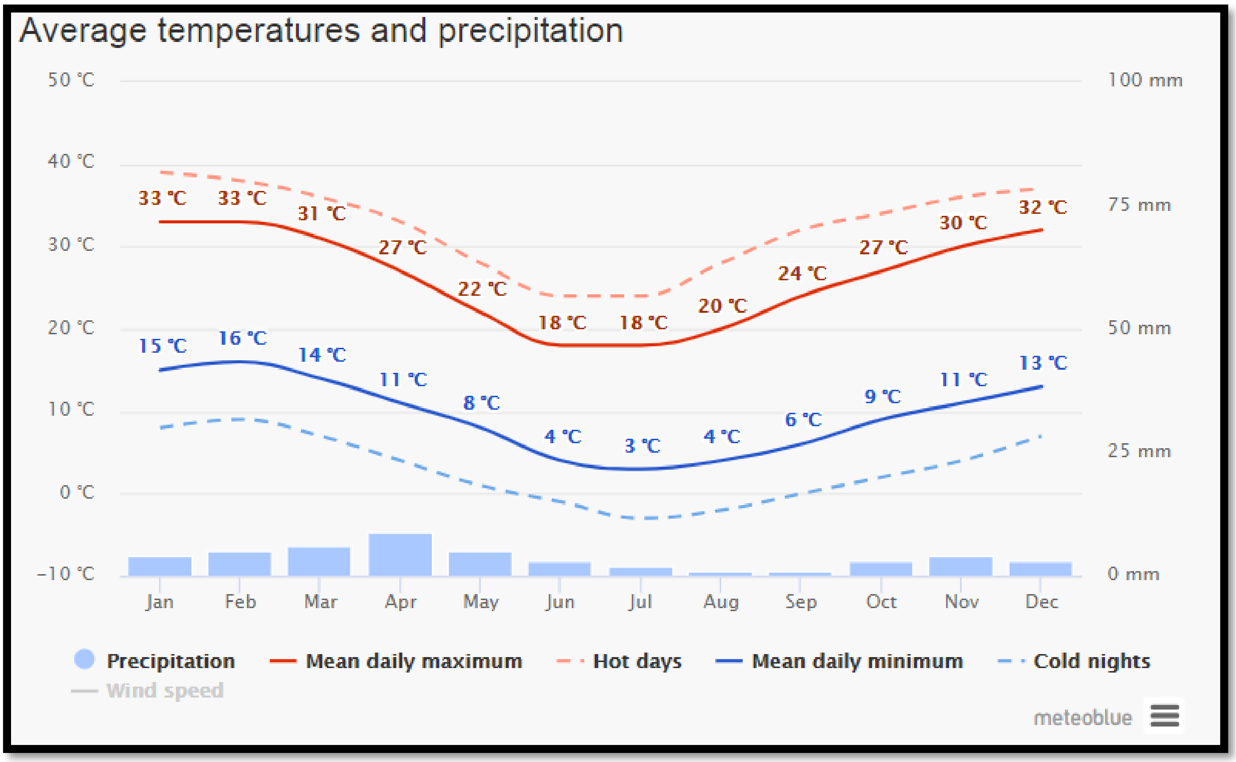

Figure 8: Average rainfall and Temperature for Aggeneys

Figure 9 shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast. As indicated in the figure below, sunny days are in June-July during winter, with overcast and precipitation days occurring in the summer season in March (Meteoblue, 2018).

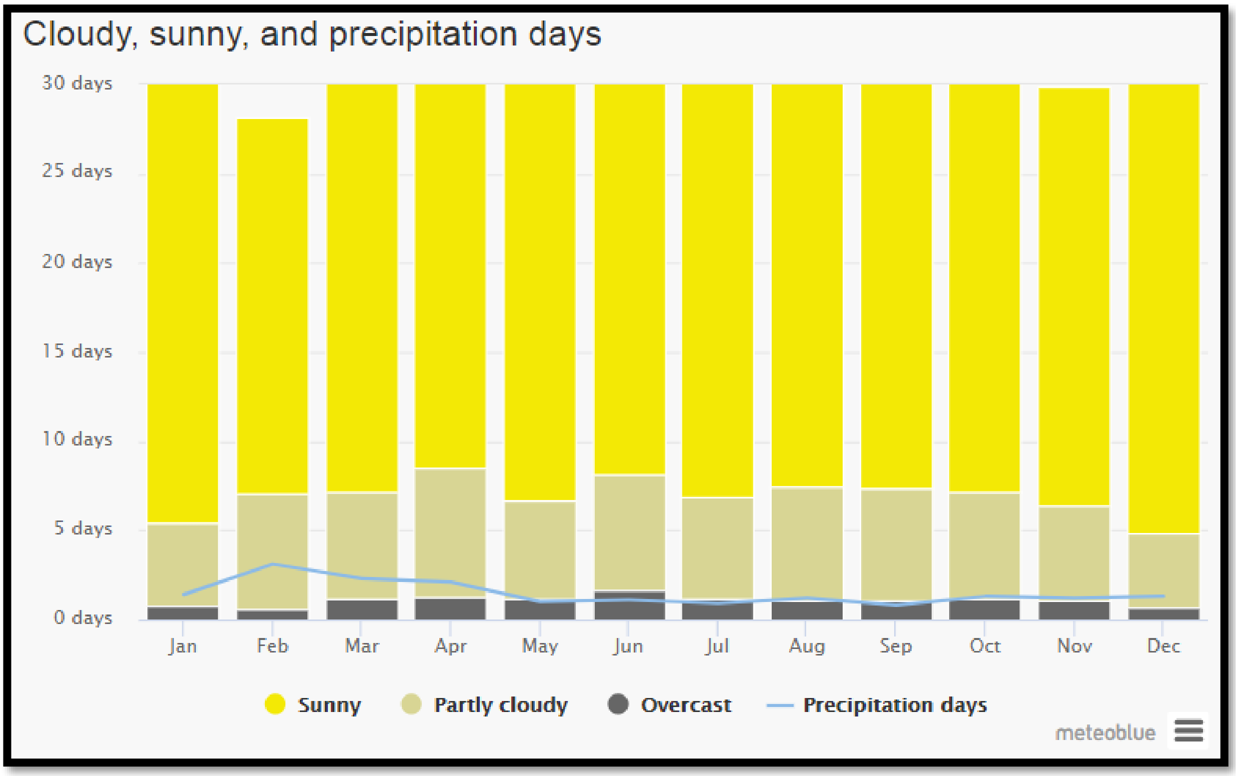

Figure 9: Cloudy, sunny and precipitation days of Aggeneys.

The maximum temperature diagram for Aggeneys displays how many days per month reach certain temperatures. As indicated in the figure below, the hottest temperatures occur during the summer season with temperatures reaching from 17.9 °C in June to 32.7 °C in January and the coldest during July when the mercury drops to 1.3 °C on average during the night when frost can occur. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Aggeneys range from 19.1 °C in June to 33.2 °C in January. The region is the coldest during July when the mercury drops to 1 °C on average during the night. Consult the figure below for an indication of the monthly variation of average minimum daily temperatures (Explorer, 2018) (Meteoblue, 2018).

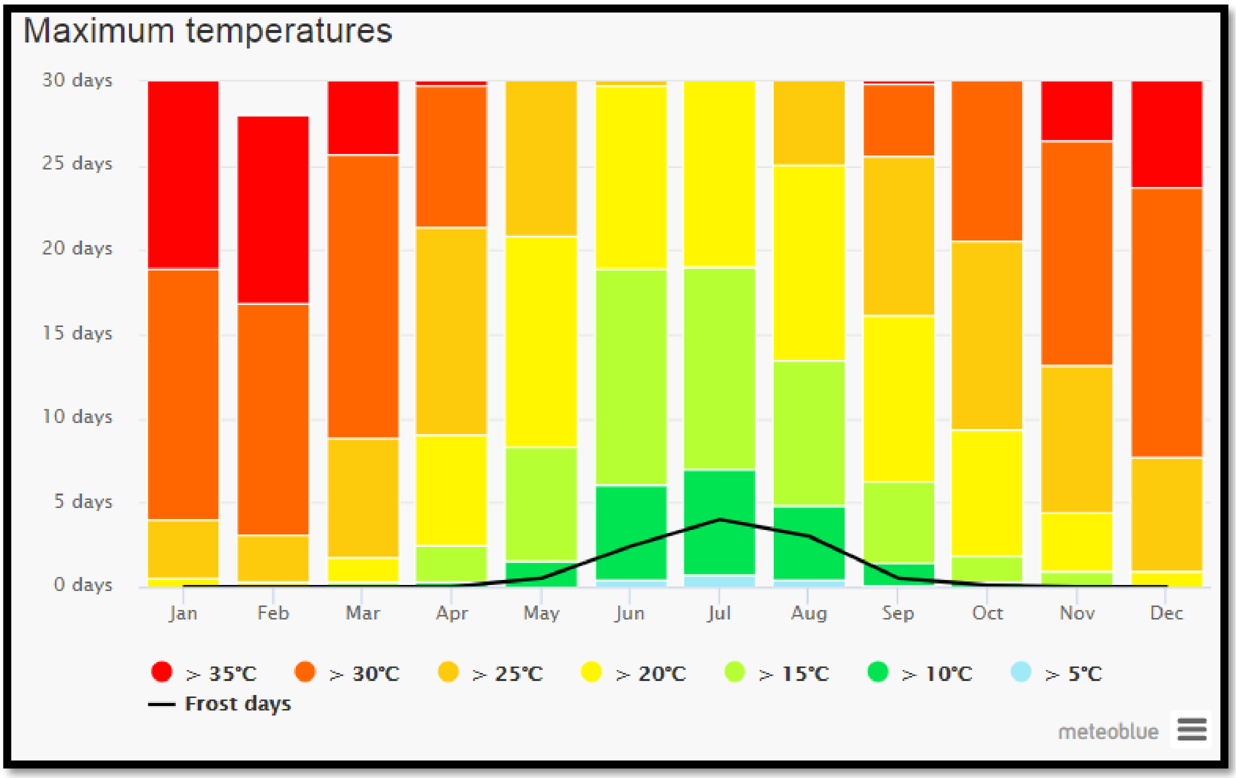

Figure 10: Maximum temperatures of Aggeneys.

The precipitation diagram for Aggeneys shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated. Aggeneys normally receives about 132 mm of rain per year, with most rainfall occurring mainly during autumn. It receives the lowest rainfall in July and the highest in (38 mm) in March (Meteoblue, 2018) (Explorer, 2018).

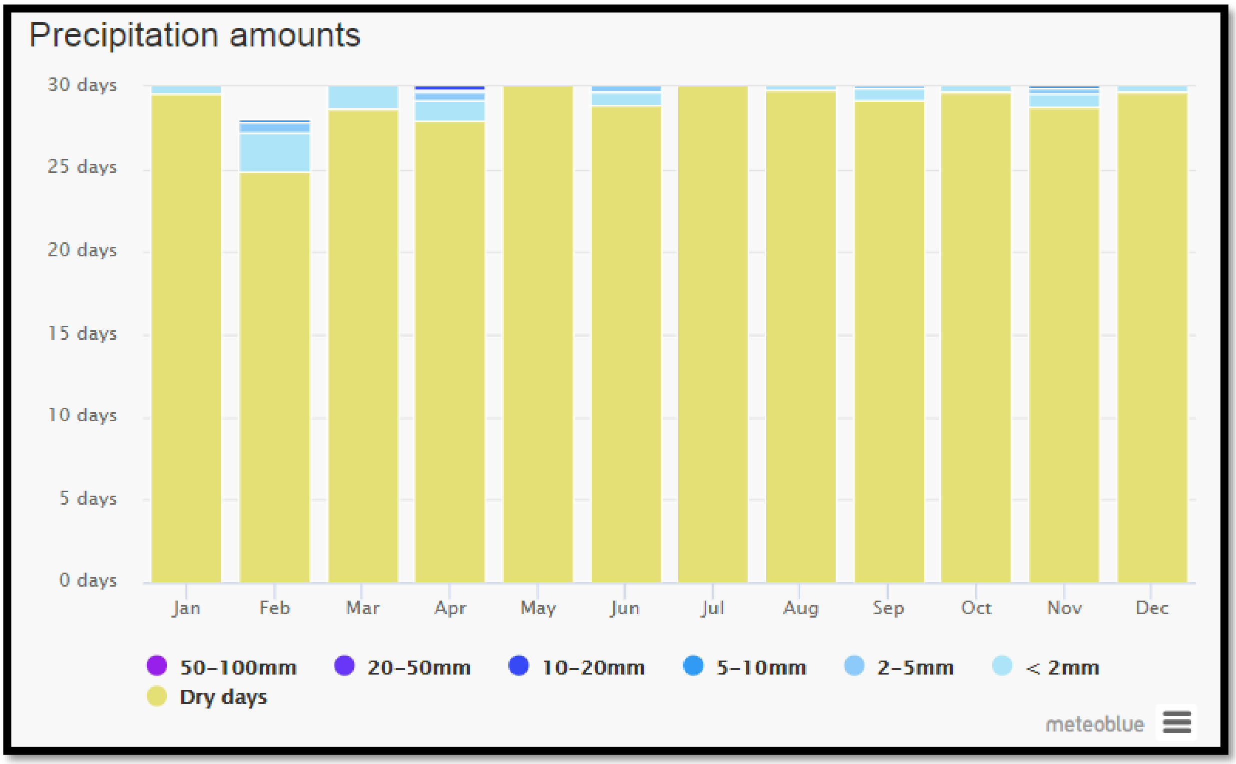

Figure 11: Precipitation amounts for Aggeneys.

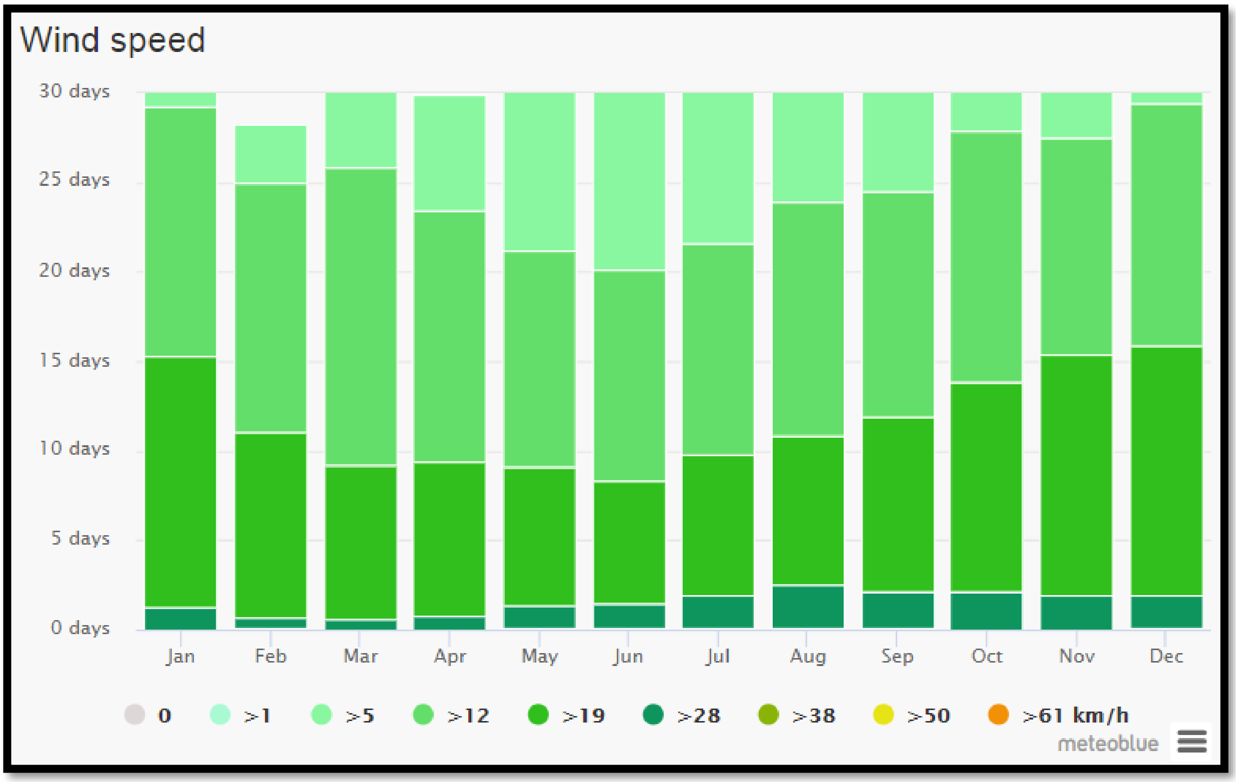

Figure 12: Average wind speeds in Aggeneys.

The diagram for Aggeneys shows the days per month, during which the wind reaches a certain speed. As seen from the figure above, the average wind speeds over the summer season is calculated to be about 19 km/h whereas in the winter season in drops to 5km/h.

The wind rose for Aggeneys shows how many hours per year the wind blows from the indicated direction. As seen from the figure below, the average wind rose in Aggeneys is a Southerly and South-South Easterly wind, this can be during winter and summer times.

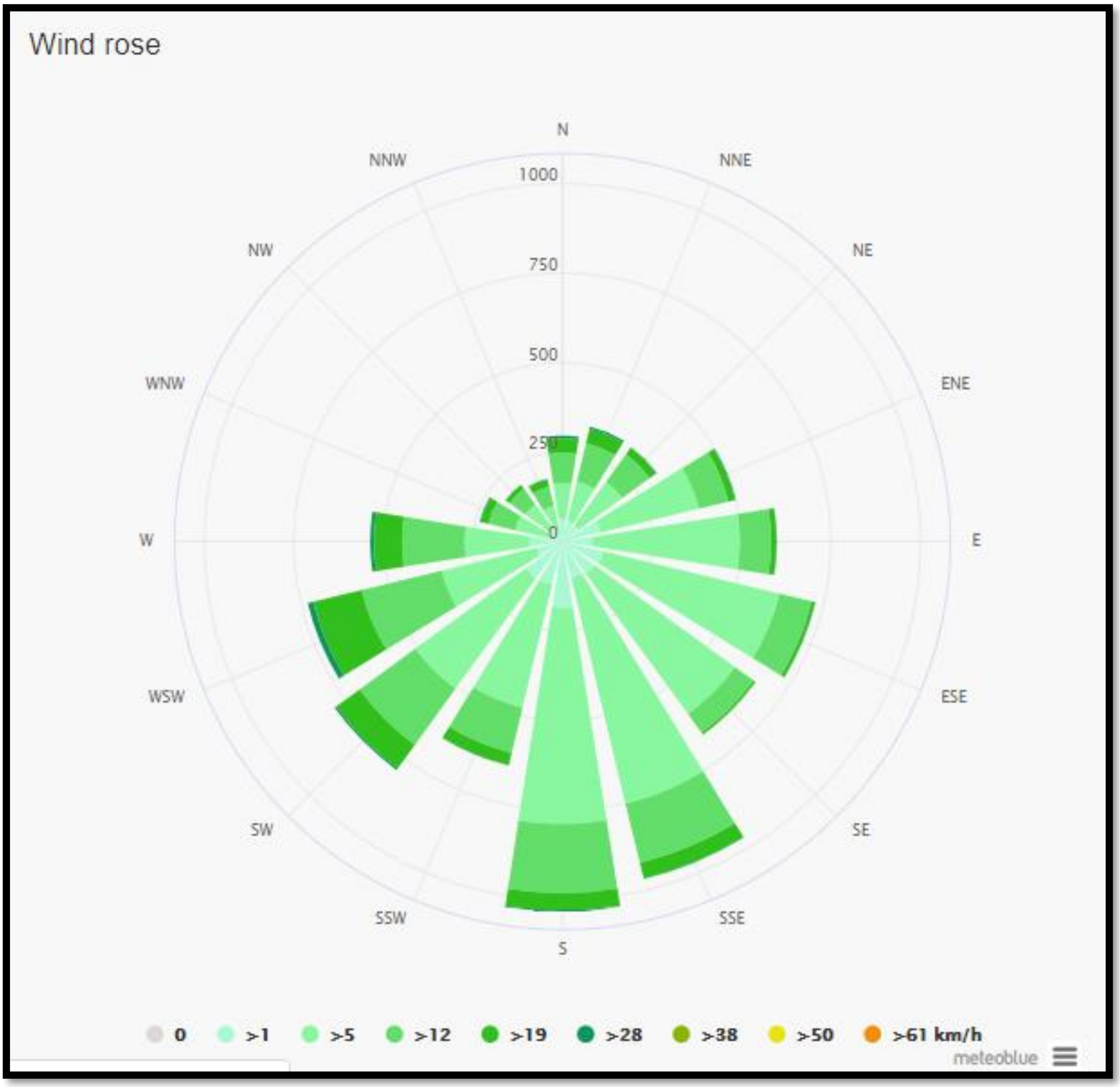

Figure 13: Wind rose for Aggeneys.

(ii) Geology

Supracrustal rocks occur in several discontinuous east-west-trending belts within the Bushmanland Terrane, increasing in abundance toward the south in the vicinity of Garies. The heterogeneity of rocks types and the disruption cause by thrust-related deformation and the voluminous sheet-like intrusions make correlation difficult. Moore (1989) suggested a broad two-fold subdivision into a southern succession (Bitterfontein-Kammieskroon area), compromising basal quartzofeldspathic gneisses, and overlying feldspathic quartzites and garnet-cordierite gneisses, and a northern succession (Springbok-Steinkopf-Pofadder area) known as the Bushmanland Group, which comprises basal leucocratic gneisses and overlying quartzites and mica-sillimanite schists.

In the region west of Pofadder, Colliston *et al.* (1989) subdivided the supracrustal rocks of their Aggeneys Terrane into six formations (Wortel, Witputs, Skelmpoort, T'hammaberg, Hotson and Koeris. These were later grouped together as the Aggeneys Subgroup of the Bushmanland Group by Praekelt and Schoch (1997), who provided detailed descriptions of all the formations.

The basal Wortel Formations (650 to 920 m thick) consists of interlayers of biotite-sillimanite schist and sub-ordinate quartzite, which is magnetite-bearing in places. Lenses of amphibolite occur sporadically, while sillimanite was mined for many years from sillimanite lenses in this formation. In the east mainly leucocratic biotite gneiss and quartz-feldspar gneiss of the Stalhoek Complex and lesser amounts of leucocratic biotite gneiss occur, with intercalations of calc-silicate rocks, mafic gneiss, and a quartzite-schist association of the Hom Subgroup, Bushmanland Group. In the west the area consists of granodiorite, adamellite, leucogranite, tonalite, and diorite of the Vioolsdrift Suite and intermediate and acid volcanic of the Haib Subgroup of the Orange River Group (all of the above of Mokalian age). Very rocky substrate with little to no soils. Land type lc.

There is limited soils in the area with mostly rock outcrops or mountains. On the lower laying areas, soils have minimal development and are usually shallow on hard or weathered rock, with or without intermitted diverse soils. Lime is generally present in part or most of the landscape.

The application areas are situated in the Koa River valley, which is striking from southeast to northwest, where it eventually joins the Orange River just west of Black Mountain in the Bushmanland region. The paleo Orange River mouth, in Pre-Cambrian time, was at the same position where the Olifants River mouth is on the west coast of South Africa. The Paleo River linked with the present river where Prieska is today. The Paleo River that flowed in a southwesterly direction, was rerouted when the Cape fold belt was uplifted in the late Paleozoic Era. This event forced the river in a north-westerly direction, creating the Koa River, today known as the Koa River valley. The diamonds that were transported to the Atlantic Ocean at that stage was then transported along the Koa River were it was partly deposited due to the widening of the valley at places, especially in the Bosluispan/Bitterputs area. This opening up of the valley caused a lost in energy of the transporting medium and the heavier material, such as diamonds, dropped out of suspension, hence the occurrence of the commodity along the Koa River Valley.

The asymmetric uplift of the subcontinent during the Cenozoic Era was responsible for the northerly shift of the Orange River and it's rerouting at Prieska, leaving the south-western extent of the paleo Orange River and the Koa River dry. (Paul Grobbelaar. B. Sc Geology).

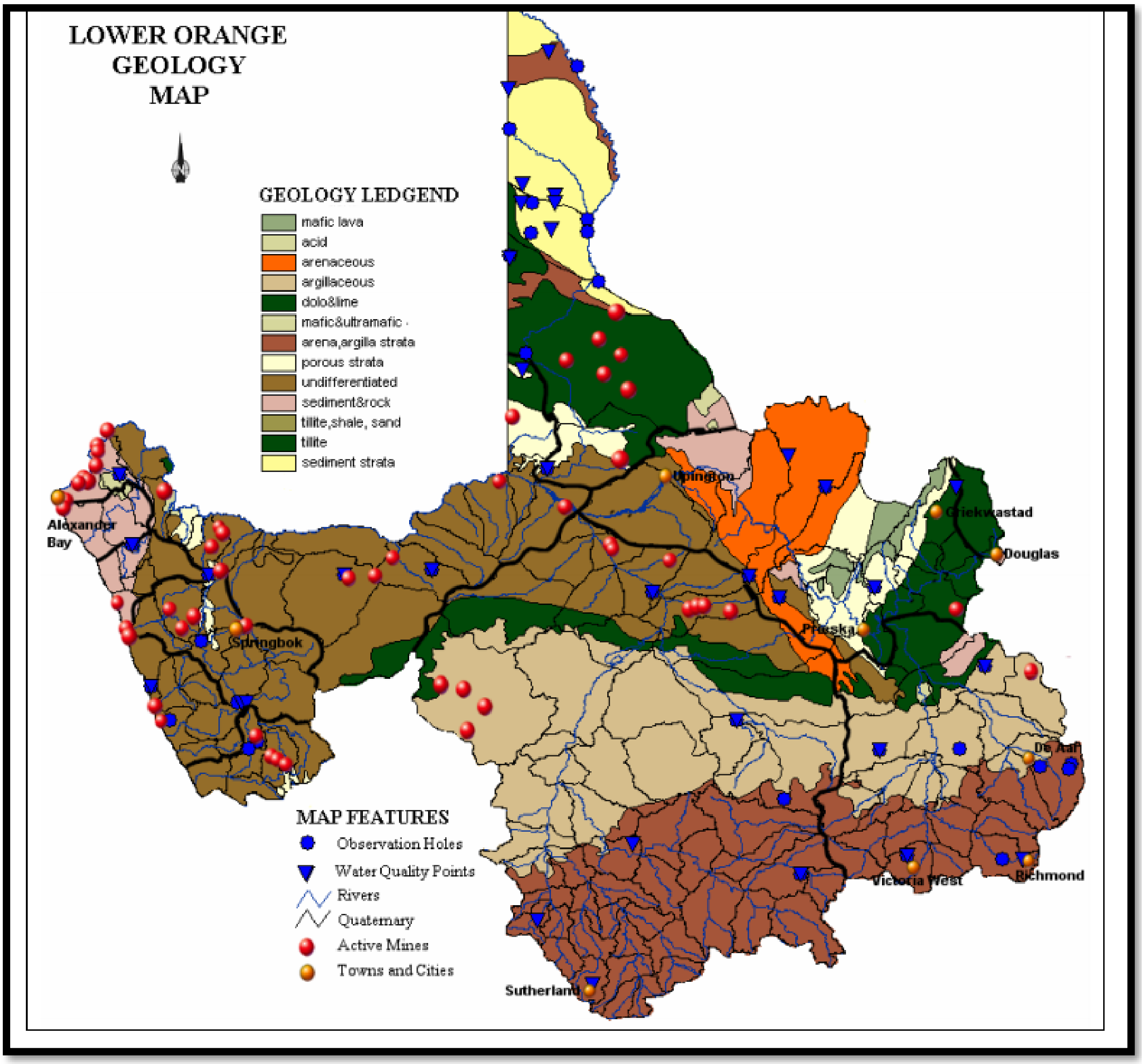

Figure 14: Simplified Geology of the WMA

The Wortel Subgroup is subdivided into the Aluminous Schist (bottom) and White Quartzite Formations (top). Quartz- biotite- sillimanite- muscovite schist forms the bulk of the Aluminous Schist Formation. The White Quartzite Formation consists off layered to massive, white to light grey weathering metaquartzite.

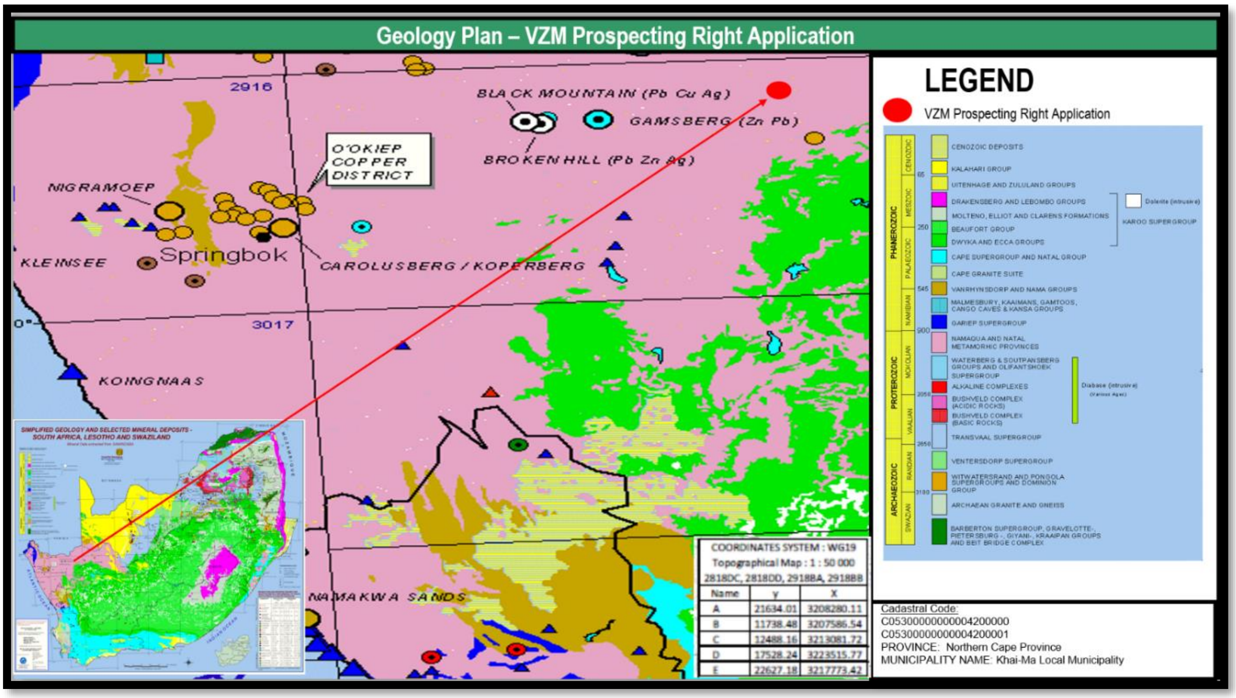

Figure 15: Geology Plan for VZF Prospecting Right Application

(iii) Topography

Mountainous and adulating landscape situated within the Witberg mountains. The only environmental feature that may proof significant is a relative major non-perennial stream. The topography of portion 1 and portion 0 are quite different from one another. On portion 0 (RE), the northern portion their topography can be described as plains, or rolling plains (irregular plains) with open high hills or ridges and level plains with some relief. There is there is also high open hills or ridges in the north.

The topography of portion 1 is described as high hills or ridges with rolling or irregular plains and low hills or ridges to the west or the property and plains with open low hills or ridges towards the south of the property. The slope of the area varies from lower than 2% to higher than 20% steep gradients.

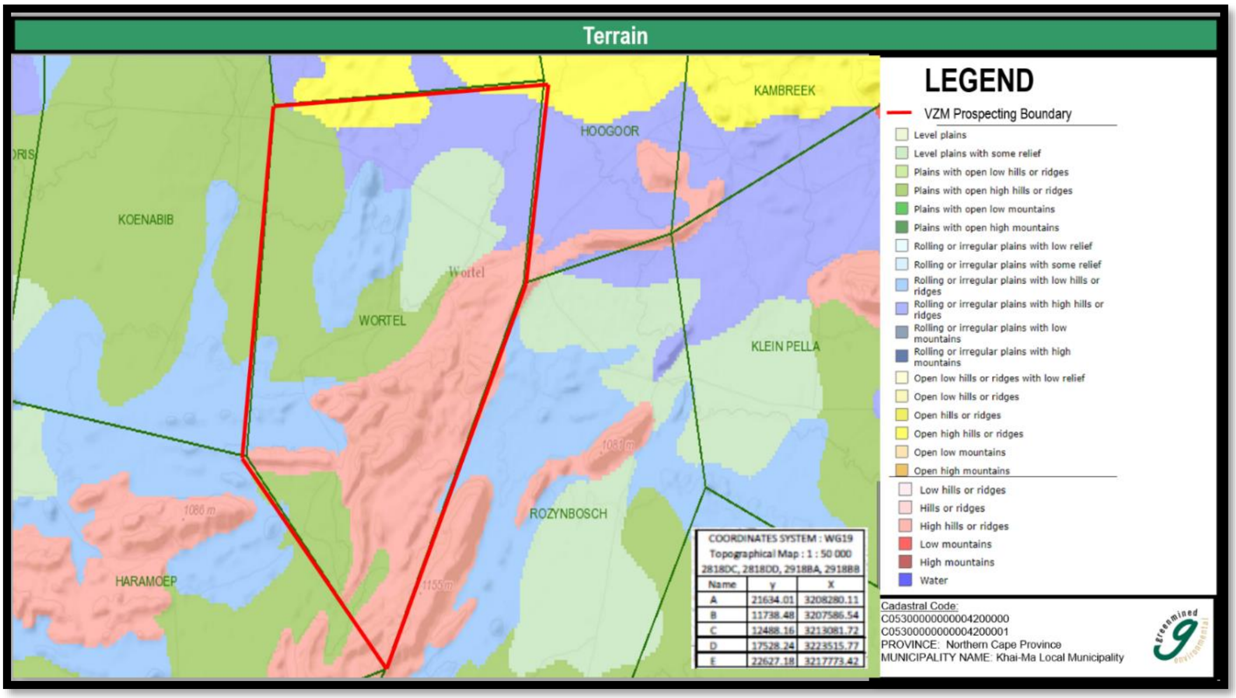

Figure 16: Topography of the prospecting area.

(iv) Soil, land use and land capability

Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. Freely drained, structure less soils quaternary sheet-wash alluvial deposits, sands, deep in places; in south, red yellow apendal, freely drained soils with a high base status. Land types includes Ag and Ae.

The soils of most of the area are red-yellow apendal soils, with a high base status and <300mm deep, typical of Ag and Ae land types. 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 storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8 – 10 Ha/SSU.

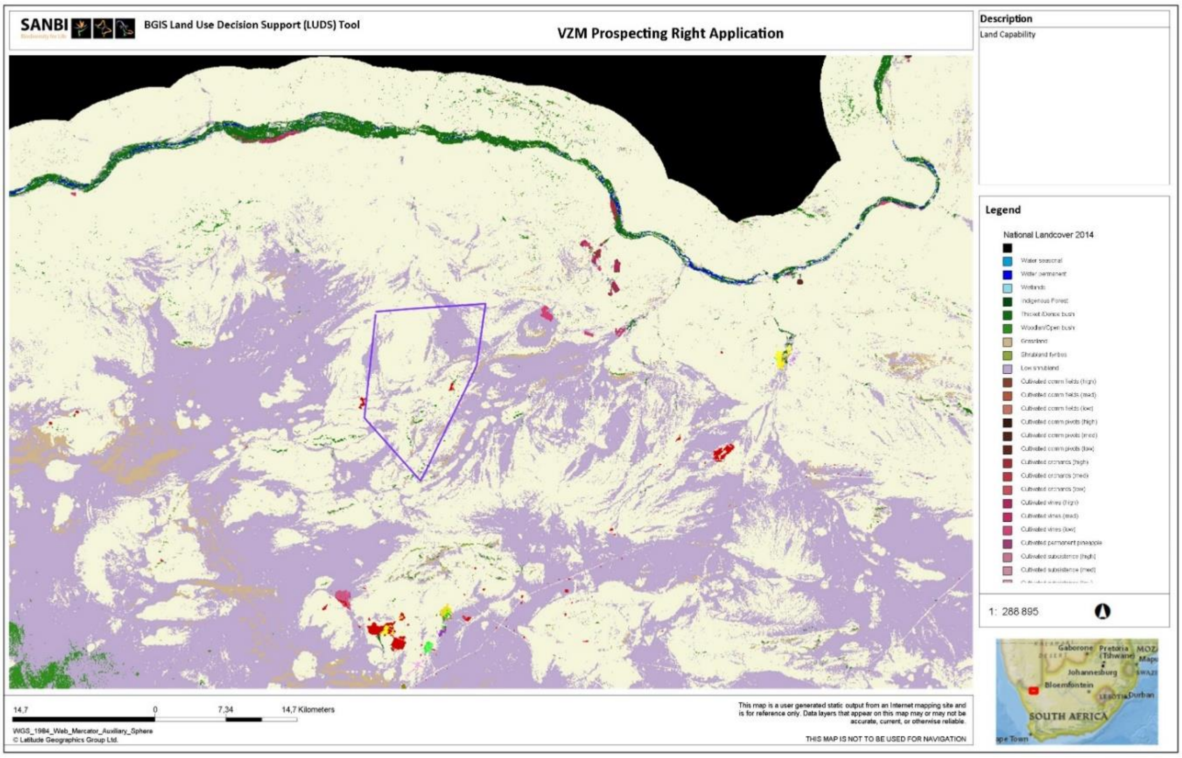

Figure 17: Land cover of the area

Land Use

Current land use conditions are those of farming with small livestock e.g. sheep and goats. More than 50% of the area is use mainly as agriculture and Hunting. The grazing capacity of the area can be classified as 81-11ha/LSU. In the north eastern corner of the farm Wortel, the grazing capacity is classified as 41-80% ha/LSU.

Current activities on the surround farms include livestock grazing at low densities, with sheep, goats and some cattle currently present to some of the surrounding farms. Surrounding farms are also used for the ranching of small stock, mostly sheep, goats, and some cattle. The land is arid and primarily used for grazing. Surrounding farms are either privately owned or owned by the municipality and used for communal purposes.

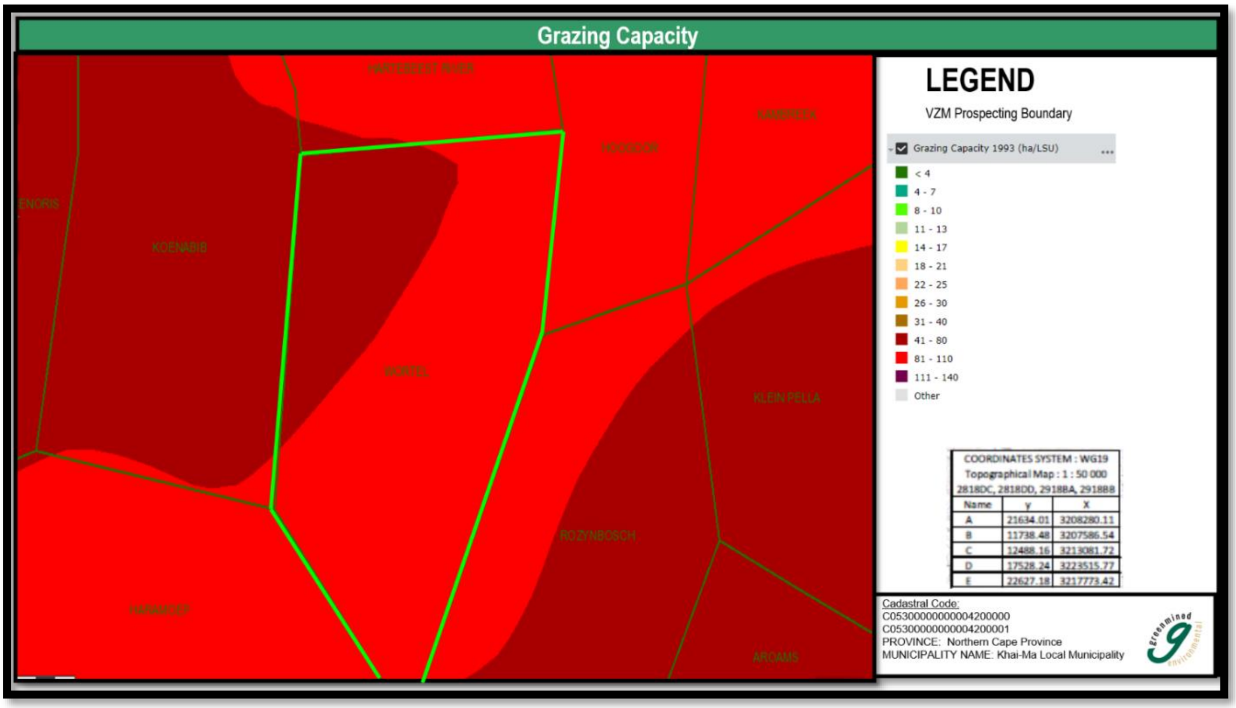

Figure 18: Grazing Capacity

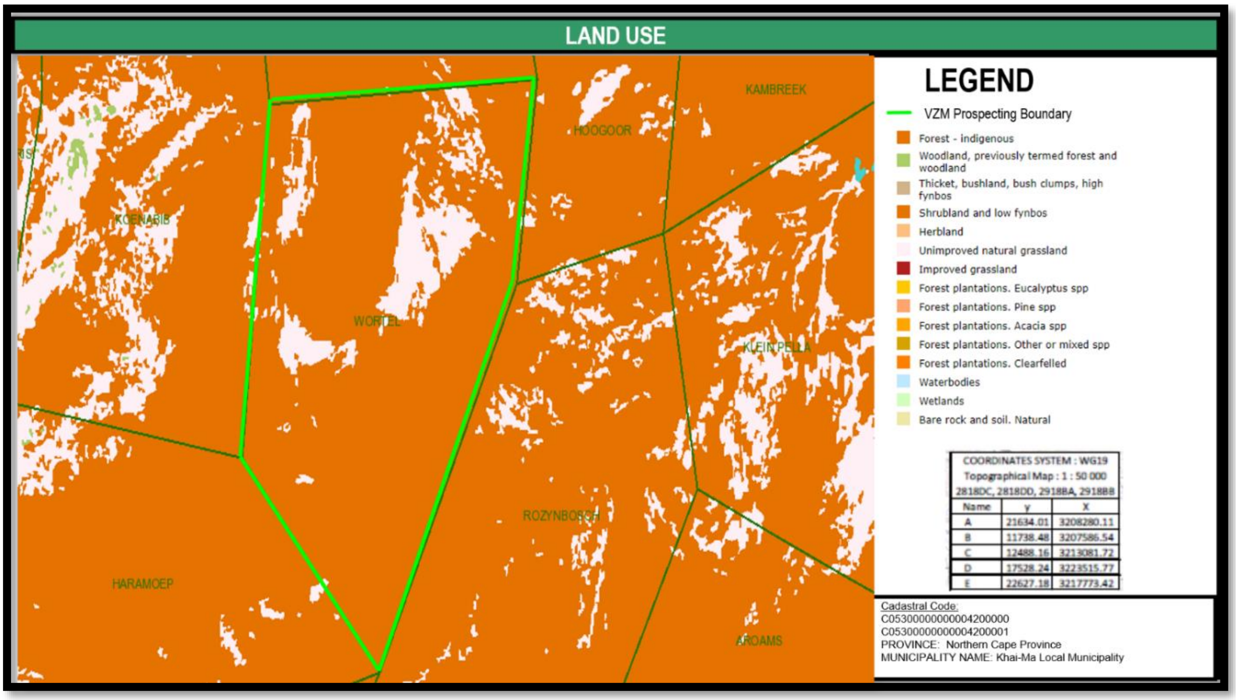

Figure 19: Land Cover

The land cover for the area is classified as shrub land and low fynbos.

<u>Soil</u>

Soils can be identified to belong to the R and LP2 groups. Soils in the low plains consist out of soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. The landscape areas in the hills are ridges are rock with limited soils. The land type of this area is described as Ic, Ib, Ae and Ag. The soil in this area has a natural organic carbon content of less than 0.5mm. Soils has a pH of 7.5-8.4 towards the south-west, and towards the north-east, soil has a pH of more the 8.4. The leaching status of these soils is described as non-calcareous and eutrophic soils. These soils have 0.6-10.0 cobalt, 0.6-3.0 copper, low iodine, high in phosphorus, low in selenium, and 0.6 to 6.1 zinc contained within them.

Sands in this area has special management requirements. These requirements include the following:

- Shifting sands are strongly dominant and present in the area.
- Alkaline Saline Sodic soils.

Soils in this area is highly susceptible to erosion caused by rainfall, even though the soil in the area is minimal, due to the rocky outcrops the soil loss in this area will be minimal. Sands in this area is susceptible to wind erosion.

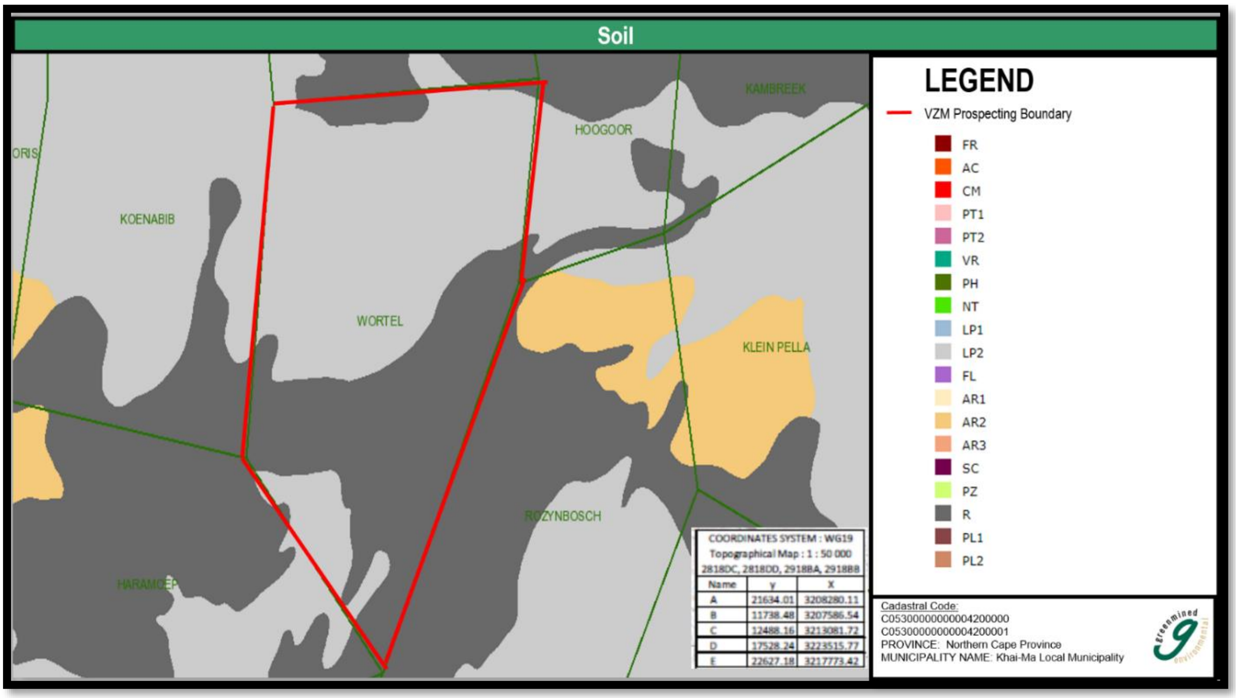

Figure 20: Soil of the proposed prospecting area.

(v) Flora

The mining area is situated within the Desert Biome. The vegetation consists of Eastern Gariep Plains Dessert and Eastern Gariep Rocky vegetation types (Dg 9 and Dg10 according to Mucina and Rutherford, 2006). The area is not conserved in statutory conservation areas. Few intact examples of this vegetation still exist. The target conservation of this area is at 34%.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant dwarf shrubs. No protected plant species could be identified at the time of the site inspection.

The Eastern Gariep Plains Desert consist out of often sloping plains, sharply contrasting with the surrounding rocky hills and mountains. Typical wash vegetation n in the breaks between the mountains to the Orange River Grassland dominated by “white grasses”, some spinescent (*Stipagrostis* species), on most of the flats with additional shrubs and herbs in the drainage lines or on gravellier or loamy soil next to the mountains.

The Eastern Gariep Rocky Desert consist out of hills and mountains with mostly bare outcrops and covered with very sparse shrubby vegetation in crevices. Separated by broad sheet-wash plains (Dg 9). Habitats are mainly controlled by the topography, aspect, local climate and lithology. On the groot Pellaberg for example there is a sparse shrub land on the southern foothills (*Alon dichotoma, Rhigozum trichtomum and Petalidium setosum*) and a higher cover of plants in the southern ravines and rocky drainage lines. (*Abutilon pycnodon, Asparagus suaveoles, Ficus cordata, Rhus populifolio and R. viminalis*). On the higher southern slopes *Justicia orchioides* is often very dominant, with localised grassland directly between steep cliffs (*Enneapogon scaber, Troroa [his ramosissima and Danthoniopis ramosa*). The south facing quartzite cliffs and steep slopes support chasmophytes (cremnophytes) such as *Ficus ilicina, Aloe dabenorisana and Bowiea gariepensis*. On the summits and higher northern slopes there is a much higher preponderance of succulent plant inlcudeing *Euphorbia avasmontana, Aloe dictoma, A. microstigma subsp microstigma, Pelargonium aridium and Kleinia longiflora*. Succulent plant is also important on the northern foothills and also include *Aloe dichotoma, Euphorbia avasmontana, Sarcostemma viminale* and the diminutive *Lapidaria margarethae*.

<u>*Conservation Areas*</u>

Target 34%. None conserved in statuary conservation areas. Few intact examples of this vegetation remain. Heavy grazing and arid climate combined with the ease of accessibility of the vegetation to stock mean that pastoral activities in the past have significantly altered the structure and composition of vegetation of this unit. In some areas *Prosopis* shows potential to become a serious problem, especially around natural springs or aquifers. Some very restricted areas are cultivated, mainly with date palms and grape vines. This unit also occurs north of the Orange River in Namibia where it is potential conserved through the ownership of the farms by the Namibian ministry of environment and tourism.

On this particular study site, Aggeneys Gravel Vygieveld is quite rare, with a very limited distribution (see Figure 21). However, large patches occur, especially on the southern parts of the farm Wortel. A few small patches gravel plains occur on the apron of some of the mountains. The floristically extremely rich Aggeneys Gravel Vygieveld which is restricted to gravel patches (Image 7). Having a high proportion of sand on the surface, the vegetation shows similarity to the grassland on flat sandy plains with *Stipagrostis obtusa* and *Stipagrostis ciliata* the dominant species, while the shrub *Zygophyllum decumbens* is often dominant. However, the gravel forms the habitat for some smaller, rare succulent plant species, such as *Lithops julii* subsp *fulleri, Titanopsis hugo-schlechteri* and *Crassula mesembrianthemopsis.* This plant community with its specific floristic composition is

regarded as highly sensitive. This plant community is regarded as Aggeneys Gravel Vygieveld, which is regarded as a rare
and threatened ecosystem.

(a) Species of Conservation Concern / Red Data Species

According to Marsh *et al.* (2009) a total of 854 plant species have been recorded in the Khai Ma Local Municipality area. As many as 41 species are known to be endemic to the area and a further 20 are potentially endemic. Many of the most special plants can be found within the fine grained quartz patches – an area that typically contains a number of special dwarf succulents (Marsh *et al.* 2009).

The Bushmanland Inselbergs are a remarkable feature of this landscape. In total, this 31,400- hectare area includes 429 plant species, of which 67 are found only in this hotspot and 87 are Red List species (Marsh *et al.* 2009).

A Threatened Species and Species of Conservation Concern list was obtained from the POSA database on the SANBI website. Threatened species are those that are facing high risk of extinction, indicated by the categories Critically Endangered, Endangered and Vulnerable. Species of Conservation Concern include the Threatened Species, but additionally have the categories Near Threatened, Data Deficient, Critically Rare, Rare and Declining. This is in accordance with the new Red List for South African Plants (Raimondo *et al*. 2009).

Table 7: Species of Conservation Concern (SANBI website, Quarter degree square Grid 2918BB)

Family	Species	Status	Endemic
Amaryllidaceae	*Brunsvigia herrei* F.M.Leight. ex W.F.Barker	VU	NO
Mesembryanthemaceae	*Lithops olivacea* L.Bolus	VU	YES
Mesembryanthemaceae	*Conophytum limpidum* S.A.Hammer	NT	YES
Apocynaceae	*Hoodia gordonii* (Masson) Sweet ex Decne.	DDD	NO
Amaryllidaceae	*Brunsvigia namaquana* D.& U.Müll.-Doblies	DDT	NO
Mesembryanthemaceae	*Drosanthemum godmaniae* L.Bolus	DDT	YES
Mesembryanthemaceae	*Trichodiadema obliquum* L.Bolus	DDT	YES
Crassulaceae	*Adromischus diabolicus* Toelken	Rare	YES
Crassulaceae	*Crassula exilis* Harv. subsp. *exilis*	Rare	YES
Eriospermaceae	*Eriospermum pusillum* P.L.Perry	Rare	YES
Hyacinthaceae	*Lachenalia polypodantha* Schltr. ex W.F.Barker	Rare	YES
Mesembryanthemaceae	*Cephalophyllum staminodiosum* L.Bolus	Rare	YES
Fabaceae	*Acacia erioloba* E.Mey.	Declining	NO

In addition to the list above, *Aloe dichotoma* Masson (Vu) are also found within the area. The majority of the threatened species and species of conservation concern may potentially occur on the rocky inselbergs and/or quartz plains. The only protected tree which may occur within the area is *Acacia erioloba* (Camel Thorn). This tree may be present within the prospecting area on the sandy plains, but has not been observed during the site investigation. A further protected species is the halfmens *Pachypodium namaquanum.* The majority of succulent plants are classified as protected plant species.

It can be concluded that although no statutory conservation area exists within the distribution range of the identified vegetation type, very little of the area has been transformed. A local exception is the mine area close to Aggeneys, where mining infrastructure and mine dumps, and also residential areas, transformed some areas. The proposed prospecting area is situated in an area of biodiversity importance. The most important areas are the Inselbergs, including their quartz gravel foot slopes. The dry grassy plains are of relatively less biodiversity importance. Although the proposed prospecting campaign will not result in a progressive loss of ecological sensitive and important habitat units or ecosystem functioning, the areas identified as being of high ecological sensitivity must be avoided and the proposed activities must be in accordance with the conservation policies of the relevant authorities.

Table 8: Important Taxa of the area.

Important taxa		
Succulent Trees		
Aloe dichotoma		
Small Trees		
Parkinsoina africana	*B.foetida*	*Ehretia rigida*
Boscia albitrunca	*Terminalia sericea*	*Acacia melifera*
Euclea pseudebenus	*Maerua gilgii*	*Papea capensis*
Stem & Leaf succulent Shrubs		
Brownanthus pseudoschilichtianus	*Psilocaulon subnodosum*	*Ceraria fruticulosa*
Ruschia barnardii		
Stem succulent shrub		
Euphorbia gregaria	*Ceraria namaquensis*	*Commiphora capensis*
C.cervifolia	*C.gracilifrondosa*	*C.namaensis*
Euphorbia avasmontana	*E. friedrichiae*	*E.gariepina*
E.guerichiana	*E.virosa*	
Other Shrubs		
Sisyndite spartea	*Adenolobus gariepensis*	*Antherothamnus pearsonii*
Apotosimum tragacanthoides	*Barleria lancifolia*	*B.rigidia*
Cadaba Aphylla	*Calcicorema capitata*	*Diospyros acocksii*
Dyerophytym africanum	*Eriocephalus scariosus*	*Hermania stricta*
Justica orchoides	*Monechma mollissimum*	*Petalidium setosum*
Rhigozu, obovatum	*Rhus populifoila*	
Perennial Herbs		
Codon royenii	*Rogerria longiflora*	
Chascanum garipense	*Tribulus cristatus*	
Annual Herbs		
Cleome angustifolia subsp diandra	*C.foliosa var lutea*	
Succulent Herb		
Mesembryanthemum guerichianum		
Leaf Succulent Shrubs		
Zygophyllym microcarpum	*Aloe dabenorisana*	*A.gariepensensis*
Mesembryanthhemum inachabense	*Prenia tetragona*	*Triantheme parvifolia*
Tylecodon rubrovenosus	*Zygophyllum decumbens*	*Z.rigidium*
Other shrubs		
Sisyndite spartea	*Calicorema capitata*	*Gailonia crocyllis*
Hermbstaedia glauca	*Monechma spartioides*	*Petaliduium setosum*
Geophytic Herb		
Boweia garipeensis		
Graminoids		
Schmidtia kalahariensis	*S. obusta*	*Stipagrostis ciliata*
Stipagrostis obusta	*Enneapogon scaber*	

(b) Endemic Taxon

The small tree *Ozoroa namaquensis and the leaf succulent dwarf shrub Tylecodon suplhurreus* is endemic to the region.

The study site is located within the area of jurisdiction of the Khai Ma Local Municipality (KMLM). The KMLM comprises virtually the entire extent of the Bushmanland Inselberg priority area. The latter is one of the nine zones identified through the Succulent Karoo Ecosystems Project (SKEP) process as important conservation areas in the Succulent Karoo. Inselbergs are important refugia for plants and animals and act as steppingstones for rock-loving species migrating east west across the sand-covered plains of Bushmanland. The isolation of populations has led to diversification within the dwarf succulent shrub lands, creating remarkable local populations of plant life. The area is unique, containing many rare and fragile habitat types. These unique and confined areas are host to a remarkable number of endemic plants (Marsh et al. 2009).

According to SANBI & DEAT (2009) none of the ecosystems occurring on the prospecting area are considered as threatened ecosystems. Nonetheless, the areas north of Aggeneys are considered as Critical Biodiversity Areas (CBAs) within the Namaqualand District. The main vegetation types occurring on the prospecting area are classified in terms of Mucina & Rutherford (2006), as Eastern Gariep Plains Desert and Eastern Gariep Rocky Desert. An additional unit is the Dry Drainage Lines (Spruits).

A buffer zone will be created around any red data plant identified by the botanist. No feedback has been received from the Department of Environment. Since no comments was received from Department of Environment the impact assessment rating will not be changed. Indigenous vegetation does occur within the proposed footprint area. As mentioned in the Flora description above, if any red data plants area observed on site, a botanist will be consulted for the inspection of these plants and plant removal permit will be obtained from Department of Environment. As mentioned previously a site walkthrough will be conducted before site clearance. Bush clearance will be conducted together with the Botanist and that the necessary permits will be obtained before any protected plants (if present) will be removed/disturbed.

(c) Critical Biodiversity Areas (CBAs) in the Namakwa District Municipality and the Mining and Biodiversity Guideline

Figure 21, shows the CBAs in the Namakwa District Municipality. CBAs are terrestrial (T) and aquatic (A) features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (Namakwa District Biodiversity Sector Plan, 2008). The purpose of CBAs is to indicate spatially the location of critical or important areas for biodiversity in the landscape. The legend can be clarified as follows:

CBA 1: Natural landscapes:

- Ecosystems and species fully intact and undisturbed
- These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost, then targets will not be met.
- These are landscape that are at or past their limits of acceptable change

Ecological Support Areas (ESA): Functional landscapes:

- Ecosystems moderately to significantly disturbed, but still able to maintain basic functionality.
- Individual species or other biodiversity indicators may be severely disturbed or reduced.
- These are areas with low irreplaceability with respect to biodiversity pattern targets only.

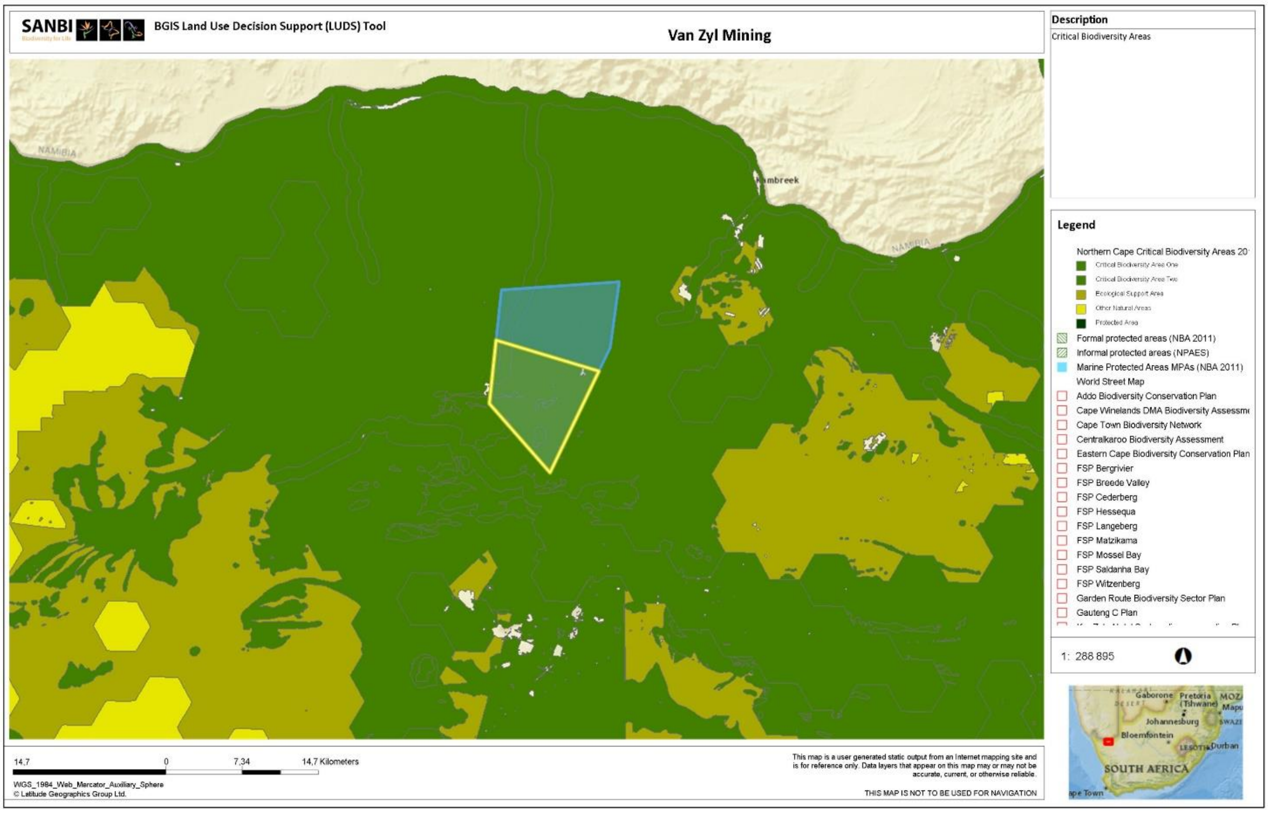

Figure 21: CBA Areas

Figure 21 shows that Aggeneys is surrounded by CBAs and ESAs. Within the proposed prospecting area, the Aggeneys Gravel Vygieveld is considered to be CBA1. ESA areas are found in the north-eastern part of the site, between mountains (on site) and extensive dunes to the east (outside the site).

The Mining and Biodiversity Guideline (MBG) (2012) describes the principles, tools and information that should inform the consideration of biodiversity in the mining life cycle (reconnaissance to mine closure) to support the sustainable use of the country's mineral resources. The MBG guideline identifies biodiversity priority areas that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services.

Figure 22 shows that:-
(a) There are no statutory protected conservation areas situated in proximity to the site;
(b) There is a National Freshwater Ecosystem Priority Area (NFEPA) located south of the site;
(c) The site contains areas considered as Critical Biodiversity Areas (CBA_T1 & T2) and Ecological Support Areas (ESA_T) (Namakwa District Biodiversity Sector Plan, 2008); and
(d) The site includes areas of moderate, high and highest biodiversity importance, suggesting a moderate to highest risk to potential future mining in terms of the MBG (2012).

Although the site is situated within an area characterized by areas classified as of moderate to highest biodiversity importance, the nature and scale of the proposed prospecting activities is such that it cannot be considered as a threat to biodiversity. Proper planning and the implementation of management measures, though the implementation of this EMP will prevent and alleviate potential impacts on biodiversity. However, buffer areas around drainage areas must be observed. No prospecting may occur within 30 m from identified drainage lines.

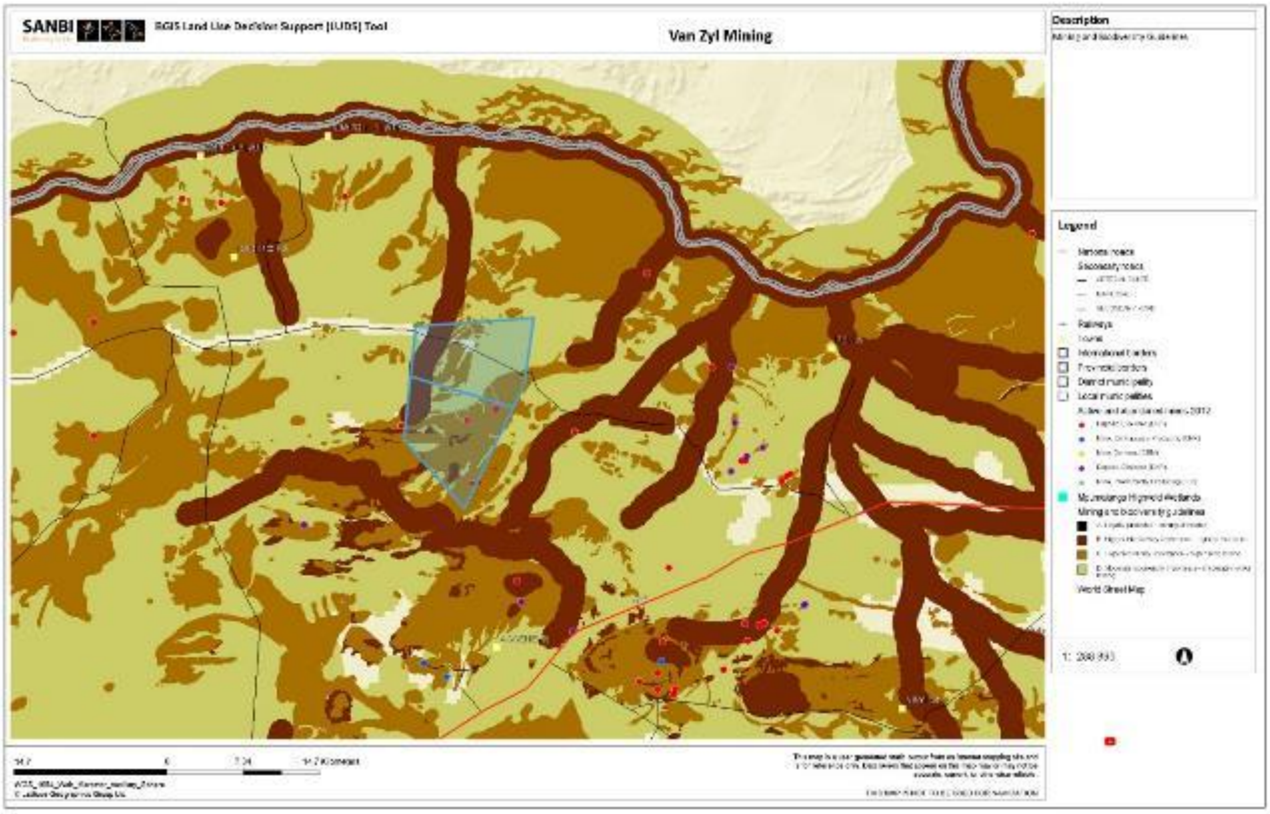

Figure 22: Mining and Biodiversity Guidelines

(vi) Fauna

Various small mammals and reptiles occur on the property. Larger herbivore species are very scares or absent due to the conflicting land use. Animals that may occur in the area will be very similar to those found around Pella / Aggeneys and surrounding towns. Small mammals, reptiles and insects will occur in the area. The fauna at the site will not be impacted by the proposed mining activity as they will be able to move away or through the site, without being harmed. Workers should be educated and managed to ensure that no fauna at the site is harmed. Upon commencement of the proposed mining activities, a fence surrounding the mining area should be erected to prevent sheep entering the site.

Most of the natural wild fauna within these areas are nocturnal; they include the silver back jackal, bat ear fox, cape hare and several other rodent species. No animals where spotted during the site inspection. The fauna at the site will not be impacted by the proposed mining activity as they will be able to move away through the site, without being harmed. Workers must be educated and managed to ensure that no fauna at the site is harmed.

(a) Mammals

The farm Wortel, comprise largely of natural habitats, subject to relatively low stocking levels of livestock (sheep, goats and cattle) with the most disturbed areas occurring around farm houses and outbuildings, water points and access tracks. The local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolus (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges.

From a mammal habitat perspective, two of the four major habitats identified above are very prominent on the study site, namely terrestrial and rupicolus (rock-dwelling) habitat. Very little arboreal and wetland-associated habitat occurs on the study site. Although not obvious in dry conditions, during periods of exceptional rainfall there are watercourses that flow, supporting a range of unusual biodiversity. Arboreal habitat is almost non-existent on the study site. A few Acacia species and other small trees and bushes occur scattered in the dunes. A few Quiver trees (*Aloe dichotoma*) occur on some of the mountain slopes.

Fifty-six mammal species are expected to occur on the study site (Table 5). It should be noted that potential occurrences are interpreted as to be possible over a period of time as result of expansion and contractions of population densities and ranges which stimulate migration.
All feral mammal species expected to occur on the study site (e.g. house mice, house rats, dogs and cats) were omitted from the assessment since these species normally associate with human settlements. Mammals reliant on wetland and arboreal habitats were a priori omitted from the list of occurrences since these habitat-types are absent from the study site. As such a species richness of 56 species in an area with average habitat diversity and a low carrying capacity is

Table 9: Mammal diversity. The species deduced to occupy the site (Systematics and taxonomy as proposed by Bronner et.al [2003] and Skinner and Chimimba [2005])

	SCIENTIFIC NAME	ENGLISH NAME
*	*Macroscelides proboscideus*	Round-eared elephant shrew
Y	*Elephantulus rupestris*	Western rock elephant shrew
Y	*Orycteropus afer*	Aardvark
Y	*Procavia capensis*	Rock dassie
Y	*Lepus capensis*	Cape hare
Y	*Lepus saxatilis*	Scrub hare
Y	*Pronolagus rupestris* Smith‟s	Smith‟s red rock rabbit
Y	*Hystrix africaeaustralis*	Cape porcupine
Y	*Petromus typicus*	Dassie rat
Y	*Pedetes capensis*	Springhare
Y	*Xerus inaurus*	South African ground squirrel
?	*Graphiurus ocularis*	Spectacled dormouse
*	*Rhabdomys pumilio*	Four-striped grass mouse

	SCIENTIFIC NAME	ENGLISH NAME
*	*Mus minutoides*	Pygmy mouse
*	*Aethomys namaquensis*	Namaqua rock mouse
Y	*Parotomys brantsii*	Brant"s whistling rat
Y	*Parotomys littledalei*	Littledale"s whistling rat
*	*Desmodillus auricularis*	Cape short-tailed gerbil
*	*Gerbillurus paeba*	Hairy-footed gerbil
*	*Gerbillurus vallinus*	Brush-tailed hairy-footed gerbil
DD*	*Gerbilliscus leucogaster*	Bushveld gerbil
*	*Petromus typicus*	Dassie rat
*	*Gerbilliscus brantsii*	Highveld gerbil
?	*Saccostomus campestris*	Pouched mouse
*	*Malacothrix typical*	Gerbil mouse
*	*Petromyscus collinus*	Pygmy rock mouse
?	*Papio hamadryas*	Chacma baboon
DD*	*Crocidura cyanea*	Reddish-grey musk shrew
?	*Sauromys petrophilus*	Flat-headed free-tailed bat
*	*Tadarida aegyptiaca*	Egyptian free-tailed bat
?	*Cistugo seabrai*	Angolan hairy bat
*	*Neoromicia capensis*	Cape serotine bat
?	*Eptesicus hottentotus*	Long-tailed serotine bat
?	*Nycteris thebaica*	Egyptian slit-faced bat
?	*Rhinolophus fumigatus*	Rüppel"s horseshoe bat
NT?	*Rhinolophus clivosus*	Geoffroy"s horseshoe bat
NT?	*Rhinolophus darlingi*	Darling"s horseshoe bat
?	*Rhinolophus capensis*	Cape horseshoe bat
?	*Rhinolophus denti*	Dent"s horseshoe bat
Y	*Proteles cristatus*	Aardwolf
Y	*Caracal caracal*	Caracal
Y	*Felis silvestris*	African wild cat
?	*Felis nigripes*	Black-footed cat
*	*Genetta genetta*	Small-spotted genet
*	*Suricata suricatta*	Suricate
Y	*Cynictis penicillata*	Yellow mongoose
?	*Galerella sanguinea*	Slender mongoose
?	*Galerella pulverulenta*	Cape grey mongoose
Y	*Otocyon megalotis*	Bat-eared fox
Y	*Vulpes chama*	Cape fox
Y	*Canis mesomelas*	Black-backed jackal
NT?	*Mellivora capensis*	Honey badger
*	*Ictonyx striatus*	Striped polecat
Y	*Oryx gazella*	Gemsbok
Y	*Antidorcas marsupialis*	Springbok

	SCIENTIFIC NAME	ENGLISH NAME
	Raphicerus campestris	Steenbok
Y	√ *Oreotragus oreotragus*	Klipspringer

Y Definitely present or have a high probability to occur;

***** Medium probability to occur based on ecological and distributional parameters;

? Low probability to occur based on ecological and distributional parameters.

Red Data species rankings as defined in Friedmann and Daly‟s S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

All Red Data species listed in Table 9 as Critically Endangered, Rare, Near Threatened or Data Deficient are discerning species and became endangered as result of the deterioration of their preferred habitats. No other Red Data or sensitive species are deemed present on the site, since the site falls outside the distributional ranges of some species, or does not offer suitable.

Four pertinent matters emerge from the list of mammals compiled during the site visit and the subsequent desktop study:

1. The species assemblage is typical of a western semi-arid region (particularly species such as the elephant’s shrew species, the ground squirrel, the spectacled dormouse, the various gerbil species, the dassie rat, whistling rats, the black-footed cat, the bat-eared fox, the Cape fox.);
2. The species richness of 56 is typical of an extensive area such as the property (5000 ha) and of adjoining areas, with a near-natural degree of connectivity;
3. Land-use practices and civilization pressures are geared to low-key grazing with a focus on concomitant floral conservation to benefit year-round grazing, which are conducive to species richness; and
4. Field observations suggested that population levels were low during the site visit.

Population fluctuations are not uncommon, and often have a domino effect (for instance when prey population densities decrease in numbers, this will have an adverse effect on carnivore and raptor numbers). The rest of the species richness is made up from common and robust mammals with wide distributional ranges such as aardvarks, springhares, four-striped grass mouse, porcupines, the caracal, the genet, the two mongoose species, the black-backed jackal etc.

The role of insectivorous bats in an ecosystem is often under-estimated, whereas their susceptibility to reigning environmental conditions is under-appreciated. Bats are sensitive to adverse daytime environmental conditions and predation, and suitable daytime roosting sites are of cardinal importance. Especially the mountains have many boulders and rock faces forming many overhangs and deep crevices suitable for daytime roosts.

The proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect mammals which may occur on site in a significant manner.

Taking cognisance of the above, the main conservation objectives for mammals on the site are to avoid the mountains and their gravel skirts and the drainage lines, including the untransformed adjacent grassy plains.

(b) Herpetofauna

From a herpetological habitat perspective, the identified terrestrial and rupicolus (rock dwelling) habitats are of significance. Man-made rupicolus habitat exists in the form of homesteads and its surrounding outbuildings, built dams and worker accommodation. These man-made habitats are often islands in the sea of terrestrial habitat and provides excellent artificial habitat for many rupicolus reptile species. In addition, connectivity across the area is fair and real opportunities for migration exist.

The Northern Cape is renowned for its biodiversity and the Herpetofauna is no exception to the rule. It is especially true for reptiles in general and lizards in particular. Based on the habitat available on site, a variety of reptile and some amphibian species are expected to occupy the prospecting area. Very few trees occur on the study site, which provided habitat for arboreal (tree-living) Herpetofauna. As a result arboreal species like the Kalahari tree skink are excluded from the species list (Table 10).

Table 10: Reptile and Amphibian species diversity deduced to be present on site Systematic arrangement and nomenclature according to Branch (1998), Alexander and Marais (2007), Minter, et.al (2004) & Du Preez and Carruthers (2009)

	SCIENTIFIC NAME	ENGLISH NAME
	CLASS: REPTILIA	**REPTILES**
	Order: TESTUDINES	**TORTOISES & TERRAPINS**
	Family:Testudinidae	**Tortoises**
Y	*Psammobates tentorius verraxii*	Karoo Tent Tortoise
	Order: SQUAMATA	**SCALE-BEARING REPTILES**
	Suborder:LACERTILIA	**LIZARDS**
	Family: Gekkonidae	**Geckos**
Y	√ *Chondrodactylus angulifer*	Giant Ground Gecko
*	***** *Goggia lineate*	Striped Dwarf Leaf-toed Gecko
?	**?** *Goggia rupicola*	Namaqualand Dwarf Leaf-toed Gecko
?	**?** *Lygodactylus bradfieldi*	Bradfield"s Dwarf Gecko
Y	√ *Chondrodactylus bibronii*	Bibron"s Tubercled or Thick-toed Gecko
?	**?** *Pachydactylus labialis*	Western Cape Thick-toed or Western Cape Gecko
?	**?** *Pachydactylus capensis*	Cape Thick-toed or Cape Gecko
Y	√ *Pachydactylus mariquensis*	Marico Thick-toed Gecko
?	**?** *Pachydactylus namaquensis*	Namaqua Thick-toed Gecko
?	**?** *Pachydactylus rugosus*	Rough Thick-toed Gecko
Y	√ *Ptenopus garrulus*	Barking Gecko
	Family: Agamidae	**Agamas**
?	**?** *Agama aculeata*	Ground Agama
Y	√ *Agama anchietae*	Anchieta"s Agama
Y	√ *Agama atra*	Southern Rock Agama
	Chamaeleonidae	**Chameleons**

	SCIENTIFIC NAME	ENGLISH NAME
Y	√ *Chamaeleo namaquensis*	Namaqua Chameleon
	Family: Scincidae	**Skinks**
Y	√ *Acontias lineatus*	Striped Legless Skink
?	**?** *Acontias gracilicauda namaquensis*	Thin-tailed Legless Skink
Y	√ *Trachylepis capensis*	Cape Skink
Y	√ *Trachylepis occidentalis*	Western Three-striped Skink
Y	√ *Trachylepis sulcata*	Western Rock Skink
	Family:Lacertidae	**Old World Lizards or Lacertids**
Y	√ *Meroles suborbitalis*	Spotted Desert Lizard
?	*? Pedioplanis laticeps*	Cape Sand Lizard
Y	√ *Pedioplanis lineoocellata*	Spotted Sand Lizard
Y	√ *Pedioplanis namaquensis*	Namaqua Sand Lizard
*	***** *Pedioplanis inornata*	Plain Sand Lizard
*	***** *Nucras tessellata*	Western Sandveld Lizard
?	**?** *Agama aculeata*	Ground Agama
Y	√ *Agama anchietae*	Anchieta"s Agama
Y	√ *Agama atra*	Southern Rock Agama
	Family: Gerrhosauridae	**Family: Gerrhosauridae Plated Lizards**
?	*? Cordylosaurus subtessellatus*	Dwarf Plated lizard
?	*?Vu Gerhosaurus typicus* Namaqua	Namaqua Plated Lizard
	Family: Cordyidae	**Family: Cordyidae**
*	***** *Cordylus polyzonus*	Karoo Girdled Lizard
Y	*? Platysaurus broadleyi*	Augrabies or Broadley"s Flat Lizard
	Family: Varanidae	**Family: Varanidae Monitors**
Y	√ *Varanus albigularis*	Rock Monitor
	Suborder: SERPENTES	**Suborder: SERPENTES SNAKES**
	Family: Typhlopidae	**Family: Typhlopidae Blind Snakes**
*	***** *Rhinotyphlops lalandei*	Delalande"s Beaked Blind Snake
*	***** *Rhinotyphlops schinzi*	Schinz"s Beaked Blind Snake
	Family: Leptotyphlopidae	**Thread Snakes**
*	***** *Leptotyphlops occidentalis*	Namaqua Worm or Western Thread Snake
	Family: Colubridae Typical Snakes	**Typical Snakes**
Y	*Lamprophis capensis*	Brown House Snake
?	*Lamprophis guttatus*	Spotted House Snake
?VU	*Lamprophis fiskii*	Fisk"s House Snake
	Pseudaspis cana	Mole Snake
?	*Prosymna bivittata*	Two-striped Shovel-snout
Y	*Prosymna frontalis*	South-western Shovel-snout
Y	*Dipsina multimaculata*	Dwarf Beaked Snake
Y	*Psammophis notostictus*	Karoo Whip or Sand Snake
Y	*Psammophis trinasalis*	Kalahari Sand Snake
Y	*Psammophis leightoni namibensis*	Namib Sand Snake
?	*Psammophis crucifer* Crossed	Crossed Whip Snake
Y	*Dasypeltis scabra*	Common or Rhombic Egg Eater
Y	*Telescopus beetzii* Beetz"s	Tiger Snake
	Family: Elapidae	**Cobras, Mambas and Others**
Y	*Aspidelaps lubricus* Coral Shield Cobra	Coral Shield Cobra
Y	*Naja nivea* Cape Cobra	Cape Cobra
Y	*Naja nigricollis* Black-necked Spitting Cobra	Black-necked Spitting Cobra
	Family: Viperidae	**Adders**
Y	*Bitis caudalis*	Horned Adder
Y	*Bitis arietans*	Puff Adder
?	*Bitis xeropaga*	Desert Mountain Adder
?	*Bitis cornuta*	Many-horned Adder
	CLASS: AMPHIBIA	**AMPHIBIANS**
	Order: ANURA	**FROGS**
	Family: Pipidae	**Clawed Frogs**
?	*Xenopus laevis*	Common Platanna
	Family: Bufonidae Toads	
?	*Vandijkophrynus gariepensis*	Karoo Toad
*	*Vandijkophrynus robinsoni* Paradise Toad	Paradise Toad
	Family: Microhylidae Rubber Frogs	

	SCIENTIFIC NAME	ENGLISH NAME
?	*Phrynomantis annectens* Marled Rubber Frog	Marled Rubber Frog
	Family: Breviceptidae Rain Frogs	
?	*Breviceps namaquensis* Namaqua Rain Frog	Namaqua Rain Frog
	Family: Pyxicephalidae	
?	*Amietia fuscigula*	Cape River Frog
*VU	*Strongylopus springbokensis*	Namaqua Stream Frog
?	*Cocosternum boettgeri* Boettger‟s	Boettger‟s Caco or Common Caco
*	*Cocosternum namaquense*	Namaqua Caco
*	*Tomopterna delalandii*	Cape Sand Frog
?	*Tomopterna tandyi* Tandy‟s	Tandy‟s Sand Frog

Y Definitely there or have a high probability of occurring;

* Medium probability of occurring based on ecological and distributional parameters;

? Low probability of occurring based on ecological and distributional parameters.

Red Data species rankings as defined in Branch, The Conservation Status of South Africa’s threatened Reptiles‟: 89 – 103. In: - G.H.Verdoorn & J. le Roux (editors), „The State of Southern Africa’s Species (2002) and Minter, *et. al*, Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) are indicated in the first column: CR= Critically Endangered, En= Endangered, Vu = Vulnerable, NT = Near Threatened, DD = Data Deficient. All other species are deemed of Least Concern.

(c) Red Data Listed Reptiles

The study site area falls outside the natural range of the speckled padloper, Namaqua day Gecko, Lawrence‟s girdled lizard, Armadillo girdled lizard, Lomi‟s blind legless skink, Namaqua dwarf adder and the Southern African python.

The Namaqua plated lizard inhabits dry sandy areas and rocky hillsides (McLachlan 1988), which is abundantly present on the study site. This species has been recorded from Springbok (McLachlan 1988). Although the possibility is very small that this species may occur on the study site, it may potentially be present.

Very few Fisk‟s house snake specimens are ever collected and little is known of its biology. There is a specimen collected from Steinkopf in the Ditsong National Museum of Natural History (Transvaal Museum) (Broadley 1990). It is very difficult to confirm whether this cryptic snake is present on any study site, but it is highly unlikely that it occurs on this particular study site.

(d) Red Data Listed Amphibians

The study site falls outside the natural range of giant bullfrogs, desert rain frog and the Karoo caco. It is unlikely that these species will occur on the prospecting area.

The Namaqua stream frog occurs in areas which receive annual rainfall of < 60mm. In this arid environment, these frogs are restricted to the proximity of springs, seps, small permanent and non-permanent streams and artificial impoundments (Channing 2004). The study site contains some of these water sources and the fact that a fragmented sub-population has been recorded at the nearby Gamsberg, makes the occurrence of this frog species on the study site a possibility. As a result, it is important that the drainage lines must be avoided and remain unaffected.

As indicated previously, the proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect reptiles and amphibians which may utilise the site in a significant manner. Taking cognisance of the above, the main conservation objectives for Herpetofauna are to avoid the mountains and their gravel skirts and the drainage lines, including the untransformed adjacent grassy plains.

(e) Birds

Based on the habitats identified on site, a wide variety of bird species occurs, and is expected to occur on the prospecting area. Table 11 shows the bird species expected to occur on and around the prospecting area:

Table 11: Birds species expected to occur on and around the site

Common English Name	**Scientific Name**	**Status Codes (see below)**		
		RD	**S**	**E**
Common Ostrich	*Struthio camelus*			
Maccoa Duck	*Oxyura maccoa*			
Egyptian Goose	*Alopochen aegyptiaca*			
South African Shelduck	*Tadorna cana*			
Spur-winged Goose	*Plectropterus gambensis*			
Cape Teal	*Anas capensis*			
Yellow-billed Duck	*Anas undulata*			
Cape Shoveler	*Anas smithii*		B/NBM	
Red-billed Teal	*Anas erythrorhyncha*			
Southern Pochard	*Netta erythrophthalma*			
Acacia Pied Barbet	*Tricholaema leucomelas*			
African Hoopoe	*Upupa africana*			
Swallow-tailed Bee-eater	Bee-eater *Merops hirundineus*			
European Bee-eater	*Merops apiaster*			
White-backed Mousebird	*Colius*			
Red-faced Mousebird	*Urocolius indicus*			
Burchell's Coucal	*Centropus burchellii*			
Alpine Swift	*Tachymarptis melba*		BM	
Common Swift	*Apus apus*		NBM	
Bradfield's Swift	*Apus bradfieldi*			
Little Swift	*Apus affinis*			
Owl	*Tyto alba*			
Cape Eagle-Owl	*Bubo capensis*			
Spotted Eagle-Owl	*Bubo africanus*			
Freckled Nightjar	*Caprimulgus tristigma*			
Rufous-cheeked Nightjar	*Caprimulgus rufigena*		BM	
Rock Dove	*Columba livia*			
Speckled Pigeon	*Columba guinea*			
Laughing Dove	*Streptopelia senegalensis*			
Cape Turtle-Dove	Cape Turtle-Dove *Streptopelia capicola*			
Namaqua Dove	Namaqua Dove *Oena capensis*			
Ludwig's Bustard	Ludwig's Bustard *Neotis ludwigii*	**VUL**		
Kori Bustard	*Ardeotis kori*	**VUL**		

Common English Name	**Scientific Name**	**Status Codes (see below)**		
		RD	**S**	**E**
Karoo Korhaan	*Eupodotis vigorsii*			
African Rail	*Rallus caerulescens*			
Red-knobbed coot	*Fulica cristata*			
Namaqua Sandgrouse	*Pterocles namaqua*			
Double-banded Sandgrouse	*Pterocles bicinctus*			
Marsh Sandpiper	*Tringa stagnatilis*		**NBM**	
Common Greenshank	*Tringa nebularia*		**NBM**	
Wood Sandpiper	*Tringa glareola*		**NBM**	
Common Sandpiper	*Actitis hypoleucos*		**NBM**	
Ruddy Turnstone	*Arenaria interpres*		**NBM**	
Little Stint	*Calidris minuta*		**NBM**	
Curlew Sandpiper	*Calidris ferruginea*		**NBM**	
Ruff	*Philomachus pugnax*		**NBM**	
Spotted Thick-knee	*Burhinus capensis*			
Black-winged Stilt	*Himantopus himantopus*			
Pied Avocet	*Recurvirostra avosetta*			
Common Ringed Plover	*Charadrius hiaticula*			
Kittlitz's Plover	*Charadrius pecuarius*			
Three-banded Plover	*Charadrius tricollaris*			
Chestnut-banded Plover	*Charadrius pallidus*	**NT**		
Blacksmith Lapwing	*Vanellus armatus*			
Crowned Lapwing	*Vanellus coronatus*			
Double-banded Courser	*Rhinoptilus africanus*			
Burchell's Courser	*Cursorius rufus*			
White-winged Tern	*Chlidonias leucopterus*		NBM	
Black-shouldered Kite	*Elanus caeruleus*			
Yellow-billed Kite	*Milvus aegyptius*			
Black-chested Snake-Eagle	*Circaetus pectoralis*			
Black Harrier	*Circus maurus*	NT		**(*)**
Southern Pale Chanting Goshawk	*Melierax canorus*			
Gabar Goshawk	*Melierax gabar*			
Steppe Buzzard	*Buteo buteo*		**NBM**	
Jackal Buzzard	*Buteo rufofuscus*			**(*)**
Verreaux's Eagle	*Aquila verreauxii*			
Martial Eagle	*Polemaetus bellicosus*	**VU**		
Secretarybird	*Sagittarius serpentarius*	**VU**		
Pygmy Falcon	*Polihierax semitorquatus*			
Rock Kestrel	*Falco rupicolus*			
Greater Kestrel	*Falco rupicoloides*			
Red-necked Falcon	*Falco chicquera*			
Lanner Falcon	*Falco biarmicus*	**NT**		
Little Grebe	*Tachybaptus ruficollis*			
Yellow-billed Egret	*Egretta intermedia*			
Grey Heron	*Ardea cinerea*			
Black-headed Heron	*Ardea melanocephala*			
Cattle Egret	*Bubulcus ibis*			
Little Bittern	*Ixobrychus minutus*			
Bokmakierie	Bokmakierie *Telophorus zeylonus*			
Pririt Batis	Pririt Batis *Batis pririt*			
Cape Crow	*Corvus capensis*			
Pied crow	*Corvus albus*			
Red-backed Shrike	*Lanius collurio*		**NBM**	
Lesser Grey Shrike	*Lanius minor*		**NBM**	
Common Fiscal	*Lanius collaris*			
Cape Penduline-Tit	*Anthoscopus minutus*			
Ashy Tit	*Parus cinerascens*			
Grey Tit	*Parus afer*			**(*)**
Brown-throated Martin	*Riparia paludicola*			
Barn Swallow	*Hirundo rustica*		**NBM**	
White-throated Swallow	*Hirundo albigularis*		**BM**	
Greater Striped Swallow	*Cecropis cucullata*		**BM**	

Common English Name	Scientific Name	Status Codes (see below)		
		RD	S	E
Rock Martin	*Hirundo fuligula*			
Common House-Martin	*Delichon urbicum*		NBM	
African Red-eyed Bulbul	*Pycnonotus nigricans*			
Fairy Flycatcher	*Stenostira scita*			(*)
Yellow-bellied Eremomela	*Eremomela icteropygialis*			
Karoo Eremomela	*Eremomela gregalis*			(*)
Lesser Swamp-Warbler	*Acrocephalus gracilirostris*			
Layard's Tit-Babbler	*Sylvia layardi*			(*)
Orange River White-eye	*Zosterops pallidus*			
Grey-backed Cisticola	*Cisticola subruficapilla*			
Zitting Cisticola	*Cisticola juncidis*			
Tawny-flanked Prinia	*Prinia subflava*			
Karoo Prinia	*Prinia maculosa*			(*)
Namaqua Warbler	*Phragmacia substriata*			(*)
Rufous-eared Warbler	*Malcorus pectoralis*			
Cinnamon-breasted Warbler	*Euryptila subcinnamomea*			(*)
Cape Clapper Lark	*Mirafra apiata*			(*)
Sabota Lark	*Calendulauda sabota*			
Fawn-coloured Lark	*Calendulauda africanoides*			
Red Lark	*Calendulauda burra*	VUL		
Karoo Lark	*Calendulauda albescens*			(*)
Spike-heeled Lark	*Chersomanes albofasciata*			
Karoo Long-billed Lark	*Certhilauda subcoronata*			
Black-eared Sparrowlark	*Eremopterix australis*			(*)
Grey-backed Sparrowlark	*Eremopterix verticalis*			
Red-capped Lark	*Calandrella cinerea*			
Stark's Lark	*Spizocorys starki*			
Pink-billed Lark	*Spizocorys conirostris*			
Sclater's Lark	*Spizocorys sclateri*	NT		(*)
Large-billed Lark	*Galerida magnirostris*			(*)
Short-toed Rock-Thrush	*Monticola brevipes*			
Karoo Thrush	*Turdus smithi*		NBM	(*)
Chat Flycatcher	*Bradornis infuscatus*			
Spotted flycatcher	*Muscicapa striata*			
Cape Robin-Chat	*Cossypha caffra*			
Karoo Scrub-Robin	*Erythropygia coryphoeus*			
Mountain Wheatear	*Oenanthe monticola*			
Capped Wheatear	*Oenanthe pileata*			
Sickle-winged Chat	*Cercomela sinuata*			(*)
Karoo Chat	*Cercomela schlegelii*			
Tractrac Chat	*Cercomela tractrac*			
Familiar Chat	*Cercomela familiaris*			
Ant-eating Chat	*Myrmecocichla formicivora*			
Pale-winged Starling	*Onychognathus nabouroup*		I	
Cape Glossy Starling	*Lamprotornis nitens*			
Wattled Starling	*Creatophora cinerea*			
Common Starling	*Sturnus vulgaris* I			
Malachite Sunbird	*Nectarinia famosa*			
Southern Double-collared Sunbird	*Cinnyris chalybeus*			(*)
Dusky Sunbird	*Cinnyris fuscus*			
Scaly-feathered Finch	*Sporopipes squamifrons*			
Sociable Weaver	*Philetairus socius*			
Southern Masked-Weaver	*Ploceus velatus*			
Red-billed Quelea	*Quelea quelea*			
Southern Red Bishop	*Euplectes orix*			
Red-headed Finch	*Amadina erythrocephala*			
Common Waxbill	*Estrilda astrild*		I	
Pin-tailed Whydah	*Vidua macroura*			
House Sparrow	*Passer domesticus*			
Cape Sparrow	*Passer melanurus*			
Southern Grey-headed Sparrow	*Passer diffusus*			

Common English Name	Scientific Name	Status Codes (see below)		
		RD	S	E
African Pied Wagtail	*Motacilla aguimp*			
Cape Wagtail	*Motacilla capensis*			
African Rock Pipit	*Anthus crenatus*			**(*)?**
African Pipit	*Anthus cinnamomeus*			
Long-billed Pipit	*Anthus similis*			
Black-headed Canary	*Serinus alario*			**(*)**
Black-throated Canary	*Crithagra atrogularis*			
Yellow Canary	*Crithagra flaviventris*			
White-throated Canary	*Crithagra albogularis*			
Lark-like Bunting	*Emberiza impetuani*			
Cape Bunting	*Emberiza capensis*			

Red Status	Status in south Africa (S)	Endemism in South Africa (E)
T = Threatened	BM = breeding migrant	Endemism in South Africa (E) (not southern Africa as in field guides)
NT = Near-Threatened	NBM = non-breeding migrant	
Vul = Vulnerable	V = vagrant	* = endemic
E = Endangered	I = introduced	
CE = Critically Endangered	R = rare	(*) = near endemic (i.e. ~70% or more of population in RSA)
RE = Regionally Extinct	PRB = probable rare breeder	B* = breeding endemic
§ = Refer to footnote	RB = rare breeder	B(*) = breeding near endemic
	RV = rare visitor	W* = winter endemic
Red Status is from *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland, Barnes (2001).*		

Nine species of international and/or national conservation concern (Red Data species, IUCN/Birdlife International 2011, Barnes 2000), ranging from Near Threatened to Vulnerable, are considered as possible to occur on site. Most of these threatened species fall into a few obvious categories by habitat preference (Table 12) and their likelihood of occurrence on site (Table 13).

Table 12: List of threatened species that will possibly make use of the habitats on and around the site, showing their preferred habitat types. Note that one species may have more than one habitat preference

Threatened Status	Species	Preferred Habitat Type(s)			
		Grassy plains	Red sand/dunes	Bare washes	Rocky mountains & gravel
Near Threatened	Chestnut-banded			X	
	Plover	X	X		
	Black Harrier	X	X		
	Lanner Falcon	X	X	X	X
	Sclater's Lark				X
Vulnerable	Ludwig's Bustard	X	X	X	
	Kori Bustard	X	X	X	
	Martial Eagle	X	X	X	
	Secretarybird	X	X	X	
	Red Lark	X	X	X	
TOTALS	**9**	**7**	**7**	**6**	**2**

Table 13: The expected frequency of occurrence of threatened bird species on and around the site

Threatened Status	Species	Probability of occurrence on site			
		Regular resident	Frequent visitor	Erratic visitor	Infrequent vagrant
Near Threatened	Chestnut-banded			X	
	Plover				
	Black Harrier			X	
	Lanner Falcon		X		
	Sclater's Lark			X	
Vulnerable	Ludwig's Bustard	X			
	Kori Bustard			X	
	Martial Eagle		X		
	Secretarybird			X	
	Red Lark				
TOTALS	**9**	**2**	**2**	**5**	**0**

Based on the analysis above, the most important habitats to conserve for threatened bird species are the grassy plains and the red sand/dunes, with the bare washes also important at the times when they are productive after rains. However, the grassy plains form part of extensive similar habitat in the area, while the red dunes are more restricted but also much more productive, for livestock and birds alike, including the **Red Lark** that is a restricted-range endemic to Bushmanland. The bare washes (for **Chestnut-banded Plover**) and gravel fields (for **Sclater's Lark**) are only really productive after good rains, while the mountains have nest sites for the **Lanner Falcon** when good rains attract large numbers of nomadic insect- and seed-eating birds.

Two Vulnerable species are expected to be regular breeding residents (**Ludwig's Bustard** and **Red Lark**). The Vulnerable **Martial Eagle** and **Secretary Bird,** and the Near Threatened **Lanner Falcon** are expected to be regular visitors to the area, when their prey animals are abundant, but while no sufficiently large trees were seen as likely nest sites for the Eagle or Secretary bird, the large south-facing cliffs could well support nesting ledges for the falcon, as they apparently do for Verreaux's Eagle.

The remaining four threatened species are expected to be erratic visitors when high rainfall creates productive conditions (plant cover, seeds, insects, small vertebrates). Some are resident species in the general area of the Northern Cape whose ephemeral habitats on the property are also only likely to become suitable after good rains, the **Chestnut-banded Plover** visiting and possibly feeding and breeding in/around the more saline pans and **Sclater's Lark** using large grass seeds on the few chalky gravel patches. The **Kori Bustard** generally prefers higher rainfall areas with more ground cover and productivity, so although they do sometimes visit the area it seems unlikely that they breed there. Finally, the Black Harrier is expected only as an erratic, non-breeding winter visitor to the area from the Western Cape, again most likely when good rains have produced abundant small animals.

As indicated previously, the proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect bird species which may utilise the site in a significant manner. Taking cognisance of the above, the main conservation objectives for birds are to avoid the sand dunes, mountains and their gravel skirts, as well as the drainage lines, including the untransformed adjacent grassy plains.

(vii) Surface water

The proposed site falls within the Lower Orange Water Management Area (WMA), specifically in the Orange Sub Water Management Area (Boegoeberg Sub Catchment), in the D82A quaternary catchment area.

The Lower Orange WMA is the lowest WMA in the Orange River Basin and as such is affected by upstream activities. The area is arid with rainfall varying from 400 mm in the east to 50 mm on the west coast. The topography of the area is flat with large pans or (endoreic areas that do not contribute runoff to the Orange River system.

The Orange River, which forms a green strip in an otherwise arid landscape, also forms the border between South Africa and Namibia over about 550 km to the west of the 20-degree longitude. The Vaal River, the main tributary to the Orange River, has its confluence with the Orange River about 13 km west of Douglas. Other tributaries are the Ongers and Hartebeest Rivers from the south, and the Molopo River and Fish River (Namibia) from the north. There are a number of highly intermittent water courses along the coast which drain directly to the ocean.

Sheep and goat farming is practised over most of the area. Large parts of the WMA also include conservation areas. Cultivation is restricted to isolated patches where somewhat higher rainfall occurs, and extensive irrigation is practised in the narrow ribbon of fertile alluvial soils along the Orange River valley. This irrigation is supplied by releases from the Vanderkloof Dam. Large mining operations occur in various parts of the water management area. There are no large urban developments or power stations. Groundwater plays a major role in meeting the water requirements of the towns and rural settlements along the tributaries of the Orange.

Less than 1% of the Gross Domestic Product (GDP) of South Africa originates from the Lower Orange WMA. The largest economic sectors (in 1997) in the water management, in terms of GGP, were:

- Government 19,4%
- Mining 17,4%
- Agriculture 15,9%
- Trade 15,1%

Economic activity is largely concentrated along the Orange River, with several towns located on the banks of the river, and at mining developments. The two major storage dams Gariep and Vanderkloof, which are both used to supply all the irrigation, urban, mining and environmental requirements along the Lower Orange River are located in the Upper Orange WMA, but are of vital importance to the Lower Orange. There are no large storage dams in the WMA, with only a few smaller dams on some of the main tributaries.

These include:

- Smartt Syndicate Dam on the Ongers River.
- Van Wyksvlei on the Carnarvonleegte.

There are also several diversion weirs of which Boegoeberg is the largest.

The Lower Orange WMA is the lowest WMA in the Orange/Vaal River Basin and as such is affected by upstream activities, both in terms of the Upper Orange and the Vaal System. The area is arid with rainfall varying from 400 mm in the east to 50 mm on the west coast. The topography of the area is flat with large pans or endoreic areas that do not contribute runoff to the Orange River system. The Orange River, which forms a green strip in an otherwise arid landscape, also forms the border between South Africa and Namibia over about 550 km to the west of 20 degrees' longitude. The Vaal River, the main tributary to the Orange River, has its confluence with the Orange River about 13 km west of Douglas. Other tributaries are the Ongers and Hartebeest Rivers from the south, and the Molopo River and Fish River (Namibia) from the north. There are a number of highly intermittent water courses along the coast which drain directly to the ocean.

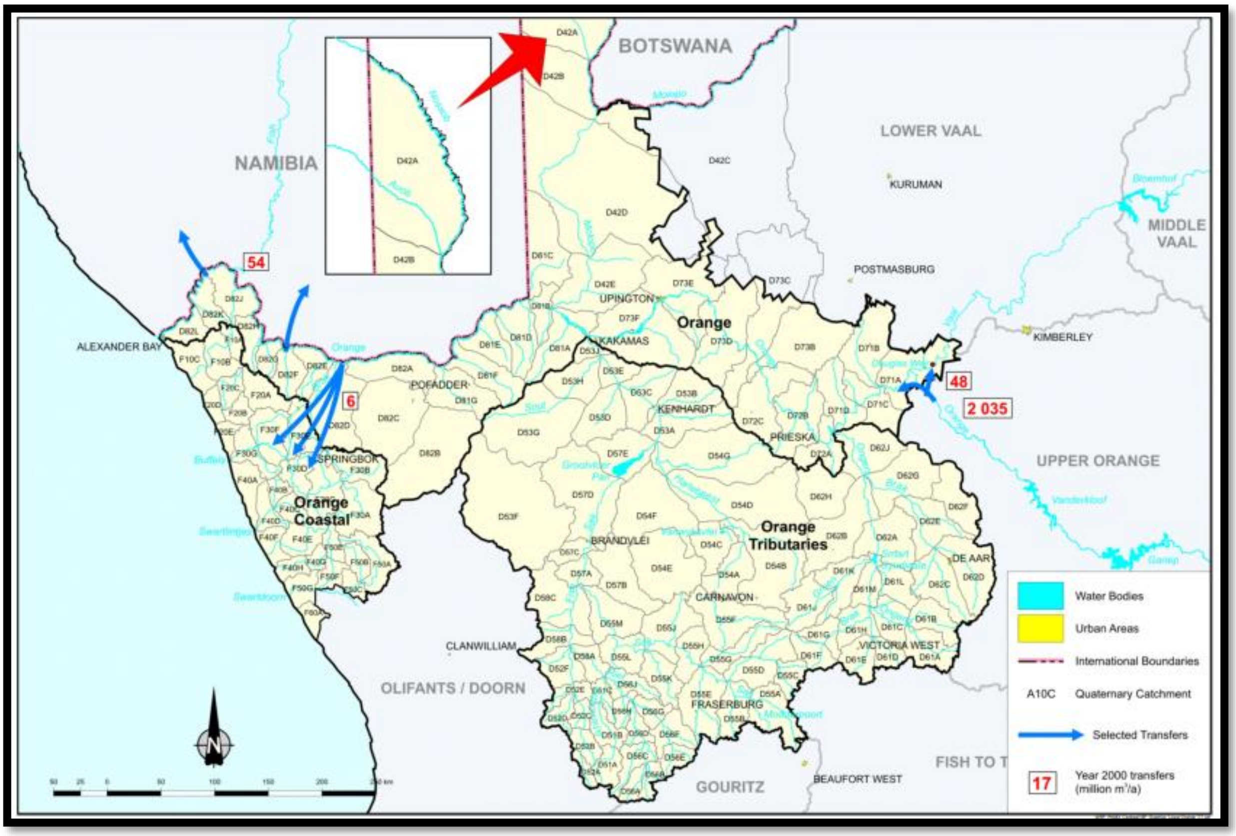

Figure 23: Lower Orange transfers

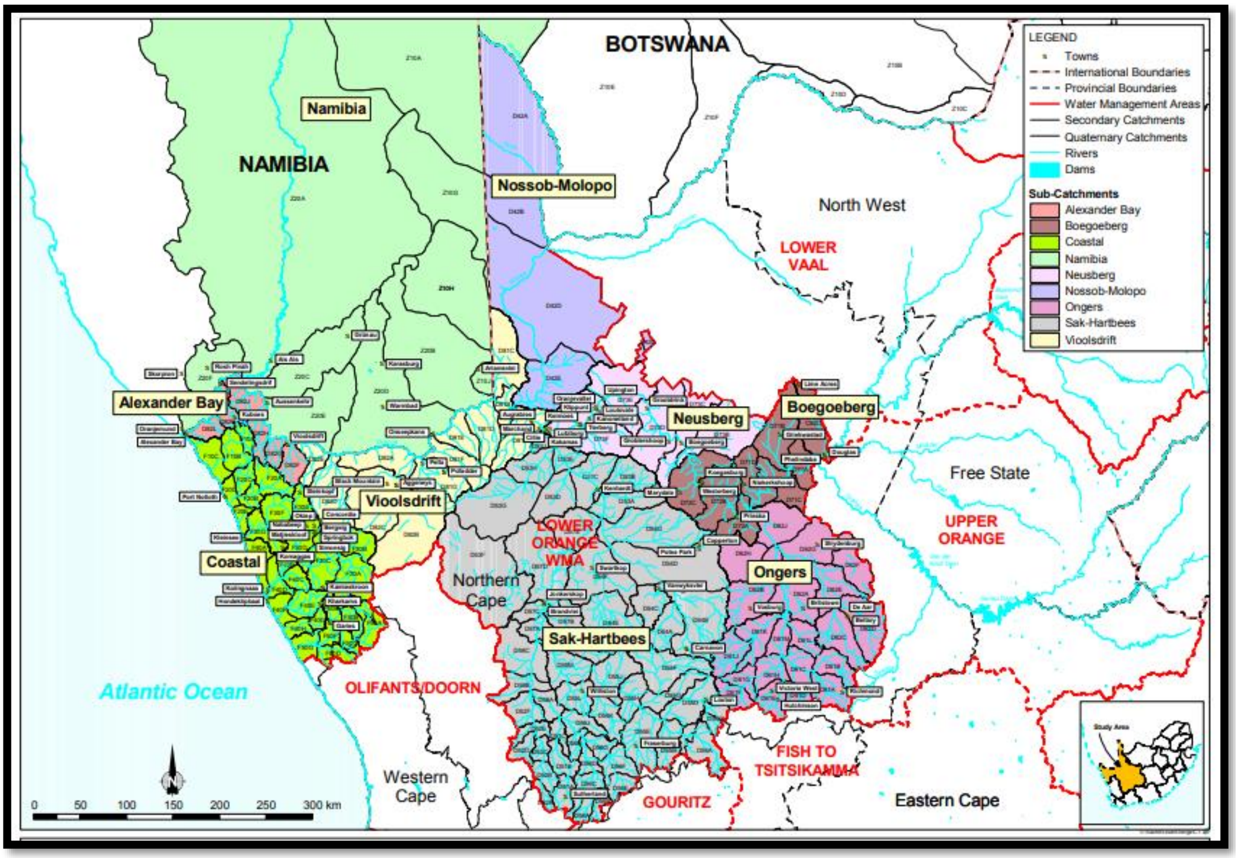

Figure 24: Sub Catchments in the WMA

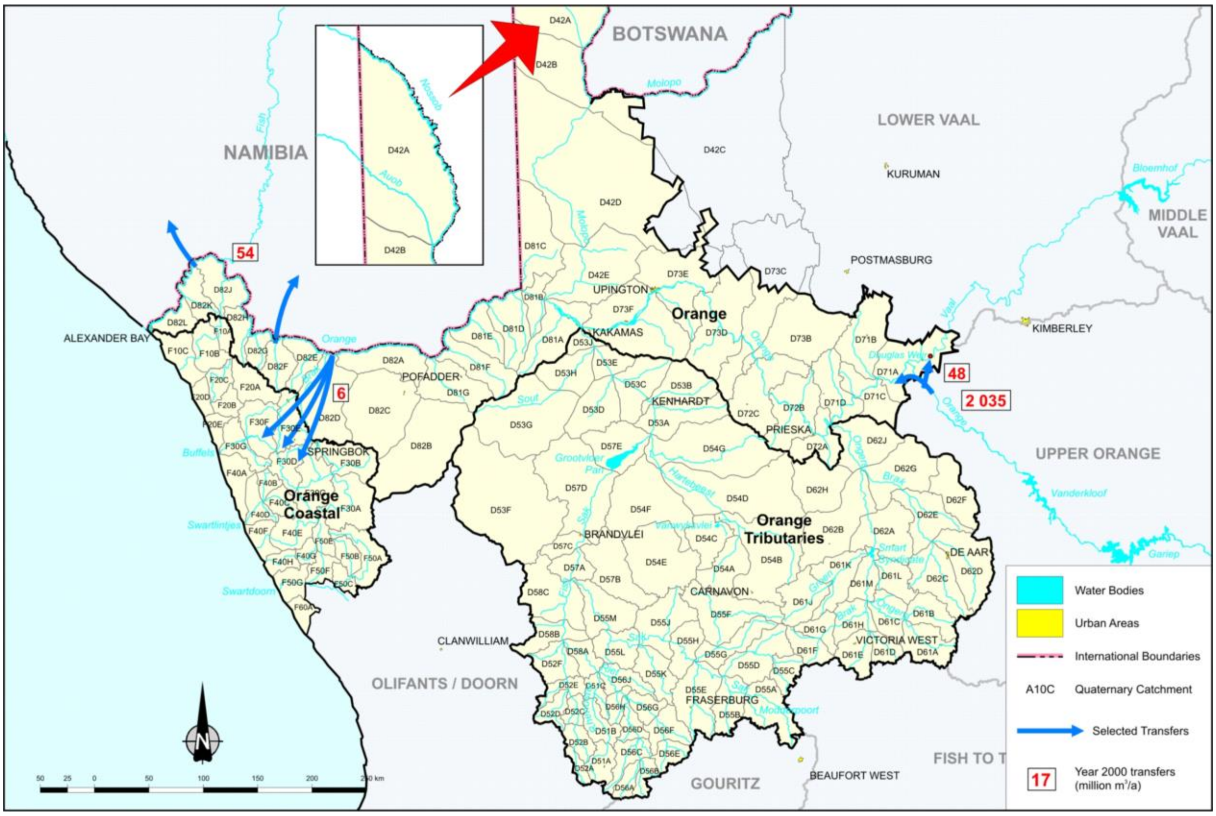

Figure 25: Layout and location of the Lower Orange WMA

In its historical natural state, the quality of water in the Orange River was good, although of high turbidity during flood flows. Water from the tributary streams tends to be of high salinity. Both the flow regime and water quality in the Orange River has, however, been severely impacted upon by extensive upstream developments. Salinity in the Orange River has increased due to the transfer of high quality water out of the Orange River (in Lesotho and the Upper Orange WMA) and as a result of high salinity irrigation return flows along the Orange River. Poor quality water from the Vaal River, which contains a high proportion of irrigation return flows as well as treated urban effluent, also enters the Orange River. Salinity is at present still moderate and acceptable along the main stem of the Orange River. Deterioration can be expected with increased upstream irrigation and the situation must be closely monitored. There are algal blooms experienced in the main stem due largely to irrigation return flows, diffuse sources and poor quality water from the upstream Vaal WMAs. The algal blooms are of particular concern as they are potentially toxic. An algal monitoring programme along the Orange River as well as management and communication protocols have been developed by DWAF if the algal blooms are identified as toxic. Studies and monitoring programmes are underway to understand the current algae behaviour. (DWAF, ISP Lower Orange WMA, 2004)

Ninety percent of the runoff generated in the two Orange River WMAs is generated in the Upper Orange WMA. The bulk of the runoff generated in the Lower Orange comes from the Fish River in Namibia (approximately 60% of the Lower Orange runoff) but this only enters the main Orange River close to the river mouth. The bulk of the surface water in the Lower Orange Water Management Area is therefore found in the main stem of the Orange River, with virtually all the surface water flowing into the Orange River from the Upper Orange and Lower Vaal WMAs.

The two major storage dams, Gariep and Vanderkloof, which are both used to supply all the irrigation, urban, mining and environmental requirements along the Lower Orange River, are located in the Upper Orange WMA, but both are of vital importance to the Lower Orange. There are no large storage dams in the WMA, with only a few smaller dams on some of the main tributaries. These include:

- Smartt Syndicate Dam (101 million m³ gross storage) on the Ongers River.
- Van Wyksvlei (143 million m³ storage) on the Carnarvonleegte.

There are also several diversion weirs in the Orange River of which Boegoeberg (20 million m³ storage) is the largest. Reliable estimates of the surface water resources in the Upper Orange and Vaal River catchment are therefore of extreme importance for the Lower Orange. There is a fairly high confidence in the yield estimates of the surface water in the main system although some of the hydrology is relatively old. The hydrology for the Lower Orange is however not at an acceptable level for the planning or operation of any local water supply schemes outside the Orange River. For more detail the reader is also referred to the Upper Orange ISP (DWAF, 2004b) and Orange River Overarching ISP (DWAF, 2004a) documents.

The total water available for use in the Lower Orange water management area at the year 2000 development levels summarised in Table 14.

Table 14: Available water in year 2000 (million m^3/a)

Sub-area	Natural resource		Usable return flow			Total local yield (1)	Transfers in	Grand Total
	Surface water	Ground-water	Irrigation	Urban	Mining and bulk			
Orange	(1 092)	9	96	1	0	(986)	2 083	1 097
Orange Tributaries	9	13	0	0	0	22	0	22
Orange Coastal	0	3	0	0	0	3	6	9
Total	**(1 083)**	**25**	**96**	**1**	**0**	**(961)**	**2 083**	**1 122**

The negative yield for the Orange River within the Lower Orange water management area, as shown in Table 14, is as a result of evaporation losses and evapotranspiration by riparian vegetation along this reach of the river, which by far exceed the run-of-river yield contributed by local inflows. It also includes a component for losses associated with insufficient management of releases from Vanderkloof Dam.

Potential for a dam in the Lower Orange River has been identified for the re-regulation of releases from Vanderkloof Dam as well as the storage of flood flows mainly from the Upper Orange and Vaal Rivers and to a lesser extent also from the flows generated in the Lower Orange. This would contribute to the improved management of the Orange/Vaal River System, and facilitate more water being made available for use.

No meaningful potential for surface water regulation exists in the Orange Coastal sub-area. Factors that could have a significant impact on the available surface water resources include:

- Saving in operational losses with regards to releases from Vanderkloof Dam (See Orange River Overarching ISP; DWAF, 2004a).
- Implementation of the Reserve on the Orange River (See Orange River Overarching ISP; DWAF, 2004a). Indications are that the reserve can vary significantly from the current environmental flows released from Vanderkloof and will therefore significantly impact on the current surplus available in the system.
- Utilising inflows from the Vaal River.
- Irrigation Return Flows. Very little data is available but return flows commonly amount to 10% of irrigation water. Yield analysis assessments for local surface water resources beyond the Orange River main stem can, with the current available hydrology, only be undertaken on a cursory level (using WR90 data).

This should be carried out only when the need exists and will be the responsibility of the specific towns or towns in need. (DWAF, ISP Lower Orange WMA, 2004)

(viii) Ground water

The mining permit processes should not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining permit will not entail deep excavations from which groundwater will need to be removed and there are no known wetlands on the farm.

Groundwater quality is one of the main factors affecting the development of available groundwater resources. Although there are numerous problems associated with water quality, some of which are easily corrected, total dissolved solids (TDS), nitrates (NO3 as N) and flourides (F) are thought to represent the majority of serious water quality problems. The water quality was evaluated in terms of TDS and potability.

The information was obtained from DWAF Geohydrology. The potability evaluation done was based on the evaluation of chloride, fluoride, magnesium, nitrate, potassium, sodium, sulfate and calcium using the Quality of Domestic Water Supplies, Volume 1 (DWAF, 1998). The portion of the groundwater resources considered to be potable has been calculated as the portion classified as ideal, good and marginal (Class 0 -blue, 1- green and 2 - yellow). Water classified as poor and unacceptable (Class 3 - red and 4 - purple) is considered not to be potable (See Point and diffusive pollution Agricultural activities are a source of diffuse water contamination.

The contribution of each farm on a local scale is often fairly small but the contribution on a catchment scale needs to be included in assessing any pollution situation. Most findings regarding this issue can only be assessed in a generic way due to the lack of data in the WMA. Nitrates are the contaminant of most concern, since they are very soluble and do not bind to soils, nitrates have a high potential to migrate to groundwater. Because they do not evaporate, nitrates/nitrites are likely to remain in water until consumed by plants or other organisms.

Generally, on a local scale the areas of intense cultivation are the major contributors in terms of inorganic nitrates. The primary inorganic nitrates, which may contaminate drinking water, are potassium nitrate and ammonium nitrate both of which are widely used as fertilizers. Where feedlots are operated the contribution of organic nitrates to groundwater contamination can be far more problematic. For most farming activities organic nitrate is not a severe problem in South Africa. High-density cultivation at surface water irrigation schemes along the Orange River contributes to the nitrate load of localized aquifers in the WMA. Other contaminants of concern are pesticides and herbicides. The contribution of these to groundwater contamination is very difficult to quantify on catchment scale. Site-specific data relating to likely loading/application volumes and history, soil profile and local geohydrology are required. The mineralogical groundwater quality in the Lower Orange Water Management Area is not particularly good in terms of its TDS rating.

In general, the groundwater quality is rated as class 2 to class 4, marginal to completely unacceptable. The southern portion of the inland region, De Aar, Victoria West and Sutherland has a class 2 rating, together with the areas surrounding Prieska, Griekwastad, Upington and Springbok. The rest of the WMA, particularly north of Brandvlei and Carnarvon and the coastal strip are rated as class 3 and 4. The Sutherland, De Aar, Upington belt has a varying range of potable groundwater from a moderate 50% to approximately 90%. The balance of the WMA, has a predominant potable usage of less than 4 30%, with the occasional improvement to 50% (V3, 2002).

See Figure 26 for average TDS values for the area under investigation as mapped by Simonic (1999). Natural occurring radioactivity is found in some of the groundwater resources associated with geological formations such as Sillimanite s and gneisses. Fortunately, the values are mostly low except at Kotzerus, Kharkams, Bulletrap, Fonteintjie, Kenhardt and Riemvasmaak, which fall into Class 2 according to the potable water classification (Van Dyk, 2003).

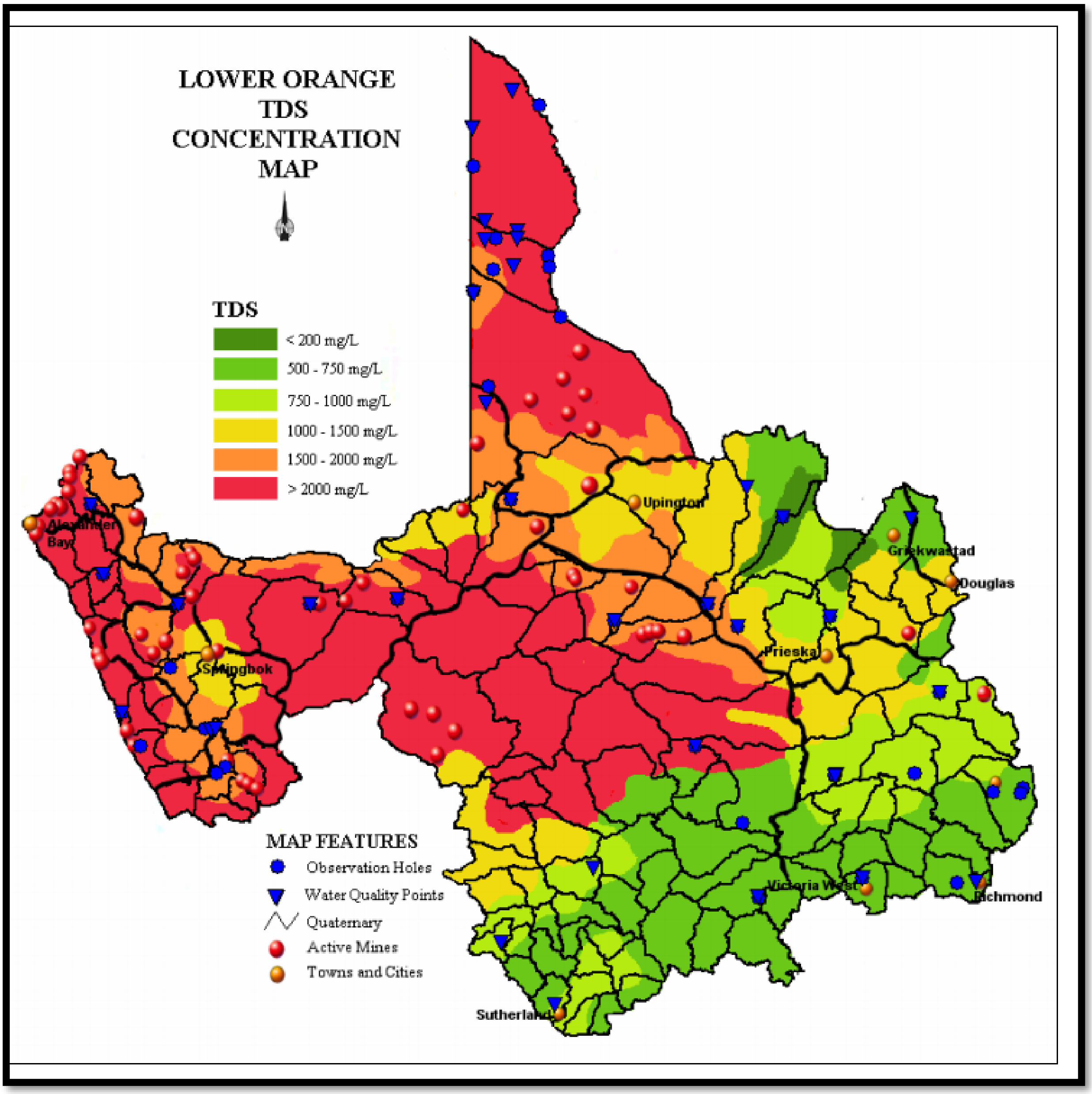

Figure 26: Total dissolved solids for the WMA with main abstraction and water quality monitoring points (DWAF, ISP Lower Orange WMA, 2004).

Agricultural activities are a source of diffuse water contamination. The contribution of each farm on a local scale is often fairly small but the contribution on a catchment scale needs to be included in assessing any pollution situation. Most findings regarding this issue can only be assessed in a generic way due to the lack of data in the WMA. Nitrates are the contaminant of most concern, since they are very soluble and do not bind to soils, nitrates have a high potential to migrate to groundwater. Because they do not evaporate, nitrates/nitrites are likely to remain in water until consumed by plants or other organisms.

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Activities related to urban areas can also result in localized or even diffuse pollution of groundwater. Poor management of sewage treatment works can contribute to the groundwater pollution as can landfill sites, on-site sanitation (especially in informal settlements) and spills resulting from accidents or leaking underground tanks. Uncontrolled dumping and accidents related to the transport industry also contribute to localized pollution in the WMA. Often goods that contain hazardous substances or perishables are confiscated by authorities and these are then dump at illegal sites. A need for incinerators has been identified. Mining activities that impact on the groundwater quality include the Okiep Copper mine and the Black Mountain lead, zinc, copper and silver mine. Mineralisation in the O'okiep area tends to occur in basic rocks intruded in the form of 'steep structures' into granitic terrain of the Namaqualand Metamorphic Complex, and may extend to depths of over 1000 m (www.metorexgroup.com/Ookiep.htm). The major copper minerals are bornite (Cu5 FeS4) with 62% copper, and chalcopyrite (CuFeS2) with 32.5% copper. Open stoping is employed at the mine, together with backfilling at times at O'okiep. Ore is concentrated by flotation and transported to the nearest available smelter. O'okiep smelts its own concentrates. The Black Mountain Mine is situated in the Northern Cape near Aggeneys. The facility produces zinc concentrate together with lead and copper concentrates, from which silver is also recovered.

Development of the nearby Gamsberg zinc deposit, is currently under consideration (http://www.dwaf.gov.za/orange). There are many impacts on the environment dealing with the water quality and waste disposal from copper mining. These adverse water quality impacts are caused primarily by land disposal practices that fail to contain wastes, by run-on and run-off controls that are inadequate to prevent surface water from flowing through impoundments, or by groundwater infiltrating surface impoundments. These open-pit mining methods also can cause disturbances that can lower the water table in an area, causing water shortages, land subsidence, and fracturing.

However due to the low rainfall in area the impacts on the groundwater quality are less than expected and very localized. Acid Mine Drainage, elevated TDS, SO4, and low pH with associated higher trace metal concentrations have been found at tailings dumps. A radioactive waste disposal site for low- and intermediate level waste generated at the Koeberg Nuclear Power Plant, is located north of Springbok on the flat plains of the Bushmanland plateau. Waste is buried in metal drums and solidified in concrete in the trenches. Up to date no significant contamination of the groundwater has occurred (Van Blerk, 2000). Sprinkbok Hard Chrome is an industry located in Springbok, an incident has occurred where Cr+6 was released into the environment but no data is available on the impact the incident had on the groundwater resource. As discussed impacts on groundwater quality from the diamond mining industry in the WMA is negligible.

The Lower Orange WMA, is underlain by very diverse lithologies. Several broad lithostratigraphic units fall within the boundaries. A simplified geological map of the WMA is presented in Figure 14.

From oldest to youngest these units comprise the following (V3, 2002):

- Namaqualand-Natal Basement Complex. Rock of this complex, ranges from homogenous Sillimanite s through to migmatites and gneisses. The area underlain by the Namaqualand-Natal Complex is situated in the vicinity of the Orange River between Upington and Springbok. The area is an assembly of compact sedimentary, extrusive and intrusive rocks.
- Ventersdorp Super group, represented by andesitic lavas and occasional sedimentary rocks related to post extensive erosion, are encountered in very small 2-5 isolated inliers between Prieska and Douglas.
- Dolomitic and related carbonate rocks of the Postmasberg Group, Campbell and Griquatown Sequence, all forming part of the Griqualand West Sequence, occupy the north-eastern lobe of the WMA. Dolomites, limestones and related sedimentary rocks (often iron or manganiferous ore bearing) make up this broad lithostratigraphic unit.
- Abbabis and Kheis Groups are represented by relatively small inliers of diverse sedimentary successions consisting of shales, sandstones, banded iron formations and conglomerates. These rocks are encountered in the vicinity of Upington and are not widespread.
- Damara Sequence encountered in the immediate vicinity of Alexander Bay and Port Nolloth, is represented by the Fish River, Schwarzrand, Kuibis, Malmesbury, Gariep, Swakop, Otavi, Nosib, Rehoboth and Sinclair Groups. Lithologies in these various groups are very diverse, ranging from shales, sandstones, diamictites, banded iron formation through to limestones and calcareous sedimentary formations.
- Karoo Sequence represented by the Ecca Group and Dwyka Formation, and to a lesser extent the Beaufort Group, occupy the southern lobe of the WMA, and comprises thick successions of sedimentary rocks. Sedimentary rocks range from mudrocks through coarser varieties (sandstones, conglomerates) to diamictites and rhythmites (pleistocene deposits). Karoo or Jurassic dolerite is fairly common throughout the sequence and also frequently intrudes older rocks.
- Quaternary and Tertiary dune deposits, consisting of “Kalahari red sands”, occupy the extreme northern part of the WMA bordering on Namibia. These dune deposits are of considerable thickness and comprise fine Aeolian sands with occasional coarser gravel deposits.

The geohydrology is just as complex as the geology in the area but can be simplified to four main aquifers namely the Karoo sediments, the weathered Sillimanite s and gneisses from the Basement complex, dolomites and associated formations and the primary aquifers such as the Kalahari sands and the alluvial deposits along streams and rivers and the coastal plains north of the Buffelsrivier. The first three of these aquifer types are typical dual porosity or secondary aquifers water associated with weathering and fracturing of the matrix. Primary aquifers are found in Kalahari sands and alluvial deposits associated with rivers and coastal plains.

At small scale a number of these aquifers are utilized mostly along dry riverbeds, Buffelsrivier, Saaipoort along Carnarvon leegte, along Gamagara River, Driekop Kanhardt. In the drier west almost all abstractions from boreholes associated with a proximate riverbed. Along the Orange River some abstraction along riverbeds is also taking place (Van Dyk, 2003).

General characteristics of riverbed aquifers can be summarized as:

- Coarse gravels and sands are more typical of alluvial deposits. However, flood plains consist mainly of fine silt. Towards the end of a river's course, the river slows down dumping some of the heavier materials on these flood plains. Boreholes drilled into these types of formations normally have higher yields. It is important to note that borehole design is plays an important role in the yield of boreholes drilled into riverbed aquifers.
- Alluvial deposits grain size varies considerably, fine and coarse materials are intermixed. The hydraulic conductivities vary between 10-3 to 103 m/d and their porosities vary 12 between 25 – 70%. However, flood plain porosities usually range 35 – 50% and the hydraulic conductivities vary between 10-8 – 10-1 m/d.
- In general riverbed aquifers are high recharge areas and often recharge deeper underlying aquifers and are unconfined in nature. The surface-water groundwater interaction is often intermittent (depending on the elevation of the water level, groundwater may recharge the surface water body or the surface water may recharge groundwater). This is normally dependent on the rainfall cycle. Therefore, boreholes drilled into these aquifers are almost always successful.

<u>Groundwater-Surface Water Linkage</u>

Groundwater-surface water interaction has not been studied sufficiently in the Northern Cape due to the limited surface water. According to records documented by Van Tonder and Dennis (2003), under natural conditions there is seldom a connection between surface water and groundwater. However, observed surface water recharge in normally dry riverbeds. Current quality problems experienced in the Vaal and Orange rivers, waterlogging experienced with irrigation along these riverbanks indicate interaction. Therefore, a study is currently motivated by DWAF Geohydrology to investigate Groundwater-surface water interaction in the Vaal and Orange rivers (Van Dyk, 2003).

Groundwater quality varies from good to unacceptable in terms of potable standards. The groundwater quality is one of the main factors affecting the development of available groundwater resources. Although there are numerous problems associated with water quality, some of which are easily corrected, total dissolved solids (TDS), nitrates (NO3 as N) and fluorides (F) represent the majority of serious water quality problems that occur (DWAF, ISP Lower Orange WMA, 2004)

Summarised information on groundwater is given in this section. Groundwater utilisation is of major importance across wide areas in the Lower Orange WMA and often constitutes the only source of water. It is mainly used for rural domestic supplies, stock watering and water supplies to towns off the main stem of the Orange. These resources must be properly managed and developed.

As a result of the low rainfall, recharge of groundwater is limited and only small quantities can be abstracted on a sustainable basis. Artificial recharge of groundwater is practised in some areas where water from small dams is transferred through pipelines into boreholes located in the area of recharge of the main production boreholes. Aquifer characteristics (borehole yields and storage of groundwater) are also typically unfavourable because of the hard geological formation underlying most of the water management area. In the Orange Tributaries sub-area 60% to 70% of the available water is supplied from groundwater sources.

Groundwater also constitutes an important source of water for rural water supplies in the Orange River, although only a small proportion of the total available water. Much of the groundwater abstracted near the river (Orange sub-area), is actually recharged from the river and could also be accounted for as surface water. Groundwater availability in the coastal region is extremely limited as a result of the lack of rainfall. Close to the sea there is a strong risk of seawater intrusion into coastal aquifers.

The interaction between the mining activity and groundwater is managed through the EMPR and the water use licensing process. Some impacts do exist with regard to localized dewatering of aquifers. These impacts are however localized and very little data exist in this regard. The information from the compliance monitoring systems at the mines needs to be integrated into the DWAF monitoring systems and regularly reviewed. Mines utilise the groundwater available but are still largely dependent on surface water, which is in most cases supplied from the Orange River. Boreholes and abstraction from boreholes are seldom managed properly and therefore the failure of boreholes is experienced. Borehole siting needs to be based on proper geo-technical work to limit the drilling of unsuccessful boreholes. As result of this some towns have drilled many boreholes without much success.

From the list of towns and related water resources given it is evident that shortages in the supply from groundwater are experienced at Vanwyksvlei, Strydenburg, Carnarvon and Garies. Proper management and monitoring of groundwater sources by municipalities and other users are of vital importance. There is a need to provide groundwater information and to create an improved understanding of groundwater at a local level.

Municipalities should also investigate groundwater potential outside town boundaries as a possible source. Groundwater monitoring and data on the availability of groundwater in general is insufficient (DWAF, ISP Lower Orange WMA, 2004)

No drainage channels occur within the mining area and there is no dendritic system which could be disturbed. Given the variability of semi-arid rainfall, the calculation of the mean annual runoff (MAR) would be of no use. The MAR is very low given the low rainfall (less than 250 mm/year) occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils. The surface water quality (when available after severe rainstorms) is suitable for animal consumption but not as potable water. No natural wetlands exist in the area.

- The proposed mining area will be further than 100m from any natural water source.
- The proposed activities are not expected to have a negative impact on the ground water of the area.

Less than 20 m³ process water will be used per day. Water will be obtained from a borehole of the landowner. The taking and storing of water is covered by a General Authorisation in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998). According to the authorisation no “groundwater taking zones” are excluded for “small industrial users”. This mining activity classifies as a “small industrial users” as it qualifies as a work creating enterprise that do not use more than 20 cubic metres per day. Mining and quarrying are also a category identified in the Standard Industrial Classification of All Economic Activities (5th edition), published by the Central Statistics Service, 1993, as amended and supplemented as a small industry.

The applicant will however in accordance with the general authorisation adhere to Record-keeping and disclosure of information.

The authorisation states that the water user must ensure the establishment of monitoring programmes to measure the quantity of water taken and/or stored, as follows -

a) the quantity of groundwater or surface water abstracted must be metered or gauged and the total recorded as at the last day of each month,

b) The quantity of water stored must be recorded as at the last day of each month.

(ix) Air quality

The site is situated primarily in a livestock farming area, with no ploughing being undertaken. There are currently no sources of air pollution present on site and the ambient air quality is generally considered as good. It is not anticipated that the proposed mining activated will introduce excessive pollution, in the form of dust to the surrounding area. The main potential sources of air pollution in the area are expected to include dust generated on gravel roads, domestic fuel burning and veld fires. Neighbouring farmstead (in proximity to mining area) are considered sensitive air quality receptors.

Emission into the atmosphere is controlled by the National Management: Air Quality Act, 2004. The proposed activity at the site will however not trigger an application in terms of the Air Quality Act as the emissions to be produced at the mining permit site will only entail dust generation due to the disturbance of soil. Dust will be generated by the movement of earthmoving equipment, the loading of material and transporting of material from site.

The trucks driving on site has to comply with the speed limits. Loads will be flattened to ensure that minimal spillage of the material takes place during transportation. Topsoil stockpiles will be planted with indigenous grass species to ensure that exposed surface areas are minimised, reducing windblown dust from the site. The vegetation will also assist in capturing wind born dust and minimising the spread of dust from the site.

Dust generation on the access and haul roads as well as mechanical excavation can be managed through the implementation of dust suppression measures via water carts and a sprinkler system. The applicant has to conduct formal dust monitoring on site to provide management with an effective management tool for mitigating the impact of the mining permit activity on the surrounding environment with regard to dust pollution.

(x) Noise

There are currently no sources of noise pollution present on site and the ambient noise levels are within the project area are anticipated to be representative of rural farming district. The only noise sensitive/sites are the interspaced farmhouses and associated structure where they are situated in proximity to proposed mining area.

Due to the nature of the proposed activity, noise will be generated as a result of mechanical excavation. The nuisance value of noise generated by heavy earthmoving equipment for residence in the near vicinity is deemed to be of low – medium significance, as the mine is expected to be operational only during daylight hours, and when necessary during the night. All mining permit vehicles will also be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No. 93 of 1996).
Noise levels will be compared against those described in Table 14.

Table 15: Typical rating levels for ambient noise in districts (extracted from the sans cop 10103:2003

Type of District	Equivalent Continuous Rating Level, LReq.T For Noise					
	Outdoors			Indoors, with Open Windows		
	Daynight	Day time 06:00 to 22:00	Night time 22:00 to 06:00	Daynight	Day time 06:00 to 22:00	Night time 22:00 to 06:00
Residential Districts/ Rural Districts	45	45	35	35	35	25
Industrial districts	70	70	60	60	60	50

(xi) Archaeological and cultural interest

Cultural resources are all nonphysical and physical man made occurrences, as well as natural occurrence associated with human activity. These include site, structures and artefact of importance, either individually or in groups. In history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included.

During the field investigation, various cemeteries have been observed in the small settlements around the proposed mining area. No cemeteries or graves are located in proximity to the mining area. A specialist study has been commissioned to identify and manage any archaeological or cultural sites if found or identified.

The larger geographical area (Bushmanland) in which the current study area is located is marked by a low-density background scatter of lithics (Beaumont *et al*. 1995). In the Aggeneys area, however, this scatter tends to be quite ephemeral (e.g., Halkett 2010; Morris 2011a, 2011b, 2013; Orton 2015, 2016; Webley & Halkett 2012, Van der Walt & Orton 2019). Field assessments closer to the current area of investigation yielded no sites of significance (e.g., Rossouw 2013 & Orton 2015) and the cultural heritage of the study area interpreted within this context.

Areas around dump 1 -3 have been impacted on by existing mining, dating to 1961 and the dumping of topsoil, clearing and levelling characterise these areas. All of these activities would have impacted on surface indicators of heritage resources if these ever existed in the areas of dump 1 -3. In terms of the prospecting boreholes that would result in a very small impact where borehole one, two and four is sited in Greenfields areas the remaining two boreholes (three & five) are in locations disturbed from a heritage perspective by previous mining activities. The proposed prospecting boreholes are all located on steep slopes of the mountains and ridges in the area of mica-sillimanite schists which do not seem to have been conducive to the formation of rock shelters and no rock art or archaeological sites of significance were recorded in the study areas.
The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Human impact (apart from the existing mining and dumps) is limited to isolated farming infrastructure like farm fences, wind pumps and tracks.
The cultural landscape (mining and farming activities) is generally modern without significant cultural landscape elements of concern and impacts are deemed to be of low significance. The impact of the proposed project on heritage resources is considered to be low, and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented and based on approval from SAHRA

- Implementation of a chance finds procedure as outlined below.

Chance Find Procedure

The possibility of the occurrence of subsurface finds or previously unknown sites cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place for the project. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

4. If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
5. It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
6. The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Reasoned Opinion

The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits associated with the project also outweigh the possible impacts of the development on heritage resource if the correct mitigation measures (i.e. chance find procedure) are included in the EMPr.

Potential risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. Thee possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earthworks. These risks can be mitigated to an acceptable level with the implementation of a chance find procedure as outlined above.

(xii) Visual exposure

The mining area was identified to constitute the lowest possible visual impact on the surrounding environment. Please note that mining permit will be done, so the sites of interest will be small and will be viewable from different areas.

(xiii) Regional socio economic structure

The Khâi-Ma Municipality has been classified as a Category B municipality, and was proclaimed as a local municipality with a council combined with a ward participatory system. The Khâi-Ma Municipality is deemed to be a low capacity municipality, and shares executive and legislative authority with the Namakwa District Municipality. The municipal area is demarcated into four wards (Khai-Ma, 2017).

The situational analysis and statistics presented in this chapter indicate the developmental challenges facing Khâi-Ma Municipality, such as poverty, unemployment, and service delivery backlogs. The programmes and projects in this IDP are informed by this scenario (Khai-Ma, 2017).

Khâi-Ma Local Municipality falls within the Namakwa District of the Northern Cape Province. The Northern Cape is spatially the largest province in the country, but also has the lowest population and some of the least developed areas in terms of its economic and social development.
Khâi-Ma lies in the central north region of the Namakwa District, which is the furthest north in terms of the provincial boundaries. Khai-Ma Local Municipality is part of Namakwa District Municipality. Up to 45 workers will be employed at the site. The workers will be sourced from the local community as far as practicable and depending on skill and expertise. Workers will daily be transported to the site. The establishment of the mining area on the farm will also assist the property owner in the diversification of his income. The material to be sourced from the mining area can be used for the upgrading of the road infrastructure in the vicinity of the site, and can therefore contribute to infrastructure development and indirectly to the economy of the area.

(a) Demographic Profile

The population for Khâi-Ma is estimated at 11 340 people (2001). The municipality is sparsely populated (+/- 1 person/km2); most people are settled in its five (5) towns. The municipality is characterized by vast tracts of land, pristine natural environment, unique mountains and its limited cell phone reception, which can be regarded as a unique attraction by some urban dwellers who wish to escape the rush of the cities. This inherent potential for eco-tourism needs to be exploited and managed in a sustainable manner in order to retain this unique setting.

(b) Population Distribution

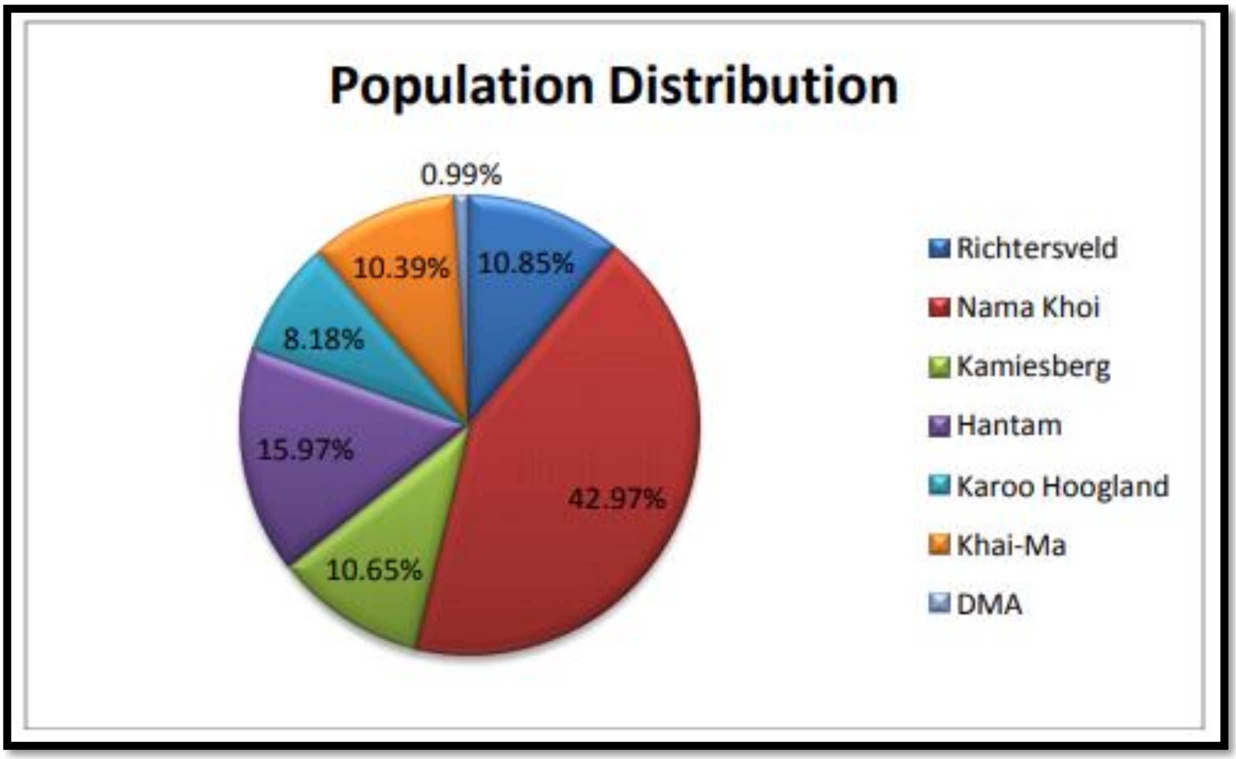

Figure 27: Population Distribution

(c) Households per town

Table 16: Household figures

Household figures per urban area.		
Towns	Population	Current households
Aggeneys	2053	666
Khâi-Ma rural	4035	1404
Onseepkans	912	204
Pella	1425	355
Pofadder	2919	733
TOTALS	**11344**	**3362**

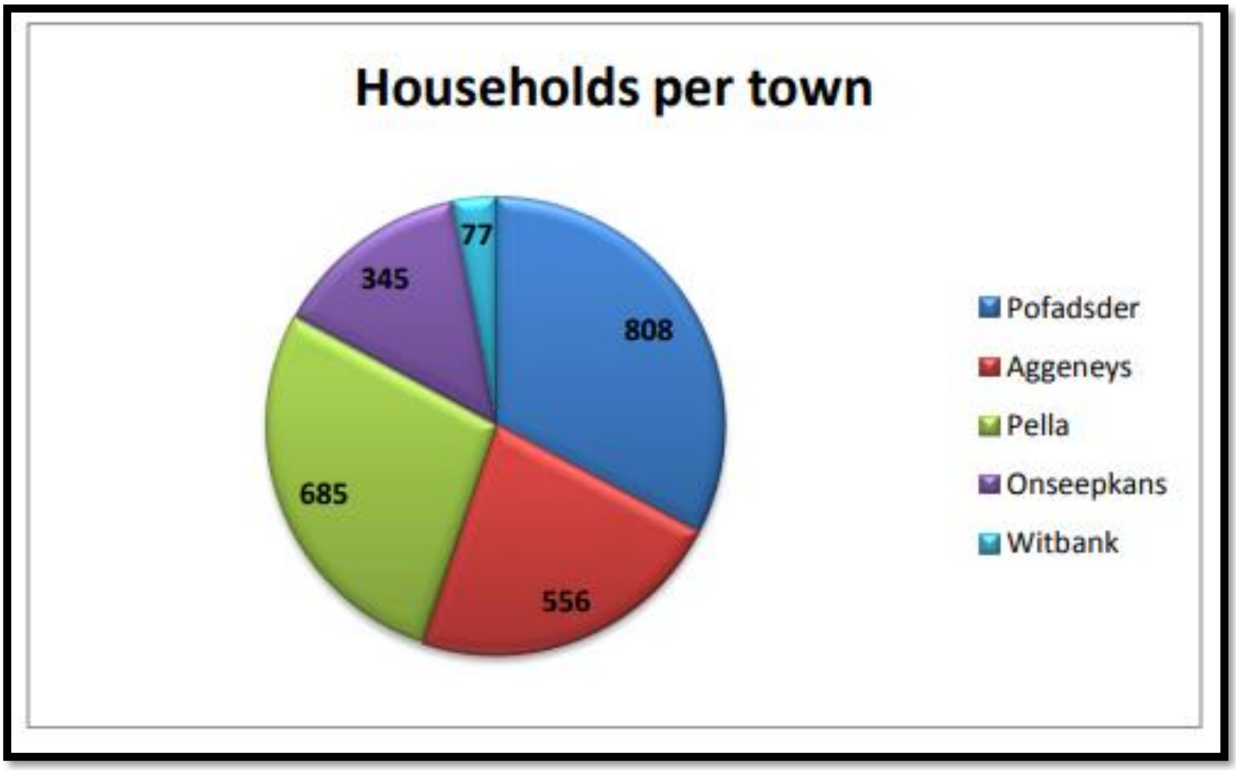

Figure 28: Households per town

Table 17: Population and Household trends.

Population and Household trends						
Khâi-Ma	Population			Households		
	1996	2001	2007	1996	2001	2007
	Statistics SA	Statistics SA	Community Survey	Statistics SA	Statistics SA	Community Survey
	9355	11344	12571	2223	3362	3787
% Increase/Decrease	n/a	21.26%	10.82%	n/a	51.24%	12.64%

CURRENT REALITY: BASIC FACTS & FIGURES

The Municipal Area is divided into 4 wards	
Ward 1	Onseepkans and it includes: Vrugbaar, Raap & Skraap, Pella Brak and Rooiklippe.
Ward 2	Blyvooruitsig and Pofadder.
Ward 3	Pella and it includes: Witbank, Klein Pella.
Ward 4	Aggeneys includes Pofadder town area and Dwaggasoutpan.

The Municipal Council of Khâi-Ma consists of 7 members. 4 represents wards and three (3) are proportional representatives of political parties. The ruling party in all the wards is the ANC.

(d) Age and Gender

Table 18: Age

Age	Male	Female
0 to 4	567	493
5 to 14	1157	1083
15 to 34	2208	1844
35 to 64	1652	1646
Over 65	254	333
Total	5838	5399

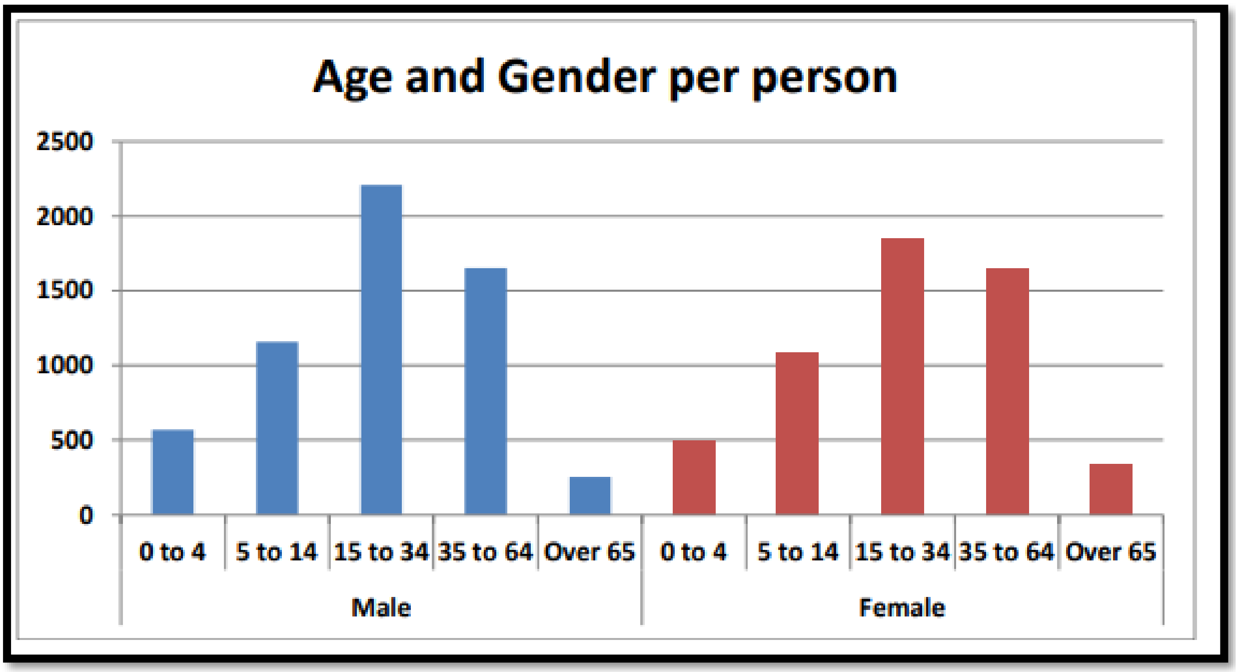

Figure 29: Age and Gender per person

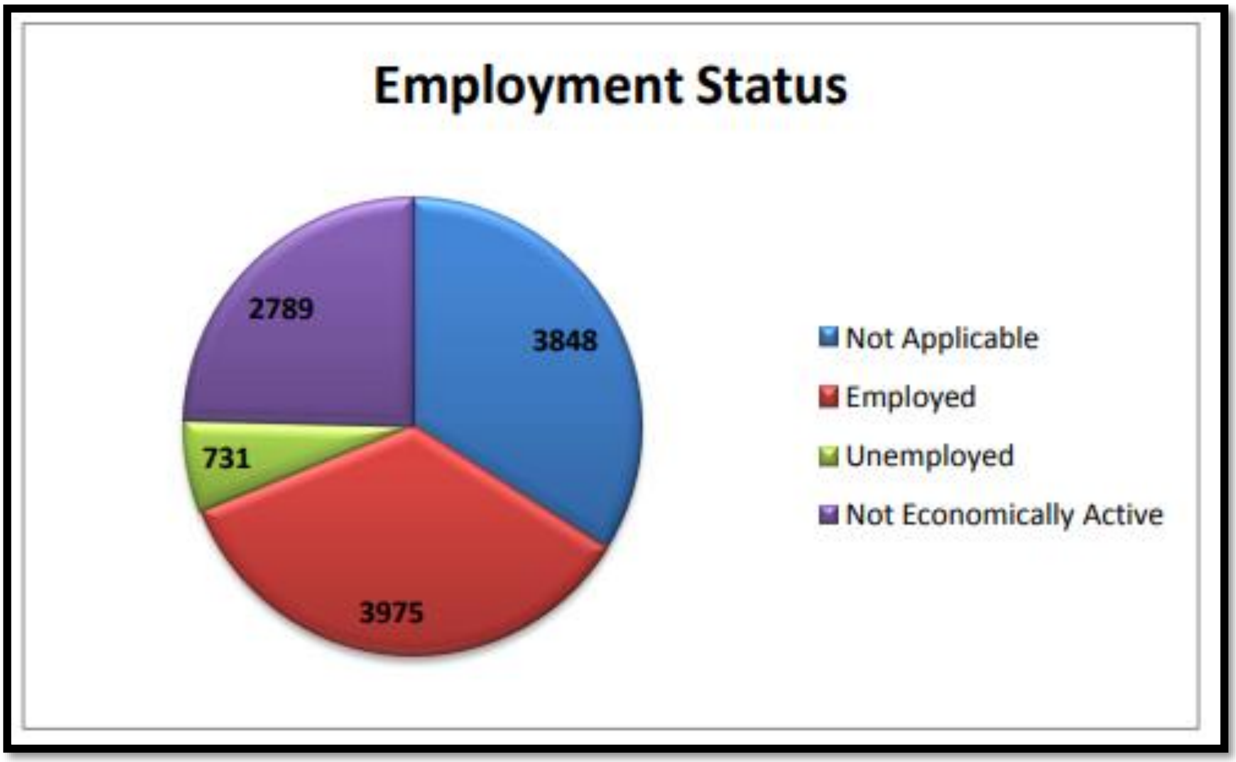

Figure 30: Employment status

(e) Employment status

Table 19: Labour force

Status	Male	Female
Employed	2589	1386
Unemployed	331	400
Not Economically Active	960	1829
Total Labour Force	3880	6315

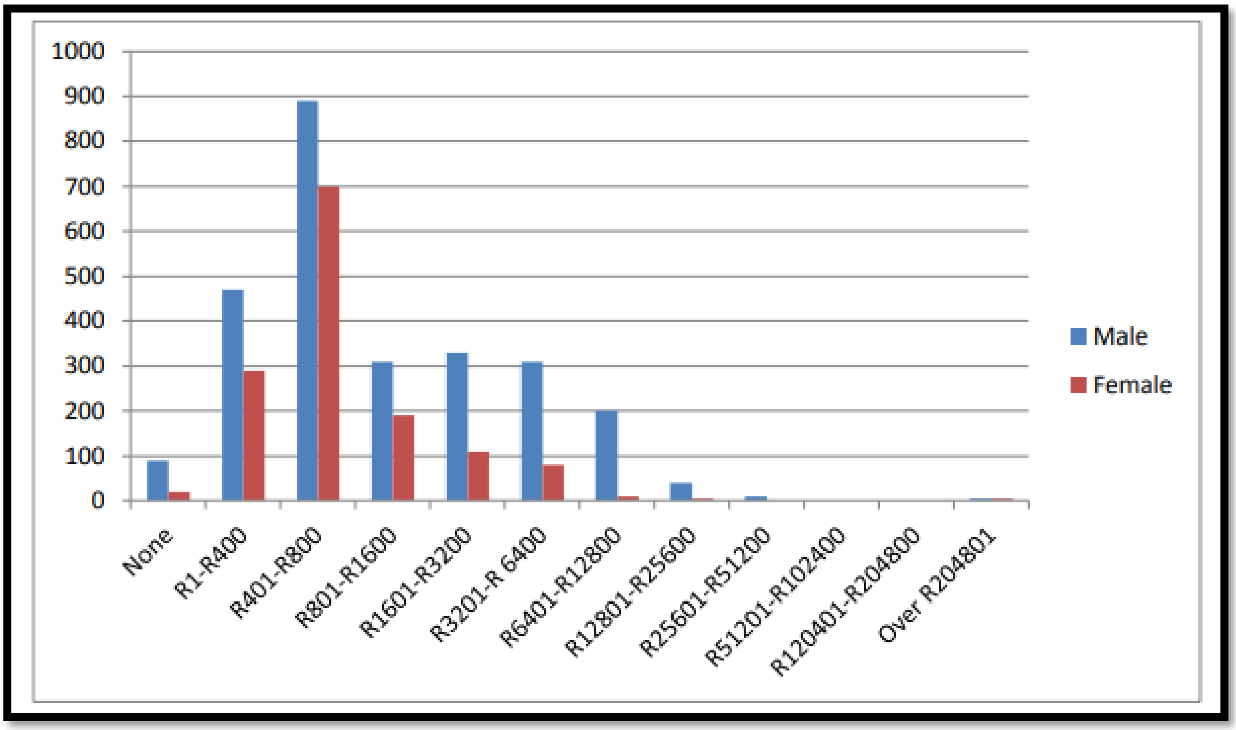

Figure 31: Salary per income.

(f) Education

Table 20: Industry monthly income

Income	Male	Female
None	76	23
R1 – 400	462	285
R401 – 800	882	688
R801 – 1600	301	179
R1601 – 3200	324	116
R3201 – 6400	313	80
R6401 – 12800	188	13
R12801 – 25600	40	3
R25601 – 51200	12	0
R51201 – 102400	0	0
R102401 – 204800	0	0
Over R204801	6	3

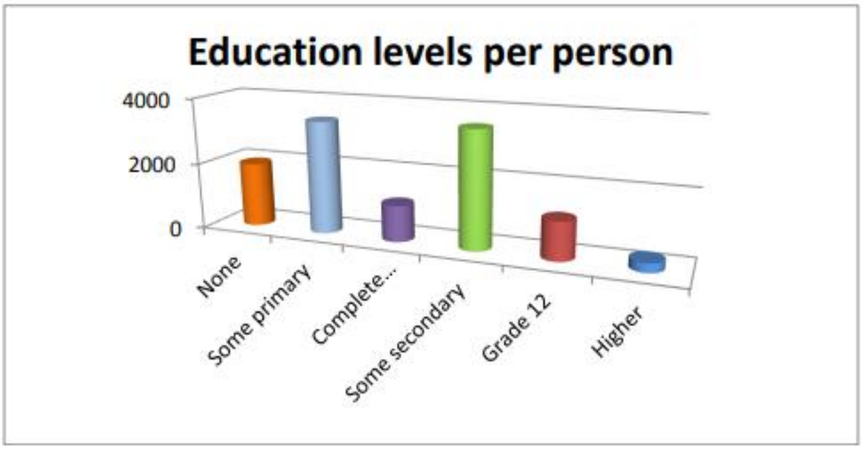

Figure 32: Education levels for person

Table 21: Education

Education Level	Persons
None	1942
Some primary	3399
Complete primary	1091
Some secondary	3497
Grade 12	1141
Higher	274

(g) Employment per industry

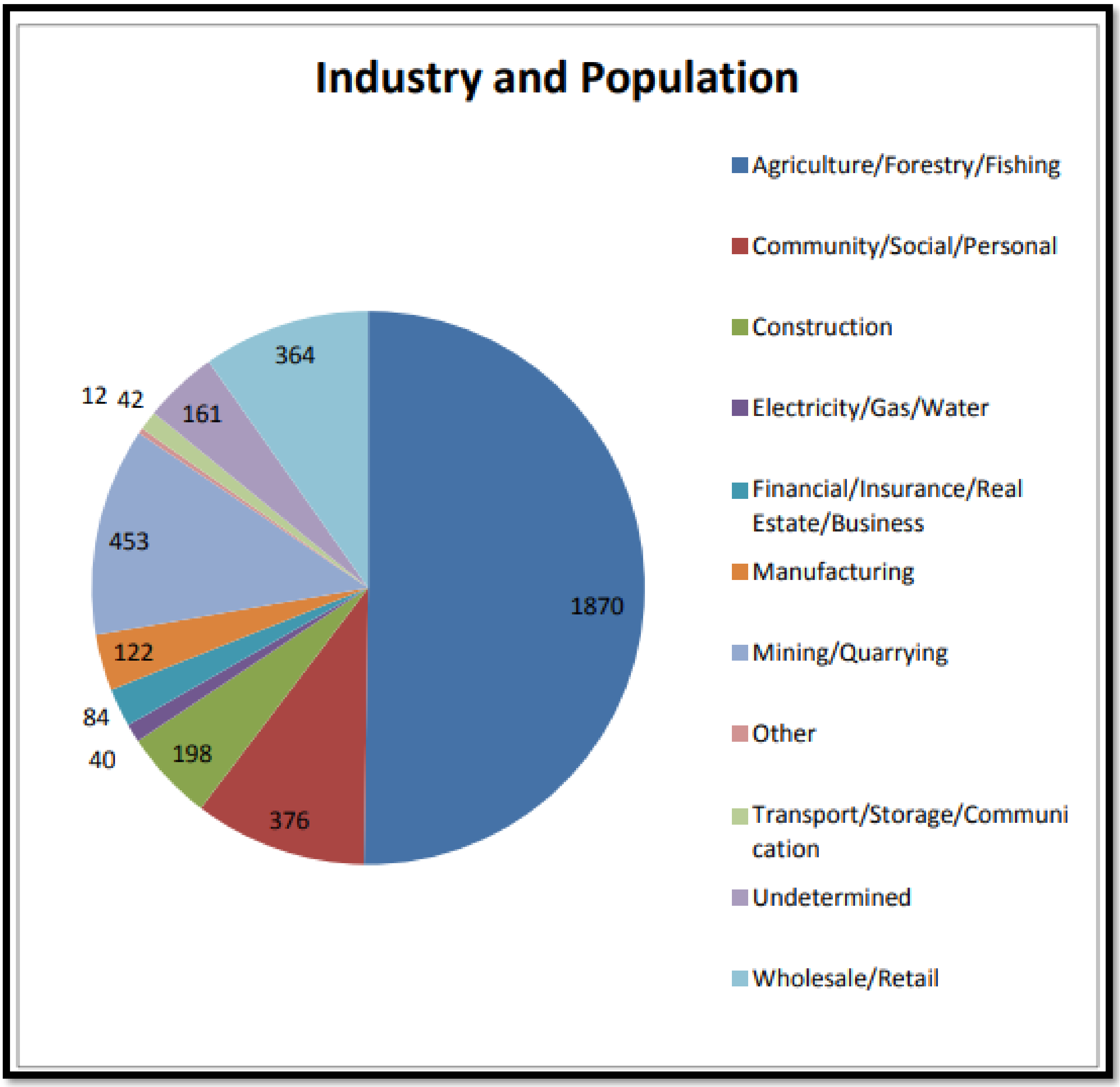

Figure 33: Industry and Population

Table 22: Employment distribution per person

Industry	Population
Agriculture/Forestry/Fishing	1870
Community/Social/Personal	376
Construction	198
Electricity/Gas/Water	40
Financial/Insurance/Real Estate/Business	84
Manufacturing	122
Mining/Quarrying	453
Other	12
Transport/Storage/Communication	42
Undetermined	161
Wholesale/Retail	364

(b) Description of the current land uses.

The farm Wortel 42 is situated in an agricultural setting, intersected by road, rail, telephone lines and electrical infrastructure. Historically the property was used for agriculture (grazing) and mining.

There are no tourism destinations in the immediate vicinity of the farm.

Van Zyl Sillimanite intends to apply for a mining permit on Portion 1 of farm the farm Wortel 42 (±11 379.8685 (Ha)), which falls in the Khai-Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province

Mining at the quarry will only be temporary where after land use will revert to grazing.

The land use of the property comprises of the following:

- Agriculture – Grazing
- Mining – Historically mined.

The land use of the surrounding properties comprises of the following:

- Agriculture – Grazing, and Date Farming
- Mining - Black mountain, Gamsberg

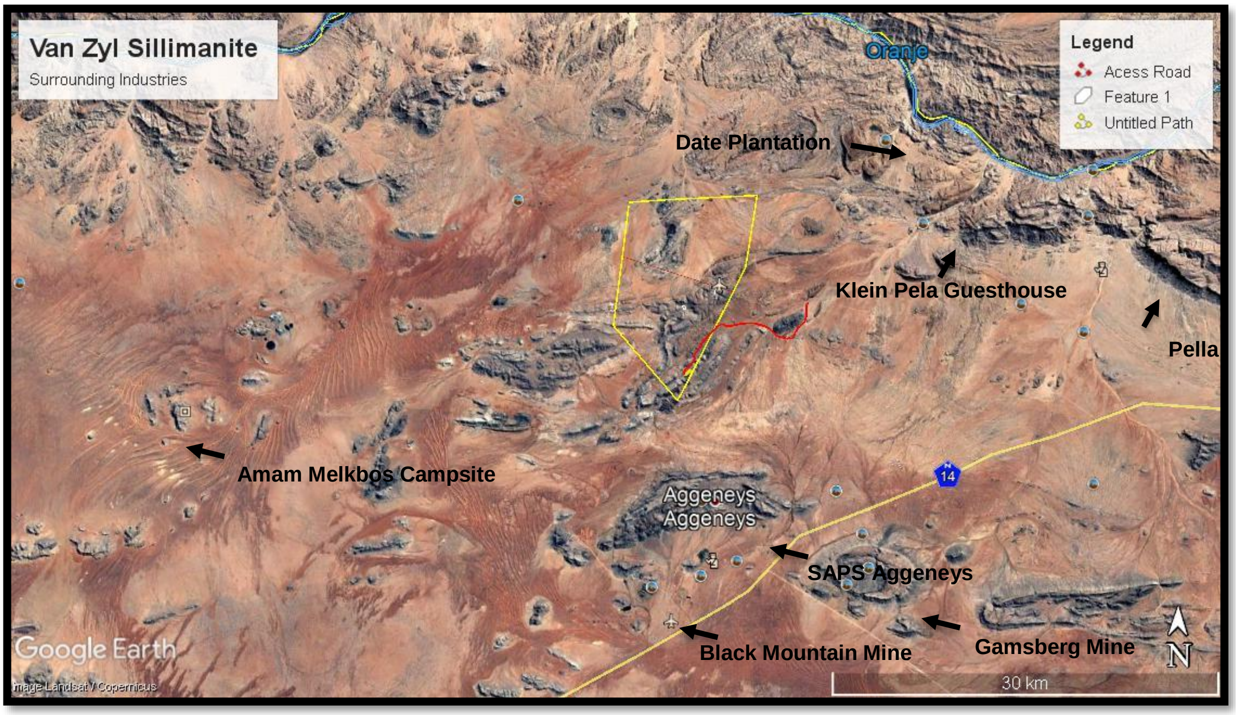

Figure 34: Industries in close proximity to Wortel Quarry

The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the site:

Table 23: Land uses and/or prominent features that occur within 500 m radius of the site.

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	-	NO	
Low density residential	-	NO	
Medium density residential	-	NO	
High density residential	-	NO	
Informal residential	-	NO	
Retail commercial & warehousing	-	NO	
Light industrial	-	NO	
Medium industrial	-	NO	
Heavy industrial	-	NO	
Power station	-	NO	
Telecoms Tower	-	NO	
High voltage power line	-	NO	
Office/consulting room	-	NO	
Military or police base / station / compound	-	NO	
Spoil heap or slimes dam	YES	-	Old mines dumps are evident in the area by previous prospectors.
Quarry, sand or borrow pit	-	NO	
Dam or reservoir	-	NO	
Hospital/medical centre	-	NO	
School/ crèche	-	NO	
Tertiary education facility	-	NO	

LAND USE CHARACTER	YES	NO	DESCRIPTION
Church	-	NO	
Old age home	-	NO	
Sewage treatment plant	-	NO	
Train station or shunting yard	-	NO	
Railway line	-	NO	
Major road (4 lanes or more)	-	NO	
Airport	-	NO	
Harbour	-	NO	
Sport facilities	-	NO	
Golf course	-	NO	
Polo fields	-	NO	
Filling station	-	NO	
Landfill or waste treatment site	-	NO	
Plantation	YES	-	A date plantation is located approximately 22.98km north from the mining area.
Agriculture	YES	-	As mentioned earlier the proposed mining area is situated within an area used for grazing purposes.
River, stream or wetland	-	NO	
Nature conservation area	-	NO	
Mountain, hill or ridge	YES		The proposed mining area is situated in undulating ridges
Museum	-	NO	
Historical building	-	NO	
Protected Area	YES		The Gamsberg Nature Reserve was proclaimed a Protected area, in accordance with the Protected Areas Act, GN 80 of 2019 on the 5th of August 2019 as a Protected nature reserve.
Graveyard	-	NO	
Archaeological site	-	NO	
Other land uses (describe)	-	NO	

(c) Description of specific environmental features and infrastructure on the site.

Van Zyl Farms intends to apply for a prospecting right on the Remaining Extent and Portion 1 of farm The farms Wortel 42 (±11 379.8685 (Ha)), which falls in the Khai-Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province

(xiv) Topography

Mountainous and adulating landscape situated within the Witberg mountains. The only environmental feature that may proof significant is a relative major non-perennial stream. The topography of portion 1 and portion 0 are quite different from one another. On portion 0 (RE), the northern portion their topography can be described as plains, or rolling plains (irregular plains) with open high hills or ridges and level plains with some relief. There is there is also high open hills or ridges in the north.

The topography of portion 1 is described as high hills or ridges with rolling or irregular plains and low hills or ridges to the west or the property and plains with open low hills or ridges towards the south of the property. The slope of the area varies from lower than 2% to higher than 20% steep gradients.

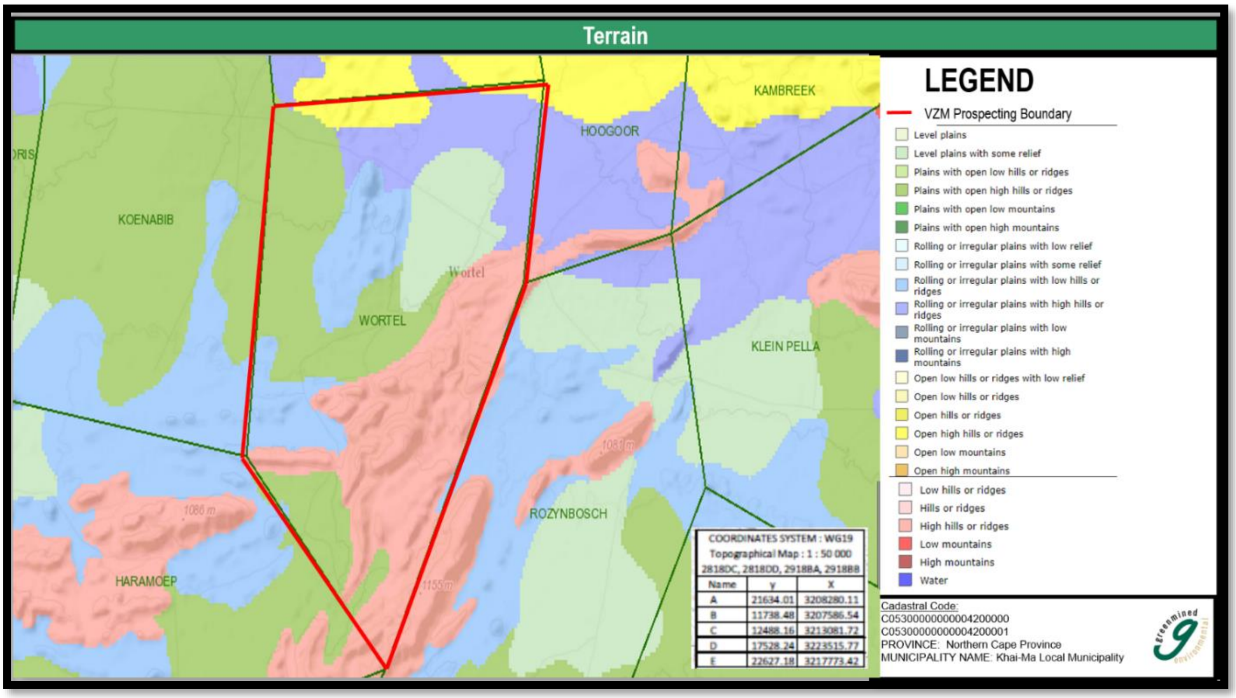

Figure 35: Topography of the prospecting area.

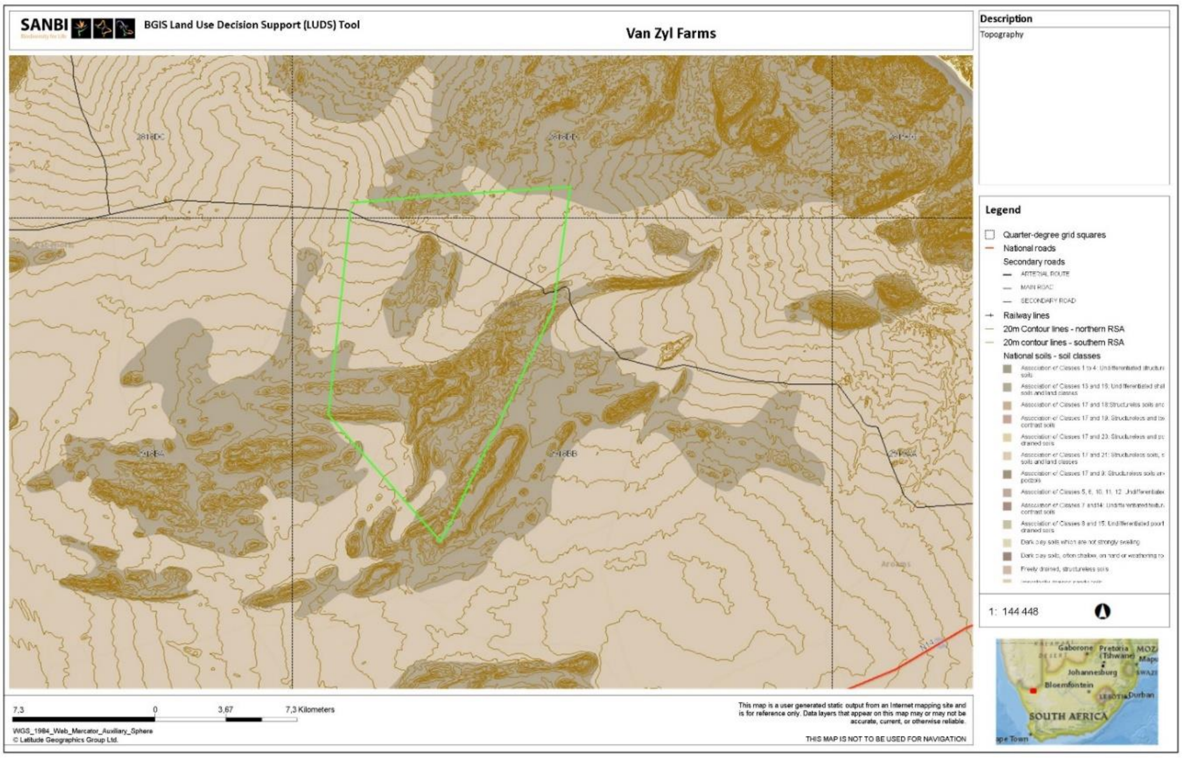

Figure 36: Topography of the prospecting area.

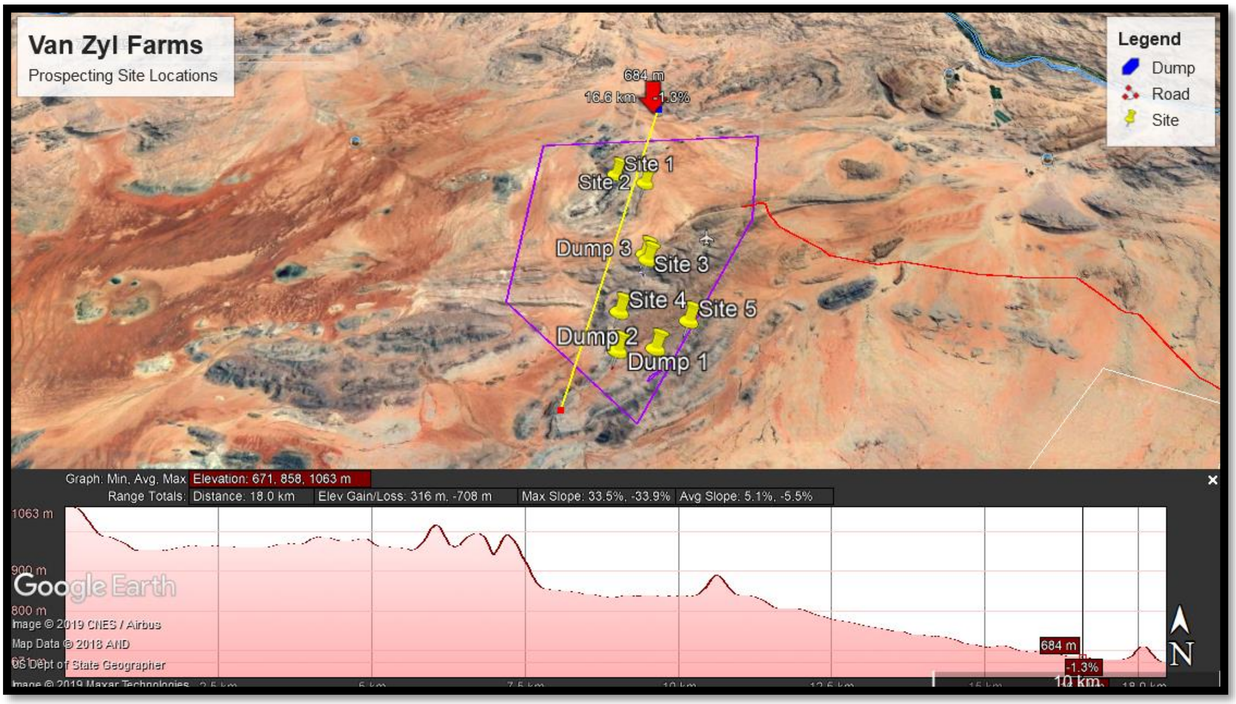

Figure 37: North-South Elevation Profile of the prospecting area.

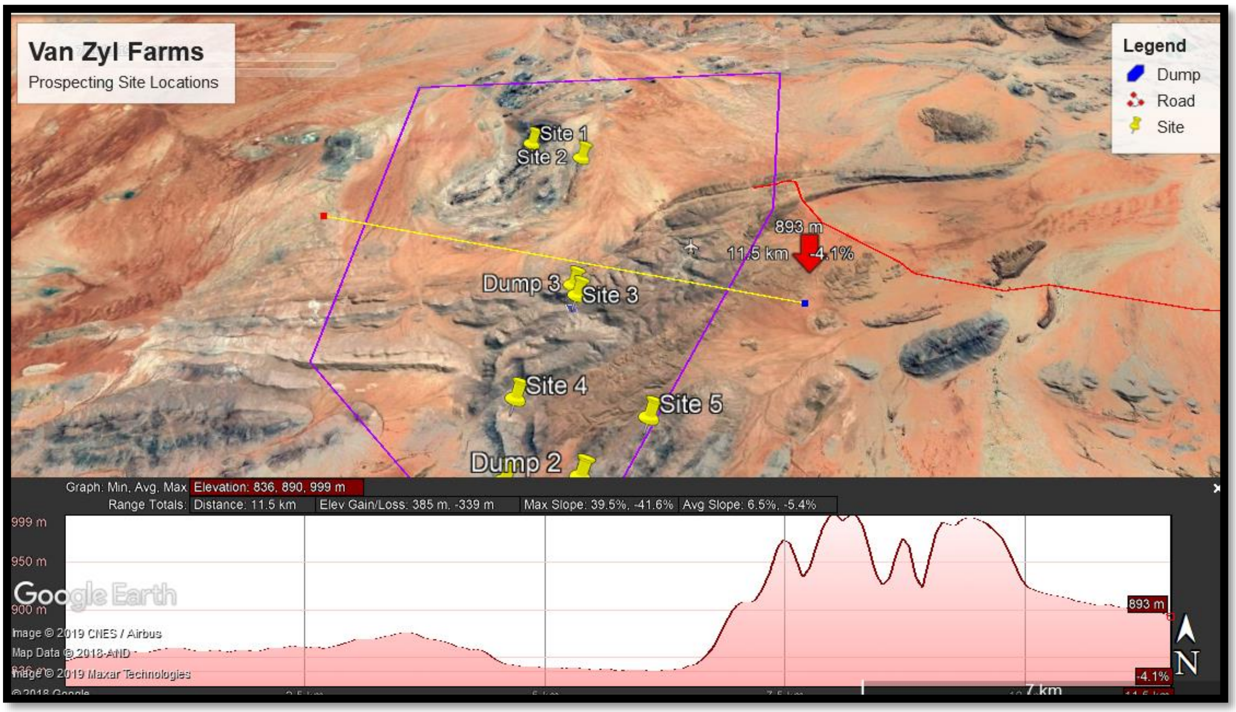

Figure 38: East-West Elevation Profile of the prospecting area.

The elevation of the Van Zyl Farms mining operations ranges between 838m and 1076m above sea level.

(xv) Soil, land use and land capability

The soils of most of the area are red-yellow apendal soils, with a high base status and <300mm deep, typical of Ag and Ae land types. 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 storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8 – 10 Ha/SSU.

Land Use

Current land use conditions are those of farming with small livestock e.g. sheep and goats. More than 50% of the area is use mainly as agriculture and Hunting. The grazing capacity of the area can be classified as 81-11ha/LSU. In the north eastern corner of the farm Wortel, the grazing capacity is classified as 41-80% ha/LSU.

Current activities on the surround farms include livestock grazing at low densities, with sheep, goats and some cattle currently present to some of the surrounding farms. Surrounding farms are also used for the ranching of small stock, mostly sheep, goats, and some cattle. The land is arid and primarily used for grazing. Surrounding farms are either privately owned or owned by the municipality and used for communal purposes.

The land cover for the area is classified as shrub land and low fynbos.

Soil

Soils can be identified to belong to the R and LP2 groups. Soils in the low plains consist out of soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. The landscape areas in the hills are ridges are rock with limited soils. The land type of this area is described as Ic, Ib, Ae and Ag. The soil in this area has a natural organic carbon content of less than 0.5mm. Soils has a pH of 7.5-8.4 towards the south-west, and towards the north-east, soil has a pH of more the 8.4. The leaching status of these soils is described as non-calcareous and eutrophic soils. These soils have 0.6-10.0 cobalt, 0.6-3.0 copper, low iodine, high in phosphorus, low in selenium, and 0.6 to 6.1 zinc contained within them.

Sands in this area has special management requirements. These requirements include the following:

- Shifting sands are strongly dominant and present in the area.
- Alkaline Saline Sodic soils.

Soils in this area is highly susceptible to erosion caused by rainfall, even though the soil in the area is minimal, due to the rocky outcrops the soil loss in this area will be minimal. Sands in this area is susceptible to wind erosion.

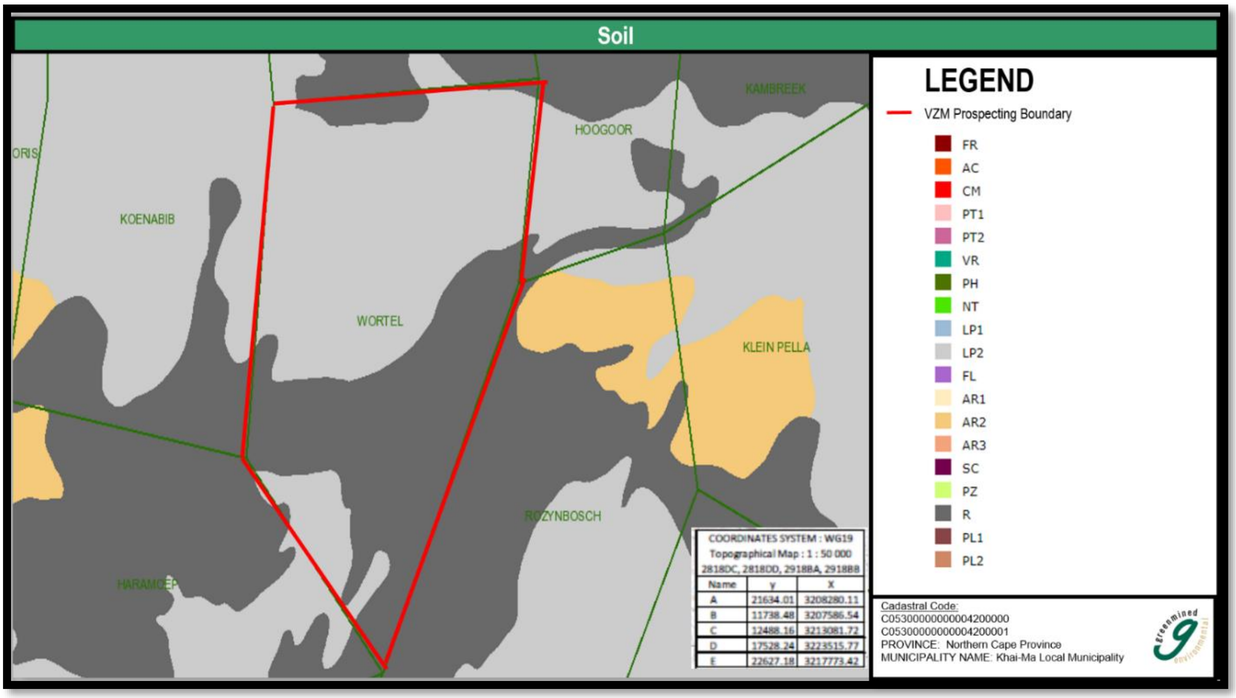

Figure 39: Soil of the proposed prospecting area.

(xvi) Flora

The mining area is situated within the Desert Biome. The vegetation consists of Eastern Gariep Plains Dessert and Eastern Gariep Rocky vegetation types (Dg 9 and Dg10 according to Mucina and Rutherford, 2006). The area is not conserved in statutory conservation areas. Few intact examples of this vegetation still exist. The target conservation of this area is at 34%.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant dwarf shrubs. No protected plant species could be identified at the time of the site inspection.

The Eastern Gariep Plains Desert consist out of often sloping plains, sharply contrasting with the surrounding rocky hills and mountains. Typical wash vegetation n in the breaks between the mountains to the Orange River Grassland dominated by “white grasses”, some spinescent (*Stipagrostis* species), on most of the flats with additional shrubs and herbs in the drainage lines or on gravellier or loamy soil next to the mountains.

The Eastern Gariep Rocky Desert consist out of hills and mountains with mostly bare outcrops and covered with very sparse shrubby vegetation in crevices. Separated by broad sheet-wash plains (Dg 9). Habitats are mainly controlled by the topography, aspect, local climate and lithology. On the groot Pellaberg for example there is a sparse shrub land on the southern foothills (*Alon dichotoma, Rhigozum trichtomum and Petalidium setosum*) and a higher cover of plants in the southern ravines and rocky drainage lines. (*Abutilon pycnodon, Asparagus suaveoles, Ficus cordata, Rhus populifolio and R. viminalis*). On the higher southern slopes *Justicia orchioides* is often very dominant, with localised grassland directly between steep cliffs (*Enneapogon scaber, Troroa [his ramosissima and Danthoniopis ramosa*). The south facing quartzite cliffs and steep slopes support chasmophytes (cremnophytes) such as *Ficus ilicina, Aloe dabenorisana and Bowiea gariepensis*. On the summits and higher northern slopes there is a much higher preponderance of succulent plant inlcudeing *Euphorbia avasmontana, Aloe dictoma, A. microstigma subsp microstigma, Pelargonium aridium and Kleinia longiflora*. Succulent plant is also important on the northern foothills and also include *Aloe dichotoma, Euphorbia avasmontana, Sarcostemma viminale* and the diminutive *Lapidaria margarethae*.

No feedback has been received from the Department of Environment. Since no comments was received from Department of Environment the impact assessment rating will not be changed. Indigenous vegetation does occur within the proposed footprint area. As mentioned in the Flora description above, if any red data plants area observed on site, a botanist will be consulted for the inspection of these plants and plant removal permit will be obtained from Department of Environment. As mentioned previously a site walkthrough will be conducted before site clearance. Bush clearance will be conducted together with the Botanist and that the necessary permits will be obtained before any protected plants (if present) will be removed/disturbed.

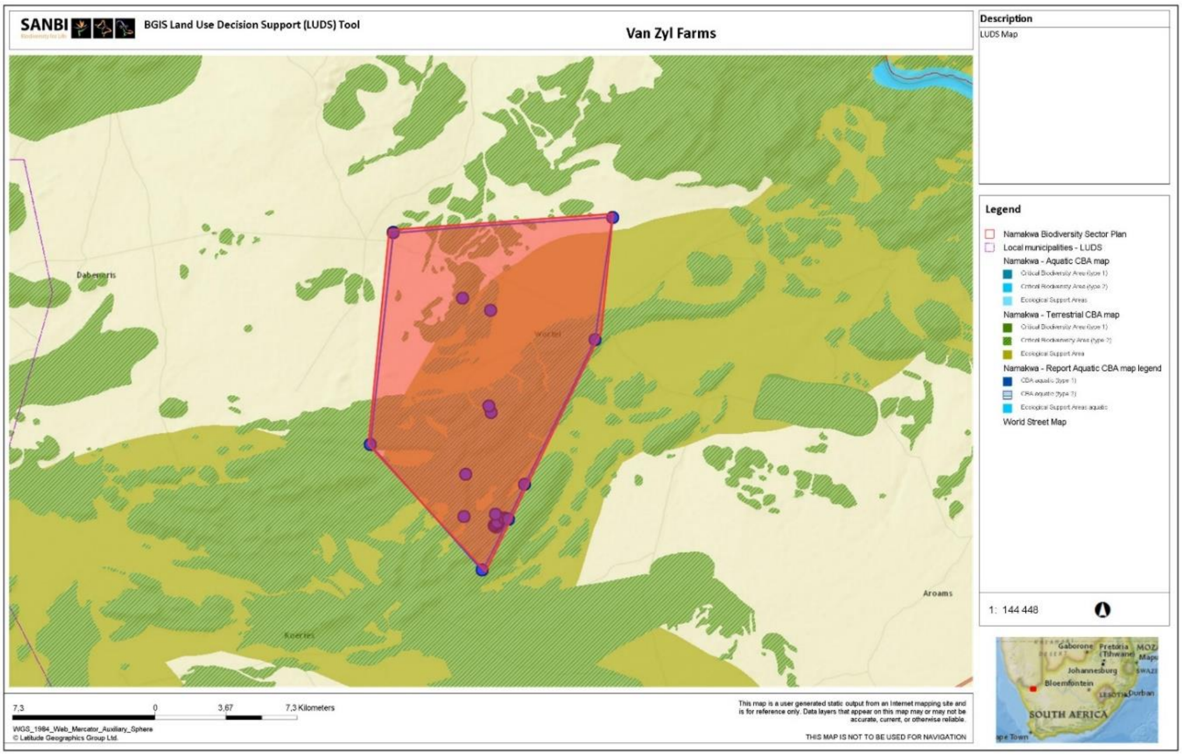

Figure 40: LUDS (Land Use Development Screening tool) (SANBI, 2019).

From the LUDS map above, it is indicated that the prospecting area falls within Namakwa Terrestrial CBA's 1 and 2 and Ecological Support areas. However, as mentioned earlier, the DENC has been contacted in this regard and no comments has been received. A botanical walk through will be conducted before prospecting is to commence to indicate the presence of any species of concern. The necessary plant permits will be obtained from DENC for the removal or disturbance of any red data plants.

(a) Mining and biodiversity guidelines

According to the Mining and Biodiversity guidelines (as presented in Figure 20) the mining area does fall within the Mining and Biodiversity area. Areas that are highlighted in brow falls within the High biodiversity importance area which have a high risk for mining (DEA, 2013). Although the site is situated within an area characterized by areas classified as of moderate to highest biodiversity importance, the nature and scale of the proposed mining permit activities is such that it cannot be considered as a threat to biodiversity. Proper planning and the implementation of management measures, though the implementation of this EMP will prevent and alleviate potential impacts on biodiversity. However, buffer areas around drainage areas must be observed. No mining permit may occur within 30 m from identified drainage lines.

Table 24: All categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining

Category	Biodiversity property areas	Risk for mining	Implications for mining
Highest Biodiversity Importance	• Critical endangered and endangered ecosystems • CBA form provincial and spatial biodiversity plans • River and wetlands FEPAs and a 1km buffer around these FEPA's • Ramsar sites	Highest risk for mining	• Environmental screening, EIAs and their associated specialist studies should focus on confirmed the, and to provide site specific basis on which to apply the mitigation hierarchy to inform regulatory decision making for mining, WULA's, and EA's. • If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significant of the biodiversity features in these areas and the associated ecosystems services. These areas are viewed as necessary to ensure protection of biodiversity, environment, sustainability and human wellbeing. • An EIA should include the strategic assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. This assessment should take fully into account the environmental sensitivity if the area, the overall environmental and socio-economic cost and benefits of mining, as well as the potential strategic importance of the minerals to the country. • Authorisations may well not be granted. If granted, the authorisation may set limits on the allowed activities, impacts, and may specify biodiversity offset that would be written into licence agreements and/or authorisations.
High Biodiversity Importance	• Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves) • Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas) • Other identified priorities from provincial spatial biodiversity plans • High water yield areas are possible. • Coastal Protection Zone • Estuarine functional zone • *Note that the status of buffer areas of World Heritage Sites is subject to a current intra-governmental process.	High risk for mining	• High risk for These areas are important for conserving biodiversity, for supporting or buffering other biodiversity mining biodiversity priority areas, and for maintaining important ecosystem services for particular importance communities or the country as a whole. • An EIA should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. • Mining options may be limited in these areas, and limitations for mining projects are possible. • Authorizations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorizations.
Moderate Biodiversity Importance.	• Ecological support areas • Vulnerable ecosystems • Focus areas for protected area expansion (land based and offshore protection)	Moderate risk for Mining	• These areas are of moderate biodiversity value. • EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. • Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorizations.

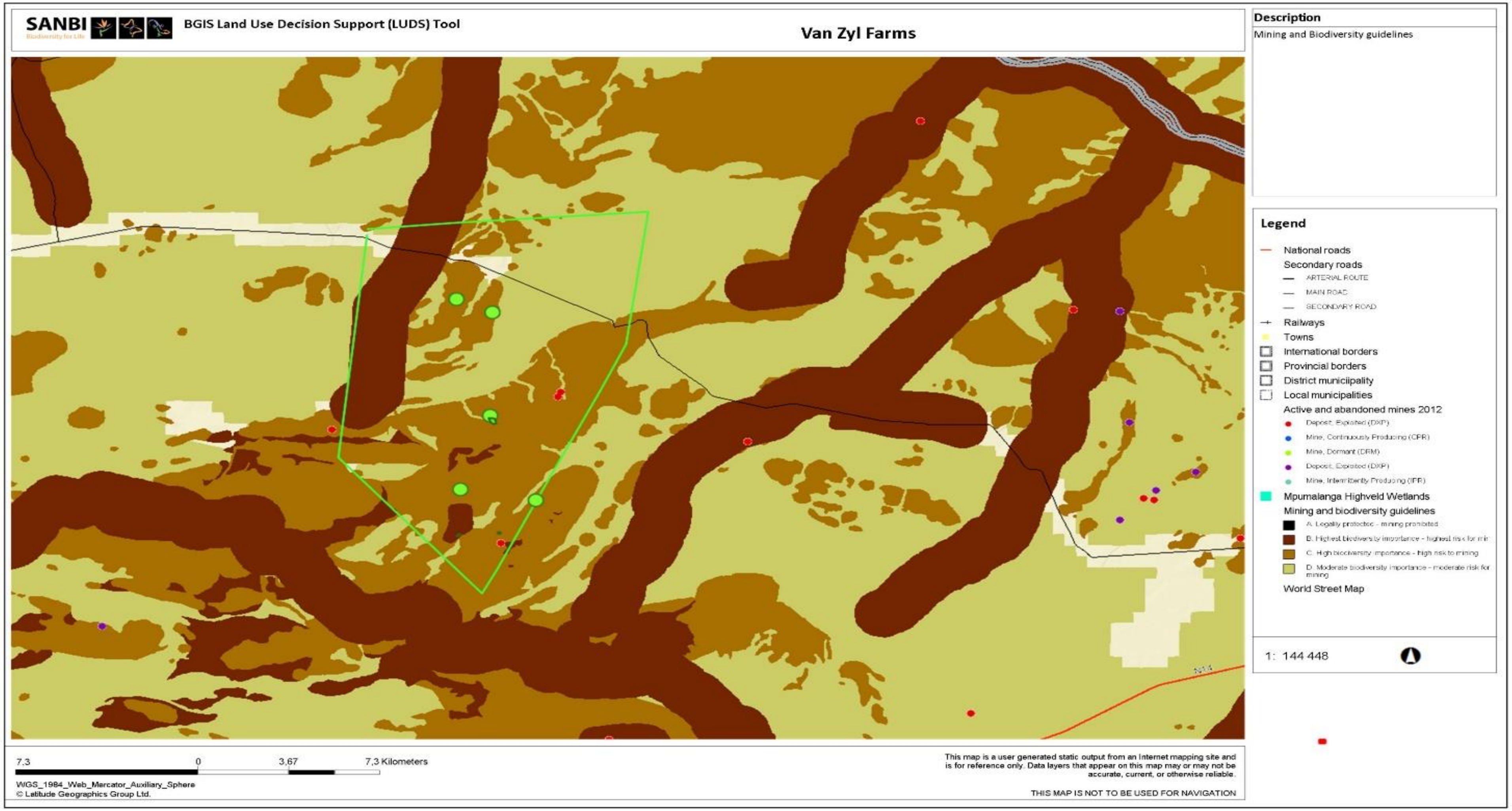

Figure 41: Mining and Biodiversity Guidelines Map (SANBI) (DEA, 2013).

Table 25: Biodiversity Priority Areas

Biodiversity priority areas	Description	Information sources
Critically endangered and Endangered ecosystems listed as threatened ecosystems in terms of the Biodiversity Act	Threatened ecosystems listed in terms of the Biodiversity Act47 have protection under law and particular activities within these areas require authorisation in terms of the EIA regulations 46**,** of NEMA. Further loss and degradation of natural habitat in critically endangered and endangered ecosystems will be available avoided. **Critically endangered** ecosystems (CR) are ecosystem types that have very little of their original extent left in natural or near- natural condition. National biodiversity targets for these habitat types cannot be met, and further loss would hence be unacceptable. **Endangered ecosystems** (EN) are ecosystems that are close to becoming critically endangered. Any further loss of natural habitat or deterioration of condition in CR or EN ecosystem types should be avoided, and the remaining healthy examples should be the focus of conservation action. Critically endangered and Endangered ecosystem types are Included in Listing Notice 3 of NEMA (GN No. R546 of 2010). Threatened terrestrial ecosystems were listed in terms of the Biodiversity Act in December 2011. Over time, marine, estuarine, river and wetland types will also be listed in terms of the Biodiversity Act.	**Data**: Terrestrial CR and EN ecosystems are currently viewable on http://bgis.sanbi.org River, wetland and marine CR and EN ecosystems should be as part of the National Biodiversity Assessment (NBA) 2011 and are viewable on http://bgis.sanbi.org **Associated legislation**: Section 52 of the Biodiversity Act, 2004 (No. 10 of 2004)
Critical Biodiversity Areas (CBAs), or areas of similar value such as irreplaceable and highly significant areas from provincial spatial biodiversity plans	- CBAs are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Some provinces use different terms for areas equivalent to CBAs, such as 'irreplaceable areas' or 'highly significant areas'. - CBAs are terrestrial (land) and aquatic (water) features (e.g. vlei, rivers and estuaries) in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning in the long term (which is particularly important in the face of climate change). The desired management objective for CBAs is for them to remain in a natural or near- natural ecological condition, i.e. to prevent further loss or degradation of natural habitat in areas these areas. Therefore, CBAs are biodiversity priority that must be afforded special attention in assessing and evaluating impacts of prospecting or mining. - Although CBAs have been identified at a very fine spatial scale in some provinces (Gauteng, Western Cape, Kwa Zulu Natal), in other areas they have been identified more at a broader scale (Eastern Cape, Northwest, Limpopo and the Namakwa district of the Northern Cape). All CBAs require field verification, but this is particularly the case for broad scale CBAs where it is only in the intact areas of the CBA that mining should be prohibited. Over time, CBAs will be identified in the Free State, and remaining areas of the Northern Cape, and may be identified at a finer scale in additional provinces. Marine ecosystem priority areas are under development, Ezemvelo KZN Wildlife has identified Critical Biodiversity Areas in the seascape for the inshore and offshore area adjacent to KZN's coastline.	**Data**: Most provinces have developed or are in the process of developing provincial spatial biodiversity plans that provide maps of CBAs. CBA maps for the Western Cape, Northwest, Eastern Cape, Northern Cape, and Namakwa District in Northern Cape (2009), are available on http://bgis.sanbi.org for download. CBA maps for Gauteng are available from GDARD on request; and for KZN is available from EKZN Wildlife on request. Some metropolitan municipalities have developed CBA maps (Nelson Mandela Bay and City of Cape Town) or are in the process of developing them (City of Johannesburg, City of Tshwane, Ekurhuleni and eThekwini. **Associated legislation**: These gain legal recognition when they are published in bioregional plans (in terms of the Biodiversity Act), or are taken up into municipal Spatial Development Frameworks (Section 26(e) Municipal Systems Act (No.32 of 2000)), and Environmental Management Frameworks (EMF; in terms of Sections 24(5) and 44 NEMA and EMF regulations (R547 of 2010).

River and wetland Freshwater Ecosystem Priority Areas (FEPAs), and 1km buffer of river and wetland FEPAs	- FEPAs are rivers and wetlands required to meet biodiversity targets or freshwater ecosystems. River FEPAs are an essential part of a sustainable water resource strategy. Buffers of healthy natural vegetation should be maintained around river and wetland FEPAs to maintain a good ecological condition to manage and conserve freshwater ecosystems, and to protect water resources for human use. - FEPAs are not formally protected in terms of law but are areas that are considered to be strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources, and should be maintained in good ecological condition. - Because of the importance of these freshwater ecosystems to lives and livelihoods, and the likelihood that their ecological condition would deteriorate if mining activities took place in or close to them (i.e. within a 1km buffer of river and wetland FEPAS), it is recommended that mining should be avoided in these areas.	**Data**: Atlas of Freshwater Ecosystem Priority Areas for South Africa (Nel et al 2011); available on http://bgis.sanbi.org **Associated legislation**: Not currently protected by law.
Ramsar sites	- Ramsar sites are internationally recognised by the Convention on Wetlands of International Importance (or Ramsar Convention). - Ramsar sites have global significance. -	**Data**: DEA: Enterprise Geospatial Information Management **Associated legislation**: Although many Ramsar sites fall inside protected areas, Some Ramsar sites do not currently have any legal status in terms of South African legislation.
Protected area buffers49 (including buffers around National World Heritage Sites, and Nature	10km wide buffers around National Parks and World Heritage Sites (or alternatively specifically defined buffers approved by the Minister according to DEA's buffer zone policy for National Parks or gazetted under the. Parks, World Convention Act) and 5km buffers around other protected areas, Heritage excluding Gauteng where there are no buffers around protected areas. In these areas environmental impact assessments should be required for a range of activities that impact on biodiversity value, sense of place, visual sensitivity of the natural landscape and cultural value of Nature Reserves.	**Data**: Protected areas and buffers layer available on SANBI B-GIS **Associated legislation**: Buffer areas defined in Listing Notice 3 of the NEMA EIA Regulations (GN No. R546 of 2010), as relevant to sections 24(2), 24(5), 24D and 44 of NEMA (No. 107 of 1998); World Heritage Convention Act (No. 49 of 1999).
Trans frontier Conservation Areas (those parts of the area that	Portions of the country have been identified as Transfrontier Conservation Areas.	**Data**: DEA: Enterprise Geospatial Information Management **Associated legislation**: No current legal status. Portions of TFCAs proclaimed as Protected Areas have legal status under the Protected Areas Act.

Other identified priorities from provincial spatial biodiversity plans	Although priorities have been identified at a very fine spatial scale in some provinces (Gauteng, Western Cape, Kwa Zulu Natal), in other provinces they have been identified at a broader scale (such as Eastern Cape, Northwest, and Limpopo). These plans sometimes identify broader areas of biodiversity importance, even though these areas may have a relatively low level of irreplaceability (i.e. there are reasonably high levels of choice in terms of where targets are met for ecosystems, species and ecological processes). Alternatively, the conservation plans may have identified a second tier of CBAs (CBA2). In both cases (i.e. broader and generally lower irreplaceability priority areas or second tier CBA s) these areas have been included as "Other identified priorities from provincial spatial biodiversity plans".	**Data**: Western Cape, Northwest, Eastern Cape, Northern Cape, and Namakwa District in Northern Cape (2009), available on http://bgis.sanbi.org for download. Gauteng, available from GDARD on request; KZN available from EKZN Wildlife on request. Some metropolitan municipalities have developed CBA maps (Nelson Mandela Bay and City of Cape Town) or are developing them (City of Johannesburg, City of Tshwane, Ekurhuleni and eThekwini). **Associated legislation**: These areas gain legal status when published in a bioregional plan (in terms of the Biodiversity Act), or taken up into municipal Spatial Development Frameworks (Section 26(e) Municipal Systems Act (No. 32 of 2000)), and Environmental Management Frameworks (EMF; in terms of Sections 24(5) and 44 NEMA and EMF regulations (R547 of 2010)).
High water yield areas	High water yield areas generally occur in mountain catchment areas, and are the "water factories" of the related primary Catchment, generating a large proportion of the water for human and ecological use. Maintaining these areas in a healthy state Plays a vital role in water provision, supporting growth and development needs that are often far away. Mining in these areas has the potential to significantly impact on national freshwater resources, and therefore potential impacts need to be carefully assessed to ensure that the project is in fact In the national interest. High water yield areas were identified by the NFEPA project.	**Data**: Atlas of Freshwater Atlas of Freshwater Ecosystem Priority Areas for South Africa (Nel et al 2011); available on http://bgis.sanbi.org **Associated legislation**: Not currently protected by law.
Coastal Protection Zone	The Coastal Protection Zone, as defined by the Integrated Coastal Management Act (No. 24 of 2008), includes but is not limited to areas within 1000m landwards of the high-water mark in rural areas and 100m of the coast in urban areas. Coastal habitats (e.g. dunes) often extend well beyond this distance. The Integrated Coastal Management Act makes provision for the formal delineation of the coastal protection zone. In the absence of a delineated coastal protection zone the 1km and 100m distances apply as a default.	**Data**: Available at http://bgis.sanbi.org **Associated legislation**: Integrated Coastal Management Act (No. 24 of 2008)

Estuarine functional zones	The estuarine functional zone means the area in and around an estuary which includes the open water area, estuarine habitat (e.g. mudflats) and the surrounding floodplain area (the default definition is the area between the 5 m above mean sea level). Estuarine functional zones are critical for the ecological functioning of estuaries, and for the continued provision of the many ecosystem services linked to estuaries, such as nursery areas for fish, recreation and leisure, channelling of nutrients and freshwater to the marine and coastal environment, and absorbing pollution and other impacts from settlements. They have high biodiversity and social value that underpins important economic activities. Their ecological integrity, biodiversity and functioning needs to be retained, and therefore must be accorded special attention in assessing and evaluating impacts of prospecting or mining.	**Data**: National Coverage (2010) (Driver et al. 2012) available on http://bgis.sanbi.org **Associated legislation**: Not currently protected by law.
Ecological support areas	These are areas identified in spatial biodiversity plans areas that play an important role in supporting the ecological functioning of Critical Biodiversity Areas or protected areas and/or in delivering ecosystem services. The management objective for these areas is to keep them in a functional state.	**Data**: Western Cape, Northwest, Eastern Cape, Northern Cape, and Namakwa District in Northern Cape (2009), are available on http://bgis.sanbi.org for download Gauteng, available from GDARD on request; KZN available from EKZN Wildlife on request
Vulnerable ecosystems	Threatened ecosystems are identified in the NBA and may be listed in terms of the Biodiversity Act55. Vulnerable ecosystem types have experienced significant loss of natural area but are not yet critically endangered or endangered. In areas where biodiversity planning has occurred, the best areas to meet targets for vulnerable ecosystem types are generally included in CBAs. However, where this planning has not yet occurred (e.g. Free State, and part of the Northern Cape), remaining intact areas of vulnerable habitat types should be avoided where possible.	**Data**: Terrestrial vulnerable ecosystems are currently viewable on http://bgis.sanbi.org Marine vulnerable ecosystems are available as part of the NBA 2011 and will also be viewable on http://bgis.sanbi.org **Associated legislation**: Section 52 of the Biodiversity Act, 2004 (No. 10 of 2004)

Focus areas for land-based protected area expansion and focus areas for offshore protection	Focus areas for land-based protected area expansion are large relatively intact (in terms of natural vegetation cover) and unfragmented areas of high biodiversity importance, suitable for the creation or expansion of large protected areas, were identified by the Offshore Marine identified in the National Protected Area Expansion Strategy 2008. They were identified through a systematic biodiversity planning process, taking into account the need to represent both terrestrial and freshwater Biodiversity in the protected area network as well as to contribute to climate change resilience. They represent the best remaining large areas of natural habitat that still have low levels of fragmentation and form a key part of our ecological infrastructure network. Focus areas for offshore protection were identified through a systematic biodiversity planning process to direct MPA expansion and other types of spatial management to ensure sustainable resource use and a representative protected area network. They identify spatial priorities for representing offshore biodiversity, protecting sensitive ecosystems, contributing to fisheries sustainability and reducing by-catch. These areas will be refined in the future.	**Data**: Focus areas for land-based protected area expansion available at http://bgis.sanbi.org. Focus areas for offshore protection Protected Area project (OMPA; Sink et al. 2011). Contact SANBI Marine Programme for more information. **Associated legislation**: These areas support further implementation of the Protected Areas Act and the Marine Living Resources Act (No. 18 of 1998)

(xvii) Fauna

Most of the natural wild fauna within these areas are nocturnal; they include the silver back jackal, bat ear fox, cape hare and several other rodent species. No animals where spotted during the site inspection. The fauna at the site will not be impacted by the proposed mining activity as they will be able to move away through the site, without being harmed. Workers must be educated and managed to ensure that no fauna at the site is harmed.

(xviii) Surface water

The proposed site falls within the Lower Orange Water Management Area (WMA), specifically in the Orange Sub Water Management Area (Boegoeberg Sub Catchment), in the D82A quaternary catchment area.

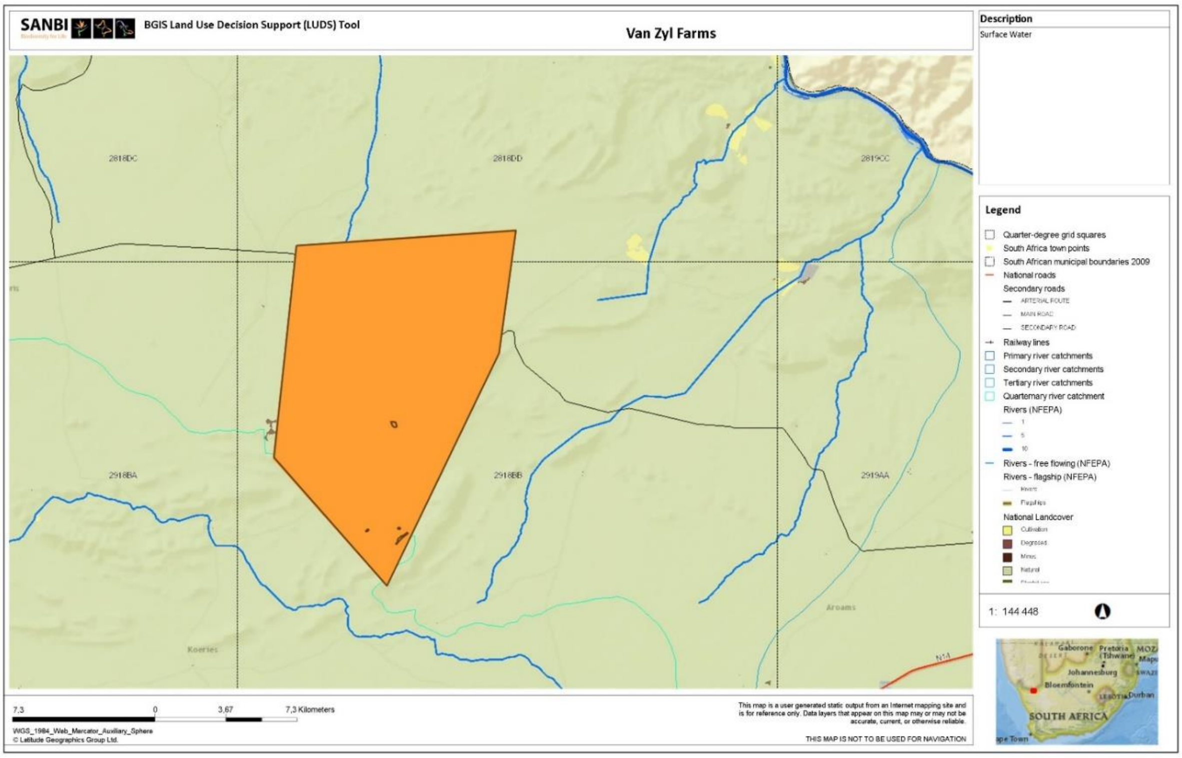

Figure 42: Map indicating the surface water features of the area.

The environmental impact assessment will identify water resources within the proposed footprint area, and prescribe no-go buffer areas to be managed throughout the invasive phase of the proposed mining permit activity. There is no significant river that runs through the farm with the exception of dry drainage channels that flow during rainy periods.

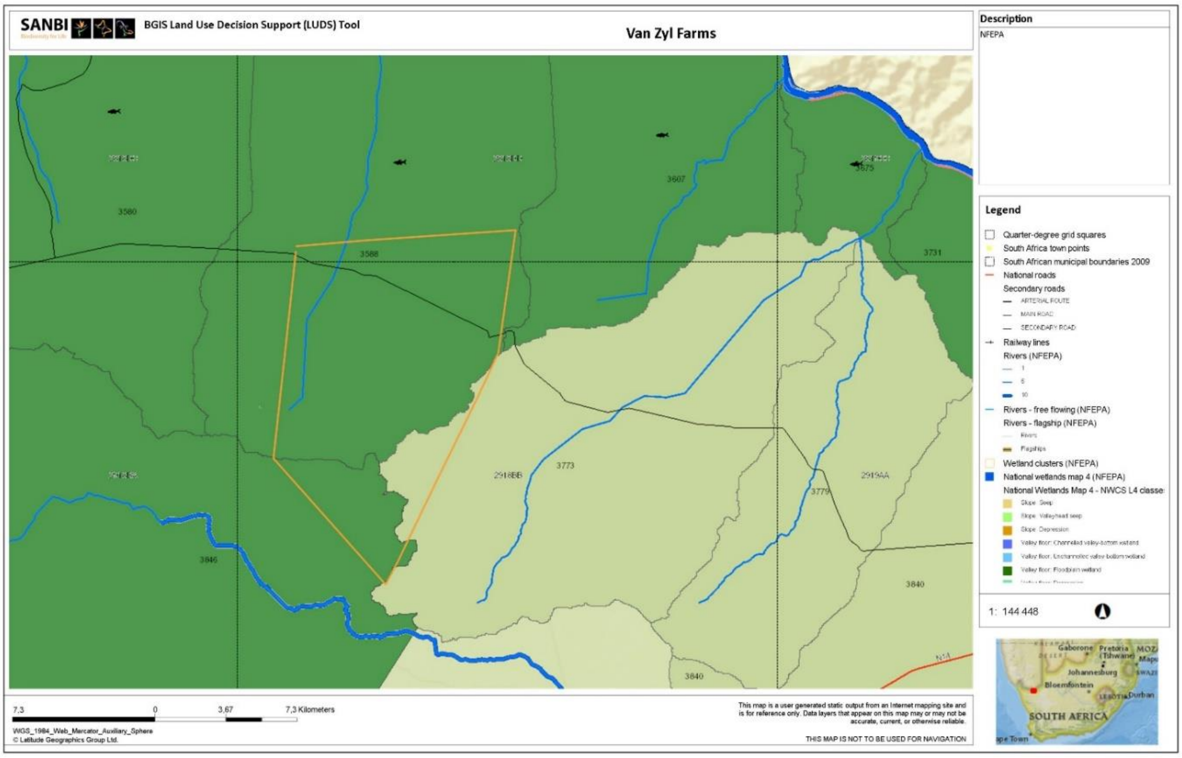

Figure 43: NFEPA status

(xix) Ground water

Water in the area is a scarce commodity. A detailed groundwater study was not compiled for the mining permit, however numerous windmills in the area where observed indicating the theirs is groundwater available in the area that is being utilised by the farmers in the area.

(xx) Air quality

There are 2 farmhouses located within the Wortel 42 Farm, within the prospecting area. The closest prospecting site to the farm house on the southern portion is located approximately 3.38km west of prospecting Site 3 and Dump 3. The closest prospecting site to the farm house on the northern portion is located approximately 2.26km south east of prospecting Site 2 and Dump 3, and approximately 3.92km south of prospecting Site 3 and Dump 3. As mentioned earlier the prevalent wind direction of the study area is southern direction.

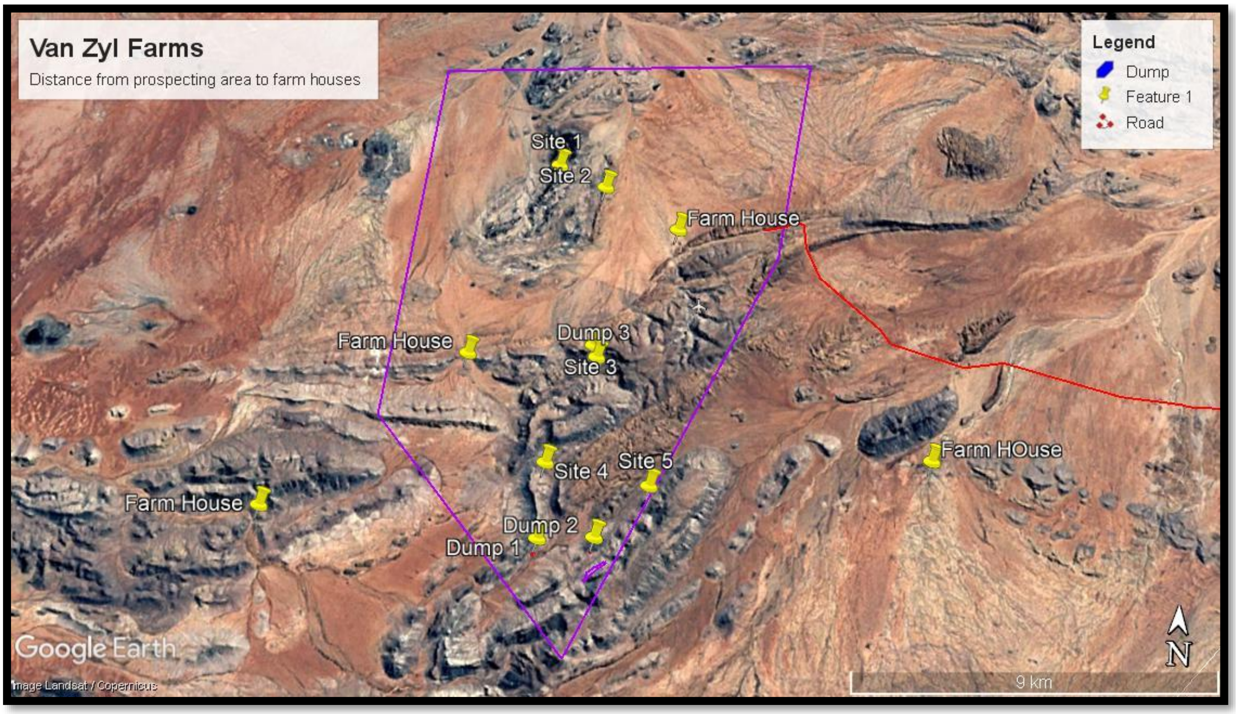

Figure 44: Proximity to neighbours

(xxi) Noise

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed mining activity does not trigger an application in terms of the said act, and emissions to be generated is expected to mainly entail dust due to the displacement of soil and transport of material on gravel roads. As the prevalent wind direction is in a south – south- eastern direction the hill will screen dust generated at Wortel quarry from the operations/residents on the opposite side. Should the Applicant however implement the mitigation measures proposed in this document and the EMPr the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.

The noise to be generated at the Wortel quarry will contribute to these daily noise levels. The proposed activity will contribute noise generated as a result of blasting, as well as loading, and transporting of material. The nuisance value of noise generated by heavy earthmoving equipment, to residence in the near vicinity is deemed to be of low significance, as the hill will act as a sound barrier to the nearest occupants. The noise caused by blasting will be instantaneous and of short duration. Blasting will only be conducted during day light hours.

Although the proposed activity will have a cumulative impact on the ambient noise levels, the development will not take place in a pristine environment, and the impact is therefore deemed compatible with the current operations and of low significance.

(xxii) Visual exposure

The mining area was identified to constitute the lowest possible visual impact on the surrounding environment. Please note that mining permit will be done, so the sites of interest will be small and will be viewable from different areas.

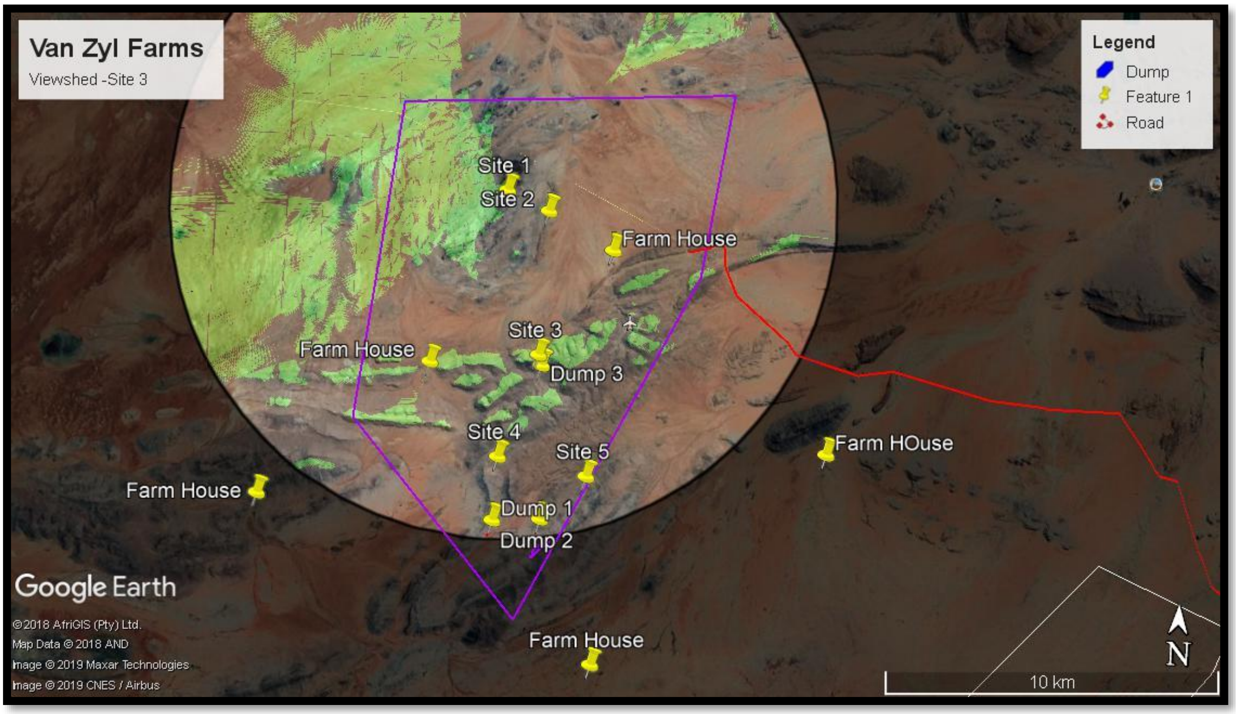

Figure 45: View shed of Site 1

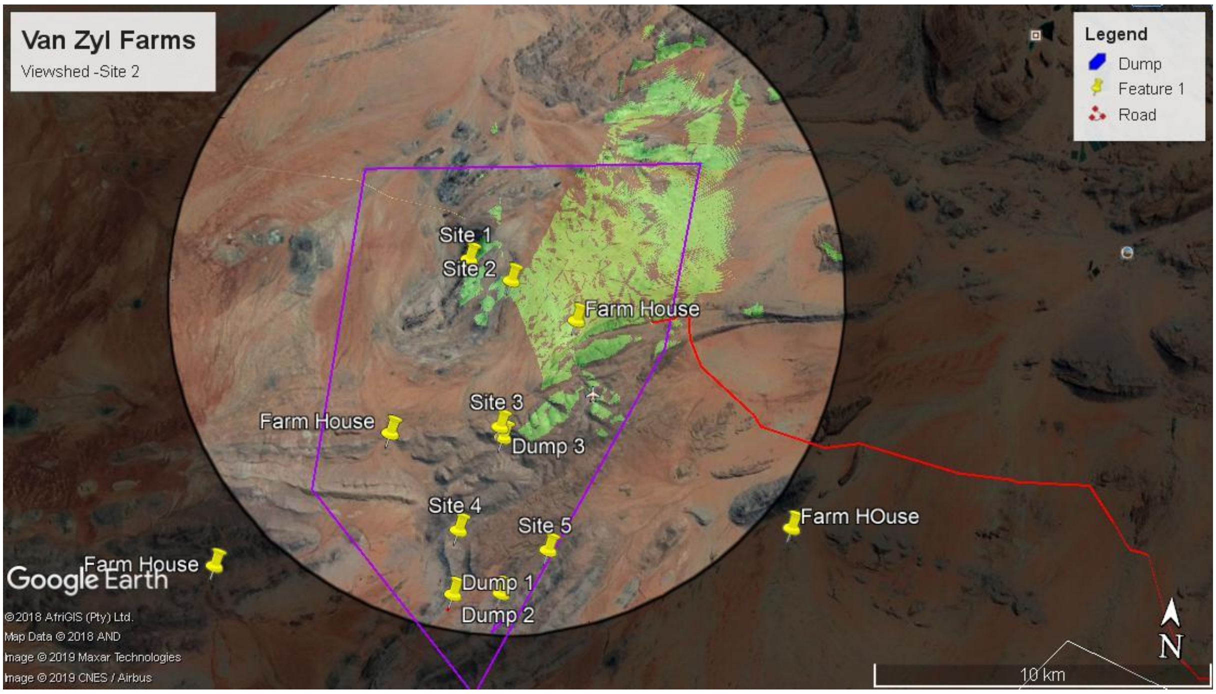

Figure 46: View shed of Site 2

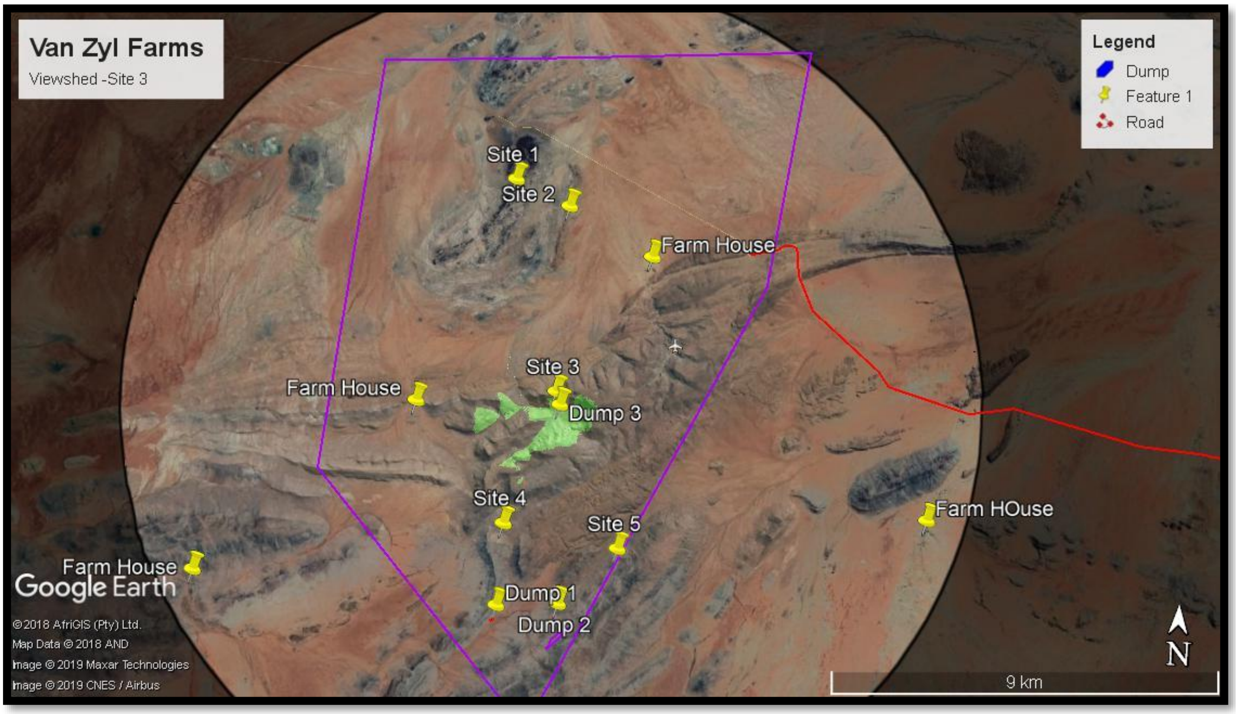

Figure 47: View shed of Site 3

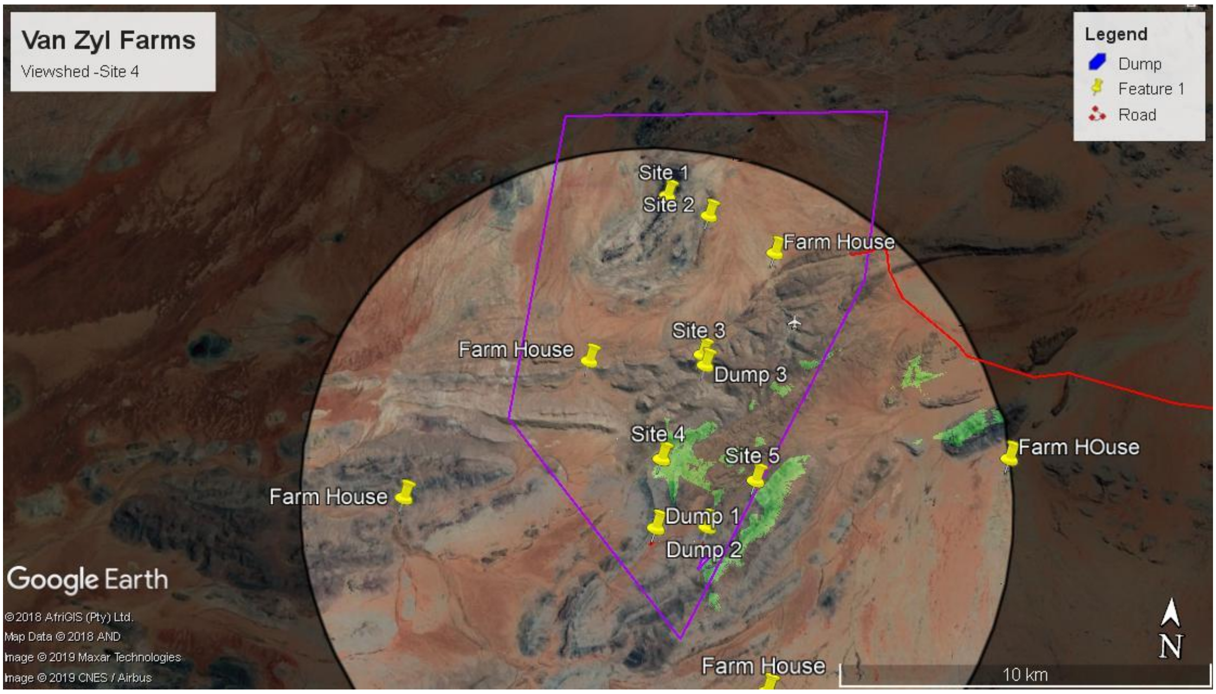

Figure 48: View shed of Site 4

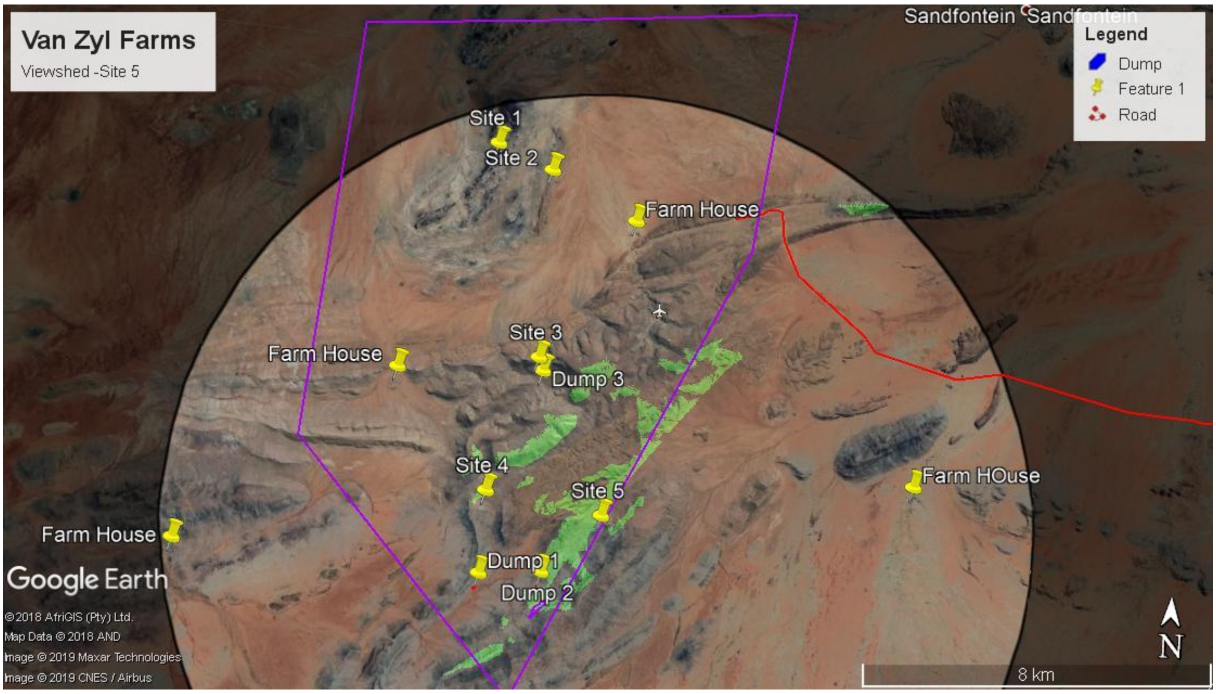

Figure 49: View shed of Site 5

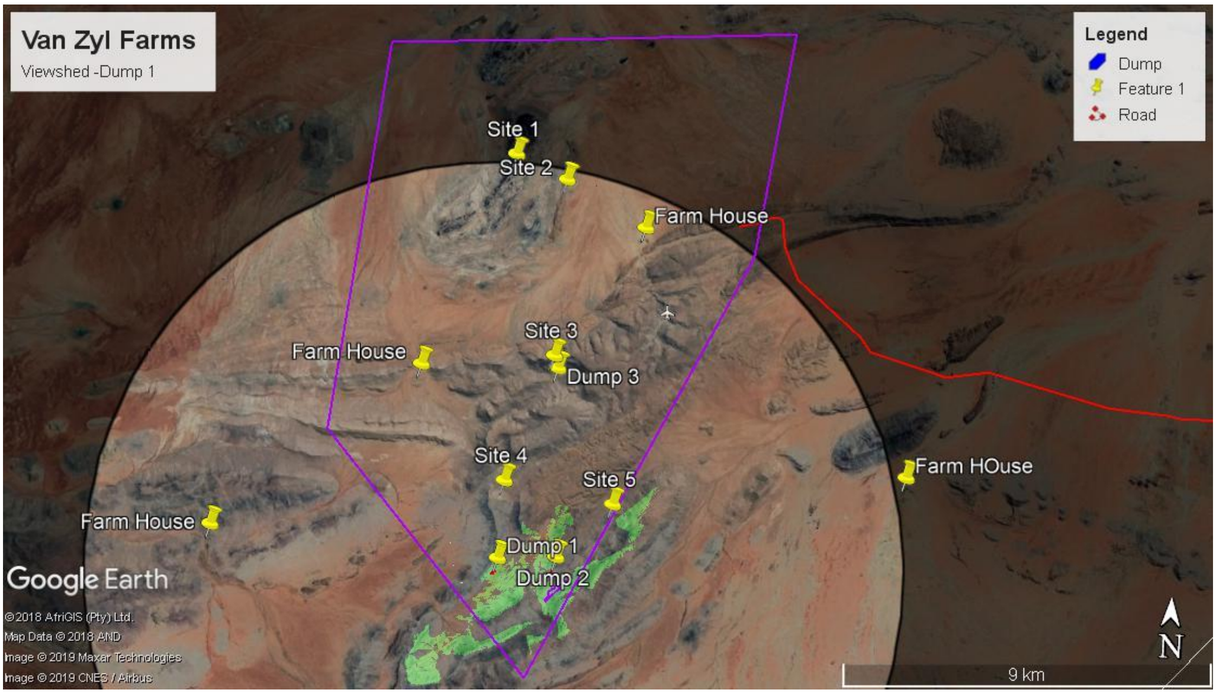

Figure 50: View shed of Dump 1

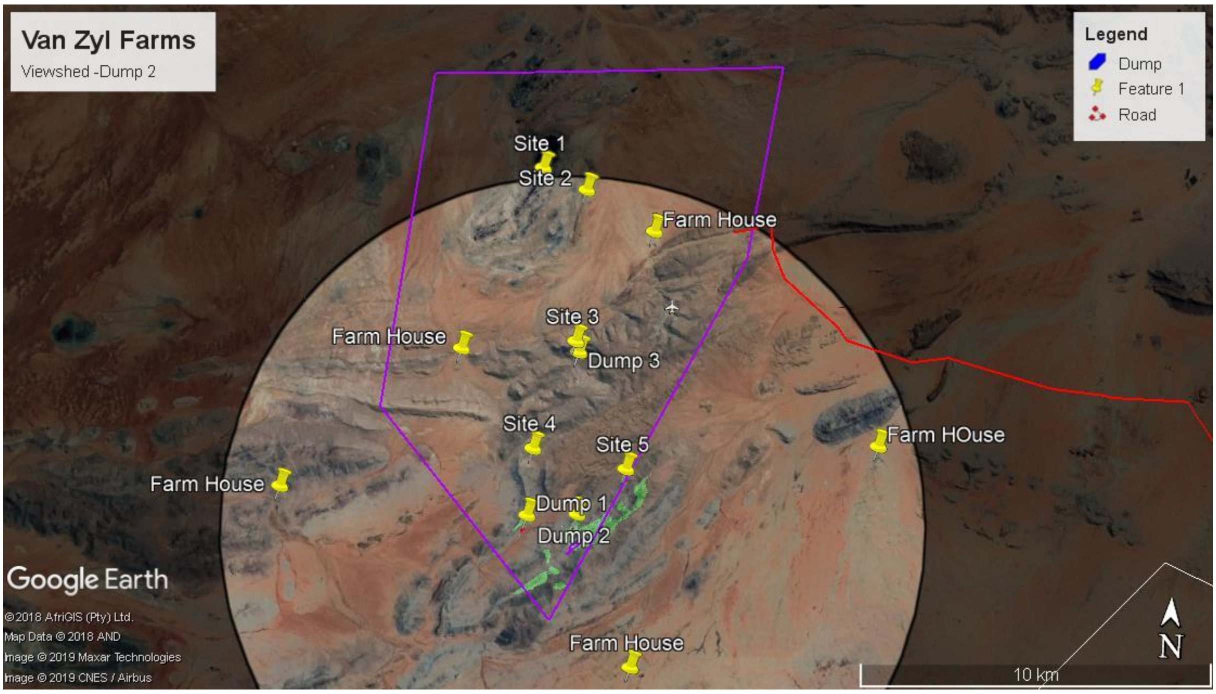

Figure 51: View shed of Dump 2

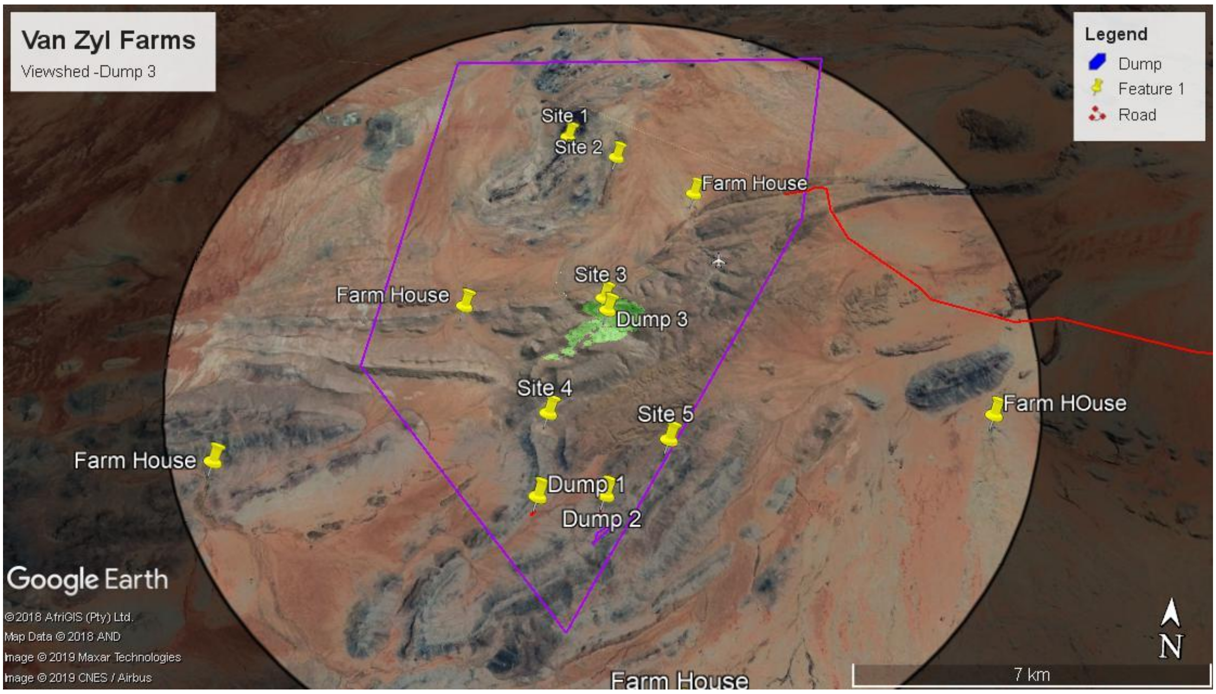

Figure 52: View shed of Dump 3

From the above figure, the green areas indicated the areas that can see the mining permit area location. The purple areas indicate the areas that cannot be seen by the surrounding landowners.

(d) Environmental and current land use map.

(Show all environmental and current land use features)

The environmental and current land use map is attached as Appendix D.

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

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

The following potential impacts were identified of each main activity in each phase. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact rating listed below was determined for each impact **prior** to bringing the proposed mitigation measures into consideration. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

Table 26: Impact Assessment of Van Zyl Farms

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
SITE ESTABLISHMENT PHASE/ CONSTRUCTION PHASE												
ACTIVITY:	**SITE VISITS BY VARIOUS SPECIALIST**											
Air Quality	Dust Generation	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Med
Air Quality	Emissions	Neg	Reversible	1	2	1	1,3	5	5	5	7	Low-Med
Archaeological & cultural sites	Loss and disturbance to surface archaeological sites	Neg	Irreversible	1	1	5	2,3	5	5	5	12	Med
Archaeological & cultural sites	Potential disruption to grave sites	Neg	Irreversible	1	1	5	2,3	5	5	5	12	Med
Groundwater	Potential hydrocarbon contamination from leeching into the water table	Neg	Reversible	2	3	2	2,3	3	2	2,5	6	Low-Med
Fauna	loss of food, nest sites and refugia	Neg	Reversible	1	1	3	1,7	5	3	4	7	Low-Med
Fauna	Potential damage to or destruction of sensitive faunal habitats: Pans & Watering Points	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Flora	Loss of biodiversity.	Neg	Reversible	1	3	4	2,7	3	3	3	8	Low-Med
Noise	Increased noise levels	Neg	Reversible	1	2	4	2,3	3	4	3,5	8	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination	Neg	Reversible	1	2	1	1,3	3	3	3	4	Low
Sensitive Landscape	Potential for damage or destruction of sensitive faunal habitats: Pans and watering points	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Surface Water	Potential hydro carbonation contamination form leaks or spills which may reach downstream surface water bodies	Neg	Reversible	3	3	1	2,3	3	5	4	9	Low-Med
Traffic and Safety	Road degradation. Increased potential for road incidences Potential distraction to road users	Neg	Reversible	2	2	1	1,7	2	5	3,5	6	Low-Med
SITE ESTABLISHMENT PHASE/ CONSTRUCTION PHASE												
ACTIVITY:	**Data Collection and Assessment, Geological Mapping, Planning for Drilling Surveys**											

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg	Reversible									Low
ACTIVITY:	**DEMARCATION OF SITE WITH VISIBLE BEACONS.**											
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg	Reversible									Low
ACTIVITY:	**ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.**											
	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	Neg										Low
Social & Safety	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Neg	Reversible	1	3	5	3	3	5	4	12	Med
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium -High
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	2	4	2,3	3	5	4	9	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	1,7	3	5	4	7	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	3,7	1	5	3	11	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Air quality	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Medium
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Medium
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	2,7	3	5	4	11	Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	3	3	2,7	3	5	4	11	Med
SUB ACTIVITY: ABLUTION FACILITIES												
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3,3	3	5	4	13	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3,3	3	5	4	13	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Soils	Portable Toilets Potential harm through sewage leaks Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	5	3	3	5	4	12	Med
SUB ACTIVITY: ACCESS ROADS												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium
Air quality	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Medium
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Medium

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med
SUB ACTIVITY: SITE OFFICES												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	3	3	2,7	3	5	4	11	Med
SUB ACTIVITY: PARKING AREA												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Medium
SUB ACTIVITY: WASTE AREA												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators.	Neg	Reversible	2	2	4	2,7	3	5	4	11	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.											
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	3	3	2,7	3	5	4	11	Med
OPERATIONAL PHASE												
ACTIVITY:	**DRILLING FOR CONTINUED RESOURCE EVALUATION**											
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.											
Noise	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Neg	Reversible	2	2	1	1,7	1	3	2	3	Low
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment 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; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Neg	Reversible	1	4	2	2,3	2	5	3,5	8	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	1,7	3	5	4	7	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Visual aspect	Deterioration in visual aesthetics of the area 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.	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	3,7	1	5	3	11	Med
Noise	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Neg	Reversible	2	2	1	1,7	1	3	2	3	Low
Air quality	Dust generation	Neg	Reversible	1	2	1	1,3	1	3	2	3	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals. 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.	Neg	Reversible	2	2	4	2,7	3	5	4	11	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water. 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.	Neg	Reversible	2	1	2	1,7	2	5	3,5	6	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table 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.	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med
Social & Safety	Health and Safety Risk by Drilling Activities. Potential danger to surrounding communities It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialized personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to	Neg	Reversible	1	3	1	1,7	1	3	2	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	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											
ACTIVITY: GENERAL ACTIVITIES												
SUB ACTIVITY: CREATION OF JOBS												
Social & Safety	**Potential for more employment**	Pos	Reversible	2	2	1	1,7	4	5	4,5	8	Low-Med
SUB ACTIVITY: ABLUTION FACILITIES												
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	2	3	5	3,3	3	5	4	13	Med
Surface water		Neg	Reversible	2	3	5	3,3	3	5	4	13	Med
Noise		Neg	Reversible	1	2	4	2,3	5	5	5	12	Medium
Visual aspect		Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Soils		Neg	Reversible	1	3	5	3	3	5	4	12	Med
SUB ACTIVITY: WASTE GENERATION												
Fauna	Potential harm through littering	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
GROUNDWATER	Potential contamination through littering	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med
soils	Potential contamination through littering	Neg	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Sensitive Landscape	Potential contamination through littering	Neg	Reversible	2	2	4	2,7	3	5	4	11	Med
Surface water	Potential contamination through littering	Neg	Reversible	3	3	4	3,3	2	1	1,5	5	Low-Med
Groundwater	Potential contamination through littering	Neg	Reversible	2	3	3	2,7	3	5	4	11	Med
DECOMMISSIONING PHASE												
ACTIVITY:	**SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**											
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. The removal of the campsite equipment and the rehabilitation of the	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	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	Soils replaced and ameliorated	Pos	Reversible	1	3	4	2,7	3	5	4	11	Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2,3	2	5	3,5	8	Low-Med
Flora	Area revegetated with indigenous plants	Pos	Reversible	1	2	1	1,3	3	5	4	5	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Topography	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Pos	Irreversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming 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.	Neg	Reversible	1	2	2	1,7	3	5	4	7	Low-Med
Visual aspect	Improved aesthetics through rehabilitation	Pos	Reversible	2	1	3	2	2	5	3,5	7	Low-Med
Noise	Noise nuisance caused by machinery 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.	Neg	Reversible	2	2	4	2,7	4	3	3,5	9	Low-Med
Air quality	Dust nuisance caused during landscaping activities 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	Neg	Reversible	2	2	4	2,7	4	5	4,5	12	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	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	Emission Monitoring: • The emissions generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Neg	Reversible	1	2	1	1,3	5	5	5	7	Low-Med
Fauna	Reintroduction of fauna attracted to flora to the area	Pos	Reversible	1	2	4	2,3	3	5	4	9	Low-Med
Social & Safety	Health and safety risk posed by un-sloped areas	Neg	Reversible	1	3	4	2,7	3	3	3	8	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm 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.	Neg	Reversible	2	1	2	1,7	2	5	3,5	6	Low-Med
Surface water	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. Free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Pos	Reversible	3	3	2	2,7	5	1	3	8	Low-Med
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials During the decommissioning and closure phase's equipment will be removed, stockpiled soils will be used for rehabilitation, and remaining	Neg	Reversible	1	3	4	2,7	3	5	4	11	Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	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.											
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	3	2	2,3	2	5	3,5	8	Low-Med
Groundwater	Improve response to issues relating to deterioration of groundwater quality or quantity	Pos	Reversible	2	1	2	1,7	2	5	3,5	6	Low-Med
ACTIVITY: Application for Closure Certificate												

(1) Cumulative Impacts

Table 27: Cumulative Impact Assessment of Van Zyl Farms Prospecting Right

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating	Mitigation
CONSTRUCTION AND OPERATIONAL PHASES													
ACTIVITY: Utilization of haul and access roads within the mining right area													
SUB ACTIVITY: Truck and heavy machinery operations													
Traffic & Safety	Increased potential for road incidences	Neg	Reversible	2	3	1	2	3	1	2	4	Low	All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips.
Traffic & Safety	Road degradation	Neg	Reversible	1	3	1	1,666667	2	1	1,5	2,5	Low	A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road.

Cumulative effects are caused by the accumulation and interaction of multiple stresses affecting the parts and the functions of ecosystems. Of particular concern is the knowledge that ecological system sometimes changes abruptly and unexpectedly in response to apparently small incremental stresses. For purposes of this report, cumulative impacts have been defined as **"the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities".**

Generally, as the sites are in non-existence and no major additional environmental impacts are expected, the cumulative impacts will generally be of medium significance.

viii) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

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

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as by its duration, magnitude, intensity or probability of occurrence”. The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream.

In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) [as amended] requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments.

The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

Greenmined Environmental has developed an impact assessment methodology (as defined below) whereby the significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the extent, magnitude and duration criteria associated with a particular impact.
This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

DEFINITIONS AND CONCEPTS:

Environmental significance:

The concept of significance is at the core of impact identification, evaluation and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognised from the various interpretations:

- Environmental significance is a value judgement;
- The degree of environmental significance depends on the nature of the impact;
- The importance is rated in terms of both biophysical and socio-economic values; and
- Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of particular consequences being realised (Environment Australia (1999) Environmental Risk Management).

(2) Methodology that will be used

(a) Nature of the impact

The nature of an impact can be defined as “a brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact”.

(b) Extent of the impact

The extent of an impact can be defined as “a brief description of the spatial influence of the impact or the area that will be affected by the impact”.

Table 28: Determining the extent of an impact

EXTENT Extent or spatial influence of impact	**Footprint**	Only as far as the activity, such as footprint occurring within the total site area
	Site	Only the site and/or 500m radius from the site will be affected
	Local	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	Entire region / province is affected
	National	Country is affected

(c) Severity of the impact

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

Table 29: Rating of Severity

Type of criteria	**Rating**				
	1	**2**	**3**	**4**	**5**
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

(d) Duration of the impact

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 30: Rating of Duration

Rating		Description
1	Very Short Term	Up to three months (quarter) after construction
2	Short Term	Three months to one year after construction
3	Medium Term	One year to six years after construction
4	Long Term	Six to ten years after construction
5	Permanent	Beyond ten years after construction

(e) Probability of the impact occurring

The probability of an impact can be defined as "the estimated chance of the impact happening". Probability refers to how often the activity or aspect has an impact on the environment.

Table 31: Determining the probability of an impact

PROBABILITY	**1**	Almost never / almost impossible	*Impossible* to occur (0 – 20% probability of occurring)
	2	Very seldom / highly unlikely	*Unlikely* to occur (20 -40% probability of occurring)
	3	Infrequent / unlikely / seldom	*May* occur (40-60% chance of occurring)
	4	Often / regularly / likely / possible	*Likely* to occur (60-80% chance of occurring)
	5	Daily / highly likely / definitely	Will *certainly* occur (80-100% chance of occurring)

(f) Degree to which impact can be reversed

The reversibility of an impact can be defined as "the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects".

Table 32: Determining the reversibility of an impact

REVERSIBILITY	**Reversible**	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures

(g) Determination of Likelihood

The irreplaceability (likelihood) of an impact can be defined as "the amount of resources that can/can't be replaced". The determination of likelihood is a combination of Duration and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarised below, and then dividing the sum by 2.

Example of calculating Overall Likelihood

Consequence	Rating
Duration	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD **(**Subtotal divided by 2)	**3**

(h) Determination of Overall Environmental Significance:

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence X Overall Likelihood

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH** or **HIGH**, as shown in the table below.

Significance or Risk	**Low**	**Low-Medium**	**Medium**	**Medium-High**	**High**
Overall Consequence X Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

Based on the above, the significance rating scale has been determined as follows:

High	Of the highest order possible within the bounds of impacts which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.
Medium-High	Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.

Medium	Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible, in case of positive impacts; other means of achieving these benefits would be about equal in time, cost and effort.
Low-Medium	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved of little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

(i) Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For the purpose of determining the environmental significance in terms of consequence, the following factors were chosen: ***Severity/Intensity, and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables above.

(j) Degree to which the impact can be mitigated

The degree to which an impact can be mitigated can be defined as "the effect of mitigation measures on the impact and its degree of effectiveness".

Table 33: Determining the mitigation rating of an impact

MITIGATION RATING	**MITIGATED Degree impact can be mitigated**	High	*Impact 100% mitigated*
		Medium	*Impact >50% mitigated*
		Low	*Impact <50% mitigated*

(k) Cumulative Impacts

The effect of cumulative impacts can be described as "the effect the combination of past, present and "reasonably foreseeable" future actions have on aspects".

Table 34: Determining the confidence rating of an impact

CUMULATIVE RATING	**CUMULATIVE EFFECTS**	Low	*Minor* cumulative effects
		Medium	*Moderate* cumulative effects
		High	*Significant* cumulative effects

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

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

No alternatives sites where considered during this prospecting drilling. If drill sites where found unfeasible due to the natural environment, these drill sites will be relocated to a position possible with minimal impacts associated. Please refer to Figure 4 for the proposed exploration boreholes. Product stockpiles to be prospected are old mining stockpiles. No other alternative sites where investigated due to limited stockpiles on site.

However, the applicant considered two activity alternatives during the planning phase of this project:

1. Temporary Infrastructure (Preferred Alternative) vs. Permanent Temporary Infrastructure:

   a. The use of temporary Infrastructure will entail the use of machinery that is either track-based or can be removed without difficulty. Temporary Infrastructure to be used in the prospecting mining method will entail some temporary offices, storage facility and chemical toilet, with servicing of vehicles and equipment being done off-site at the existing workshop on the applicant's farm.

      i. **Positive Aspects**: The positive aspects associated with the use of temporary infrastructure firstly enable the applicant to move the temporary infrastructure within the boundaries of the prospecting mining area as prospecting mining of the mineral progresses. Secondly the decommissioning phase is facilitated as the removal of temporary infrastructure from the prospecting mining area during the rehabilitation of the site is easy and highly effective.

   b. The use of permanent infrastructure will entail the construction of an office building with ablution facilities, and installation of a permanent vehicle service area.

      i. The use of permanent Infrastructure will increase the impact of the proposed project on the environment as it will entail the establishment of more structures, lengthen the period required for rehabilitation as well as increase the rehabilitation amount as the permanent Infrastructure will either have to be decommissioned or be maintained after the closure of the site.

ii. The construction of permanent Infrastructure at the site will also increase the visual impact of the proposed project on the surrounding environment and additional mitigation measures will have to be implemented to address the impact.

In the light of the above the use of temporary Infrastructure is deemed to be the most viable preferred alternative.

No-go Alternative:

The ‘No Go’ option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass.

The proposed rehabilitation of the area that includes:

- The preservation of the topsoil to cover disturbed areas;
- Implementation of measures to monitor the natural establishment of plants growth and to re-vegetate with representative seed mixes in the case of poor plant establishment;
- The proposed program to combat invader weeds on a regular base; and
- Will ensure that the land use will remain almost the same when prospecting operations cease.

The no-go alternative entails no change to the status quo and is therefore a real alternative that needs to be considered. The ‘No Go’ option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass.

The no-go alternative was not deemed to be the preferred alternative as:

- The applicant will not be able to supply in the demand for Sillimanite in the vicinity;
- The application, if approved, would allow the applicant to utilize the available Sillimanite as well as provide employment opportunities to local employees. Should the no-go alternative be followed these opportunities will be lost to the applicant, potential employees and clients; and
- The applicant will not be able to diversify the income of the property.

Not proceeding with the proposed operation will entail that a mineral which if mined will contribute towards the local and provincial social and economic structures of the area, will not be mined, and that this opportunity will be lost.

It is important to note that as previously discussed, that execution of the prospecting operation will not leave the land unproductive, so that the proposed prospecting operation can be considered to be a sustainable land-use option for the area. If the prospecting project does not go ahead the farm will be used for cultivating grazing and mixed farming. This is also the current use of the land in question.

Positive Impacts:

- The prospecting site offers the mineral sought after;
- The site is located within neighbouring sand mines, and will minimally affect the community with regards to dust and noise;
- The prospecting area can be reached by an existing farm access roads. No new road infrastructure need to be constructed;
- Due to the small size of the activity and the remote location of the prospecting area the potential impacts on the surrounding environment, associated with prospecting is deemed to be of low significance; and
- No residual waste as a result of the prospecting activity will be produced that needs to be treated on site. Any general waste that may be produced on-site will be contained in sealed refuse bins to be transported to the local municipal landfill site (Pofadder). The amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental leakage. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site.

Negative Impacts:

- Due to the remote location of the prospecting area very little negative impacts on the community could be identified that were deemed to be of significant importance. The dust and noise impacts that may emanate from the prospecting area during the operational phase could have a negative impact on the surrounding community if the mitigation measures proposed in this document is not implemented and managed on-site; and
- Negative impacts with regard to the environment include potential contamination of the area due to spillage of hydrocarbon products.

The land is currently under cultivated grazing and mixed farming.

x) The possible mitigation measures that could be applied and the level of risk.

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

Visual Mitigation:

The risk of the proposed mining activity having a negative impact on the aesthetic quality of the surrounding environment can be reduced to a low – medium risk through the implementation of the mitigation measures listed below:

- The site needs to have a neat appearance and be kept in good condition at all times.
- Upon closure the site needs to be rehabilitated to insure that the visual impact on the aesthetic value of the area is kept to a minimum.

Dust Handling:

The risk of dust, generated from the proposed prospecting activity, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.
- The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust.
- All roads will be sprayed with water or an environmental friendly dust-allaying agent that contained PCB's (e.g. DAS products/ Pro/base) at regular intervals to ensure that dust is adequately suppressed in the prospecting of roads.
- All disturbed or exposed areas will be re-vegetated as soon as possible during the prospecting to prevent any dust source from being created.
- A fall out and nuisance dust monitoring programme could be submitted to the principle inspector of mines (DMR-Northern Cape) on an annual basis if required. If any complaint is received form the public or state department regarding dust levels, the fall-out and nuisance dust levels will again be monitored at prescribed monitoring points. The result will then be compiled into monthly reports and forwarded to the Director-Occupational Hygiene.
- Fallout dust will be monitored via a fallout dust bucket system on the boundaries of the prospecting area.

Noise Handling:

The risk of noise, generated from the proposed mining activity, having a negative impact on the surrounding environment can be reduced to being low-medium through the implementation of the mitigation measures listed below:

- The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.
- No loud music may be permitted at the mining area.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.

Management of weed or invader plants:

The risk of weeds or invader plants invading the disturbed area can be reduced to being low through the implementation of the mitigation measures listed below:

- A weed and invader plant control management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure.

- Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
  - "The plants can be uprooted, felled or cut off and can be destroyed completely."
  - "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide."
  - The temporary topsoil stockpiles need to be kept free of weeds.

Storm water Handling:

The risk of contamination through dirty storm water escaping from work areas, or erosion or loss of stockpiled topsoil caused due to uncontrolled storm water flowing through the prospecting area can be reduced to being low through the implementation of the mitigation measures listed below:

- Storm water must be diverted around the topsoil heaps, and access roads to prevent erosion and loss of material.
- Prospecting must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
- Runoff water should be diverted around the site areas with trenches and contour structures to prevent erosion of the work areas.
- Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
- Dirty water must be collected and contained in a system separate from the clean water system.
- Dirty water must be prevented from spilling or seeping into clean water systems.
- The storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).
- The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the management plan.

Handling of Hazardous Materials and Substances:

- All hazardous materials or substances should be stored in a closed storage facility with an impermeable floor.
- The storage area should meet the following conditions:
  - The storage area should be constructed on a level area to prevent offsite migration of any spilled product.
  - The floor of the storage area should be impermeable to prevent seepage of spilled products into the ground or ground water.

- The storage area should be out of the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest.
- The facility should be such that access to the materials/substances can only take place with the prior notification of an appropriate staff member.

- All fuel storage tanks should have secondary containment in the form of an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. This bund capacity should be sufficient to contain 110% of the tank's maximum capacity.
- The distance and height of the bund wall relative to that of the tank should also be taken into consideration to ensure that any spillage does not result in oil spouting beyond the confines of the bund.
- The site manager should establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. The bund area should be inspected at least weekly and any accumulated rainwater removed. All valves and outlets should be checked to ensure that they are intact and closed securely.
- The bund base must slope towards a rainwater sump of sufficient size.
- Contaminated water may not be allowed to mix with clean water, and contained until it can be collected by a registered hazardous waste handling contractor or be disposed of at a registered hazardous waste handling facility.
- Drip trays should be available to be place underneath all stationary equipment or vehicles.
- The layer of material at the vehicle service area should be removed and if contaminated with hazardous substances such as hydrocarbons should be disposed of as hazardous waste by an appropriately qualified waste handling contractor. The compacted areas should be ripped and the topsoil returned over the area.
- The site should be cleared of all hazardous substances once decommissioning has been completed and should be disposed of by an appropriately qualified waste handling contractor.

Waste Management:

The risk of waste generation having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- No waste stockpile area may be established outside the boundaries of the mining area.
- Vehicle maintenance may only take place within the service bay area of the off-site workshop.
- The diesel bowser needs to be equipped with a drip tray at all times. Drip trays have to be used during each and every refuelling event.
- The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility.

- Spills must be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing it at a recognised facility. Proof should be filed.
- Suitable covered receptacles should be available at all times and conveniently placed for the disposal of waste.
- Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., should be stored in a container with a closable lid at a collecting point and collected on a regular basis and disposed of at a recognised landfill site. Specific precautions should be taken to prevent refuse from being dumped on or in the vicinity of the mine area.
- Biodegradable refuse generated should be handled as indicated above.
- Water from the wash bay should drain into the oil sump from where it should be removed by an approved contractor.
- Drip trays should be available to be place underneath all stationary equipment or vehicles.
- Waste material of any description, including receptacles, scrap, rubble and tyres, should be removed entirely from the mining area and disposed of at a recognized landfill facility once decommissioning has been completed. It will not be permitted to be buried or burned on the site.

Management of Health and Safety Risks:

The health and safety risk, posed by the proposed prospecting activity can be reduced to being low through the implementation of the mitigation measures listed below:

- Workers must have access to the correct personal protection equipment (PPE) as required by law.
- All operations must comply with the Occupational Health and Safety Act.

Protection of fauna and flora:

The risk on the fauna and flora of the footprint area as well as the surrounding environment, as a result of the proposed mining activity, can be reduced to being low through the implementation of the mitigation measures listed below:

- The site manager should ensure that no fauna is caught, killed, harmed, sold or played with.
- Workers should be instructed to report any animals that may be trapped in the working area.
- No snares may be set or nests raided for eggs or young.
- No plants or trees may be removed without the approval of the ECO.
- Clearing of vegetation has to be restricted to the smallest possible area.

Management of Access Roads:

The risk on the condition of the roads, as a result of the proposed prospecting activities, can be reduced to being low-medium through the implementation of the mitigation measures listed below:

- Storm water should be diverted around the access roads to prevent erosion.
- Erosion of access road: Vehicular movement must be restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas. Rutting and erosion of the access road caused as a result of the mining activity should be repaired by the applicant.

- On completion of prospecting operations, the surface of these areas, if compacted due to hauling and dumping operations, should be scarified to a depth of at least 300 mm and graded to an even surface condition and the previously stored topsoil should be returned to its original depth over the area.

Topsoil Handling:

The risk of loss of topsoil can be reduced to being low through the implementation of the mitigation measures listed below:

- Where applicable the first 300 mm of topsoil should be removed in strips and stored along the boundary of the mining area. Stockpiling of topsoil must be done to protect it from erosion, mixing with overburden or other material. The topsoil must be used to cover the rehabilitated area and improve the establishment of natural vegetation.
- The temporary topsoil stockpiles should be kept free of weeds.
- Topsoil stockpiles should be placed on a levelled area and measures should be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water.
- Topsoil heaps should not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- Should natural vegetation not establish on the heaps within 6 months of stockpiling it should be planted with an indigenous grass species.
- Storm- and runoff water should be diverted around the topsoil stockpiles and access roads to prevent erosion.

xi) Motivation where no alternative sites were considered.

Not applicable.

xii) Statement motivating the alternative development location within the overall site.

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

Van Zyl Farms identified the need for Sillimanite in the area. The prospecting right application area of (±11 379.8685 (Ha)) within the boundaries of the farms Wortel 42, which falls in the Khai-Ma Local Municipality, Namakwa District Municipality, Namaqualand Magisterial District, Northern Cape Province, for Sillimanite. Due to the remote location of the excavation area the potential impacts on the surrounding environment, associated with prospecting drilling, is deemed to be of low significance. It is proposed that all prospecting drilling related temporary infrastructure will be contained within the boundary of the prospecting mining area.

i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures)

During the impact assessment process the following potential impacts were identified of each main activity in each phase. An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed prospecting activity may have on the surrounding environment.

The significance rating was again determined for each impact using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

Table 35: Impact Assessment of Van Zyl Farms Prospecting Right

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
SITE ESTABLISHMENT PHASE/ CONSTRUCTION PHASE												
ACTIVITY:	**SITE VISITS BY VARIOUS SPECIALIST**											
Air Quality	Dust Generation	Neg	Reversible	2	1	3	2	5	3	4	8	Low-Med
Air Quality	Emissions	Neg	Reversible	1	1	1	1	5	3	4	4	Low
Archaeological & cultural sites	Loss and disturbance to surface archaeological sites	Neg	Irreversible	1	1	5	2,3	5	1	3	7	Low-Med
Archaeological & cultural sites	Potential disruption to grave sites	Neg	Irreversible	1	1	5	2,3	5	1	3	7	Low-Med
Groundwater	Potential hydrocarbon contamination from leeching into the water table	Neg	Reversible	2	2	2	2	2	2	2	4	Low
Fauna	loss of food, nest sites and refugia	Neg	Reversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Fauna	Potential damage to or destruction of sensitive faunal habitats: Pans & Watering Points	Neg	Reversible	1	2	3	2	2	3	2,5	5	Low-Med
Flora	Loss of biodiversity.	Neg	Reversible	1	2	3	2	2	2	2	4	Low
Noise	Increased noise levels	Neg	Reversible	1	2	1	1,3	1	3	2	3	Low
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination	Neg	Reversible	1	2	1	1	1	1	1	1	Low
Sensitive Landscape	Potential for damage or destruction of sensitive faunal habitats: Pans and watering points	Neg	Reversible	3	3	1	2,3	2	2	2	5	Low-Med
Surface Water	Potential hydro carbonation contamination form leaks or spills which may reach downstream surface water bodies	Neg	Reversible	3	3	1	2,3	2	5	3,5	8	Low-Med
Traffic and Safety	Road degradation. Increased potential for road incidences Potential distraction to road users	Neg	Reversible	1	2	1	1,3	2	5	3,5	5	Low-Med
SITE ESTABLISHMENT PHASE/ CONSTRUCTION PHASE												
ACTIVITY:	**Data Collection and Assessment, Geological Mapping, Planning for Drilling Surveys**											
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg	Reversible									Low
ACTIVITY:	**DEMARCATION OF SITE WITH VISIBLE BEACONS.**											
	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	Neg	Reversible									Low
ACTIVITY:	**ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.**											

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	Neg										Low
Social & Safety	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Neg	Reversible	1	2	5	2,7	2	5	3,5	9	Low-Med
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	5	5	15	Medium-High
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2,3	2	3	2,5	6	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	3	2,5	7	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	1,7	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	3,7	1	3	2	7	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Air quality	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia	Neg	Reversible	2	2	4	2,7	2	5	3,5	9	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.											
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
SUB ACTIVITY: ABLUTION FACILITIES												
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	1	2	3	2	2	5	3,5	7	Low-Med
Surface water	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	1	2	3	2	2	5	3,5	7	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Soils	Portable Toilets Potential harm through sewage leaks Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	2	5	2,7	2	5	3,5	9	Low-Med
SUB ACTIVITY: ACCESS ROADS												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics.	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.											
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Air quality	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	2	4	3	1	1	1	3	Low
SUB ACTIVITY: SITE OFFICES												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Neg	Reversible	3	2	4	3	1	1	1	3	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
SUB ACTIVITY: PARKING AREA												
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med
Noise	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Air quality	Emissions caused by vehicles and equipment	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
SUB ACTIVITY: WASTE AREA												
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Neg	Reversible	2	2	4	2,7	2	5	3,5	9	Low-Med
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies.	Neg	Reversible	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.											
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
OPERATIONAL PHASE												
ACTIVITY:	**DRILLING FOR CONTINUED RESOURCE EVALUATION**											
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Neg	Reversible	1	3	4	2,7	2	3	2,5	7	Low-Med
Noise	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Neg	Reversible	2	1	1	1,3	1	3	2	3	Low
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment 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; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Neg	Reversible	1	4	2	2,3	2	3	2,5	6	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	3	2,5	7	Low-Med
Geology	Disturbance of geological strata	Neg	Irreversible	1	3	5	3	5	1	3	9	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Neg	Reversible	1	2	2	1,7	3	3	3	5	Low-Med
Visual aspect	Deterioration in visual aesthetics of the area 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.	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Archaeological & cultural sites	Loss of and disturbance to surface archaeological sites	Neg	Irreversible	1	5	5	3,7	1	3	2	7	Low-Med
Noise	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Neg	Reversible	1	1	1	1	1	3	2	2	Low
Air quality	Dust generation	Neg	Reversible	1	1	1	1	1	3	2	2	Low
Fauna	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals. 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.	Neg	Reversible	2	2	4	2,7	2	5	3,5	9	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water. 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.	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery.	Neg	Reversible	3	3	4	3,3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
	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.											
Social & Safety	Health and Safety Risk by Drilling Activities. Potential danger to surrounding communities It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialized 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	Neg	Reversible	1	3	1	1,7	1	3	2	3	Low
ACTIVITY: GENERAL ACTIVITIES												
SUB ACTIVITY: CREATION OF JOBS												
Social & Safety	**Potential for more employment**	Pos	Reversible	2	1	2	1,7	2	3	2,5	4	Low
SUB ACTIVITY: ABLUTION FACILITIES												
Groundwater	Portable Toilets Potential harm through sewage leaks	Neg	Reversible	1	2	3	2	2	5	3,5	7	Low-Med
Surface water		Neg	Reversible	1	2	3	2	2	5	3,5	7	Low-Med
Noise		Neg	Reversible	1	1	3	1,7	2	3	2,5	4	Low
Visual aspect		Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Soils		Neg	Reversible	1	2	5	2,7	2	5	3,5	9	Low-Med
SUB ACTIVITY: WASTE GENERATION												
Fauna	Potential harm through littering	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
GROUNDWATER	Potential contamination through littering	Neg	Reversible	1	3	4	2,7	2	4	3	8	Low-Med
soils	Potential contamination through littering	Neg	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Sensitive Landscape	Potential contamination through littering	Neg	Reversible	2	2	4	2,7	2	5	3,5	9	Low-Med
Surface water	Potential contamination through littering	Neg	Reversible	3	2	4	3	1	1	1	3	Low

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Groundwater	Potential contamination through littering	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
DECOMMISSIONING PHASE												
ACTIVITY:	**SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)**											
Soils	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Neg	Reversible	1	2	1	1,3	2	3	2,5	3	Low
Soils	Soils replaced and ameliorated	Pos	Reversible	1	3	4	2,7	2	3	2,5	7	Low-Med
Flora	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Neg	Reversible	1	4	2	2,3	2	3	2,5	6	Low-Med
Flora	Area revegetated with indigenous plants	Pos	Reversible	1	2	2	1,7	3	4	3,5	6	Low-Med
Topography	Alteration of topography	Neg	Irreversible	1	2	5	2,7	2	3	2,5	7	Low-Med
Topography	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Pos	Irreversible	1	2	5	2,7	2	3	2,5	7	Low-Med
Land Use	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming 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.	Neg	Reversible	1	2	2	1,7	3	3	3	5	Low-Med
Visual aspect	Improved aesthetics through rehabilitation	Pos	Reversible	2	1	3	2	2	3	2,5	5	Low-Med
Noise	Noise nuisance caused by machinery 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.	Neg	Reversible	2	1	4	2,3	3	3	3	7	Low-Med

Nature of Impact	Impact	Positive/Negative/ Neutral Impact	Reversibility	Extent	Severity	Duration	Consequence	Probability	Frequency	Likelihood	Significance	Mitigation Rating
Air quality	Dust nuisance caused during landscaping activities 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.	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Air quality	Emission Monitoring: • The emissions generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Neg	Reversible	2	2	1	1,7	2	3	2,5	4	Low
Fauna	Reintroduction of fauna attracted to flora to the area	Pos	Reversible	1	2	3	2	1	3	2	4	Low
Social & Safety	Health and safety risk posed by un-sloped areas	Neg	Reversible	2	1	3	2	1	3	2	4	Low
Surface water	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm 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.	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
Surface water	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. Free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Pos	Reversible	2	1	2	1,7	2	3	2,5	4	Low
Hazardous Waste	Contamination of area with hydrocarbons or hazardous waste materials During the decommissioning and closure phase's equipment will be removed, stockpiled soils will be used for rehabilitation, and 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.	Neg	Reversible	1	3	4	2,7	2	5	3,5	9	Low-Med
Groundwater	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Neg	Reversible	2	1	2	1,7	2	3	2,5	4	Low
Groundwater	Improve response to issues relating to deterioration of groundwater quality or quantity	Pos	Reversible	2	1	2	1,7	2	5	3,5	6	Low-Med
ACTIVITY: Application for Closure Certificate												

j) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons and not only those that were raised by registered interested and affected parties).

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
whether listed or not listed	(Including the potential impacts for cumulative impacts)		In which impact is anticipated	if not mitigated	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc.)	if mitigated
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc. Etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))		E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.	
SITE VISITS BY VARIOUS SPECIALIST	Dust Generation	Air Quality	Construction / Site Establishment phase	Med	Control: Dust suppression	Low-Med
	Emissions	Air Quality		Low-Med	Control: Emissions	Low-Med
	Loss and disturbance to surface archaeological sites	Archaeology		Med	**Control:** Survey area before site clearance	Low
	Potential disruption to grave sites	Archaeology		Med	**Control:** Survey area before site clearance	Low
	Potential hydrocarbon contamination from leeching into the water table	Surface Water		Low-Med	Control through proper site management	Low
	loss of food, nest sites and refugia	Fauna		Low-Med	Control: Implementation of fauna protection measures	Low-Med
	Potential damage to or destruction of sensitive faunal habitats: Pans & Watering Points	Surface Water		Med	Control: Implementation of fauna protection measures	Low-Med
	Loss of biodiversity.	Flora		Low-Med		Low-Med
	Increased noise levels	Air Quality		Low-Med	**Control:** Noise control measures	Low
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination	Soil		Low	**Control:** Storm water management Site Management Soil Management	Low
	Potential hydrocarbon contamination topsoil's	Soil		Med		Low
	increased risk of erosion	Soil		Low-Med		Low
	Potential for damage or destruction of sensitive faunal habitats: Pans and watering points	Surface Water		Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Low-Med
	Potential hydro carbonation contamination form leaks or spills which may reach downstream surface water bodies	Surface Water		Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Low-Med
	Road degradation. Increased potential for road incidences Potential distraction to road users	All road users will be affected		Low	Control & Remedy: Road management	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
DESKTOP STUDY	None	N/A	Planning		Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	N/A	Construction / Site Establishment phase	Low	N/A	Low
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	N/A		N/A	N/A	N/A
	Portable Toilets Potential harm through sewage leaks	Groundwater		Med	Control through proper site management	Low-Med
	Portable Toilets Potential harm through sewage leaks	Surface Water		Med	Control through proper site management	Low-Med
	Portable Toilets Potential harm through sewage leaks Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Soils		Med	Control through proper site management	Low-Med
	Deterioration in visual aesthetics of the area	The visual impact may affect the aesthetics of the landscape.		Low-Med	Control: Implementation of proper housekeeping Rehabilitation of areas cleared of vegetation	Low-Med
	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Dust will be contained within the property boundaries and will therefore affect only the landowner.		Medium	Control: Dust suppression	Low
	Emissions caused by vehicles and equipment	Emissions will be contained within the property boundaries and will therefore affect only the landowner.		Low-Med	Control: Emissions	Low-Med
	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	The noise impact should be contained within the boundaries of the property, and will represent the current noise levels of the farm.		Medium	**Control:** Noise control measures Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies egg noise mufflers Control through the limiting of the activities to the day time and the implementation of an open and transparent channel of communication	Low
	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora		Low-Med	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Low-Med
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.		Med	**Control:** Storm water management Site Management Soil Management	Low – Medium
	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed		Med	Control: Waste management	Low-Med
	Migration of fauna due to disturbance caused by the proposed project	Fauna			Relocation of affected species of conservation importance	
	Alteration of topography	Topography		Medium -High	Control: Surface water Monitoring	Medium-High

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	Loss of and disturbance to surface archaeological sites	Artefacts or graves		Med	**Control:** Survey area before site clearance	Low-Med
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Groundwater pollution		Med	Control: Proper site management. Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low
	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Surface water Bodies		Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. Monitoring through rehabilitation and management of spoil sites	Low
	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away		Med	Control: Implementation of fauna protection measures	Low-Med
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use		Low-Med	Control: Fire	Low-Med
	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use			Rehabilitation of areas cleared of vegetation and dust control	
	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Social		Med	Control through proper site management	Low-Med
DRILLING FOR CONTINUED RESOURCE EVALUATION	Deterioration in visual aesthetics of the area 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 Aesthetics	Operational phase	Low-Med	Control: Implementation of proper housekeeping Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Low-Med
	Dust nuisance due to excavation activities 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 will be contained within the property boundaries and will therefore affect only the landowner.		Low	Control: Dust Suppression	Low
	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise		Low	Control: Noise Control Measures Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Low
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table 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 pollution		Low-Med	Control: Proper site management. Rehabilitation of affected areas and control using bunds	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.		Med	**Control:** Storm water management Site Management Soil Management Rehabilitation of affected areas	Low-Med
	Health and Safety Risk by Drilling Activities. Potential danger to surrounding communities It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialized 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	The Unsafe working conditions should only impact the applicant. Safety measures will be implemented		Low	Control: Implementation of safety control measures Control of times during which operation activities will take place	Low
	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals. 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.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away		Low-Med	Control: Implementation of fauna protection measures 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	Low
DRILLING FOR CONTINUED RESOURCE EVALUATION	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment 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; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Flora	Operational phase	Low-Med	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success. Modify: Consider use of a less sensitive area	Low-Med
	Alteration of topography	Topography		Low-Med	Control: Surface water Monitoring	Low-Med
	Fauna				-	
	Disturbance of geological strata	Geology			N/A	
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use		Low-Med	Control: Fire	Low-Med
	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed		Medium	Control: Waste management	Low-Med
	Loss of and disturbance to surface archaeological sites	Artefacts or graves		Med	**Control:** Survey area before site clearance	Low-Med

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water. 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 Bodies		Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. Control through management and monitoring of surface runoff	Low
GENERAL ACTIVITIES	Potential for more employment	Social			Control through proper site management	
	Portable Toilets Potential harm through sewage leaks	Groundwater		Med		Low-Med
		Surface Water		Med		Low-Med
		Soils		Medium		Low
		Social		Low-Med		Low
	Potential harm through littering			Med	Control: Implementation of fauna protection measures	Low-Med
				Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	0
				Low-Med	Control through proper site management	#REF!
				Med	Control: Implementation of proper housekeeping	Low-Med
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Soil	Decommissioning phase	Med	**Control:** Storm water management Site Management Soil Management	Low
	Soils replaced and ameliorated	Soil		Med	**Control:** Storm water management Site Management Soil Management	Low-Med
	Dust nuisance caused during landscaping activities 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 will be contained within the property boundaries and will therefore affect only the landowner.		Med	Control: Dust Suppression Dust control measures and rehabilitation of areas stripped of vegetation	Low
	Emissions caused by vehicles and equipment	Emissions		Low-Med	Control: Emissions	Low
	Noise nuisance caused by machinery 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		Low-Med	Control: Noise Management Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Low-Med
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Groundwater pollution		Low-Med	Control: Proper site management.	Low
	Contamination of area with hydrocarbons or hazardous waste materials During the decommissioning and closure phase's equipment will be removed, stockpiled soils will be used for rehabilitation, and 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.	Contamination may cause surface or ground water pollution if not addressed		Medium	Control: Waste management 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.	#REF!

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
					Control through the implementation of the NWA GN 704 water management principles.	
	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora		Low-Med	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Low-Med
	Area revegetated with indigenous plants	Flora		Low-Med	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Low-Med
	Improve response to issues relating to deterioration of groundwater quality or quantity	Groundwater improvement		Low-Med	Control: Proper site management.	Low-Med
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm 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.	Surface water Bodies	Decommissioning phase	Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	Low
	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. Free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Surface water Bodies		Low-Med	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. 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
	Health and safety risk posed by un-sloped areas	The impact on health and safety due to un-sloped areas will be contained within the site boundary.		Medium	Control: Sloping of areas upon decommission	Low-Med
	Reintroduction of fauna attracted to flora to the area	Fauna returning to area		Low-Med	Control: Implementation of fauna protection measures	Low
	Alteration of topography	Topography		Low-Med	Control: Surface water Monitoring	Low-Med
	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Topography		Low-Med	Control: Surface water Monitoring	Low-Med
	Improved aesthetics through rehabilitation	The visual impact may affect the aesthetics of the landscape.		Low-Med	Control: Implementation of proper housekeeping	Low-Med
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming 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.	Land use		Low-Med	Control: Fire	Low-Med

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix I.

k) Summary of specialist reports.

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

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 Impact Assessment	Will be included as part of the FBAR.	The larger geographical area (Bushmanland) in which the current study area is located is marked by a low-density background scatter of lithics (Beaumont *et al*. 1995). In the Aggeneys area, however, this scatter tends to be quite ephemeral (e.g., Halkett 2010; Morris 2011a, 2011b, 2013; Orton 2015, 2016; Webley & Halkett 2012, Van der Walt & Orton 2019). Field assessments closer to the current area of investigation yielded no sites of significance (e.g., Rossouw 2013 & Orton 2015) and the cultural heritage of the study area interpreted within this context. Areas around dump 1 -3 have been impacted on by existing mining, dating to 1961 and the dumping of topsoil, clearing and levelling characterise these areas. All of these activities would have impacted on surface indicators of heritage resources if these ever existed in the areas of dump 1 -3. In terms of the prospecting boreholes that would result in a very small impact where borehole one, two and four is sited in Greenfields areas the remaining two boreholes (three & five) are in locations disturbed from a heritage perspective by previous mining activities. The proposed prospecting boreholes are all located on steep slopes of the mountains and ridges in the area of mica-sillimanite schists which do not seem to have been conducive to the formation of rock shelters and no rock art or archaeological sites of significance were recorded in the study areas. The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Human impact (apart from the existing mining and dumps) is limited to isolated farming infrastructure like farm fences, wind pumps and tracks. The cultural landscape (mining and farming activities) is generally modern without significant cultural landscape elements of concern and impacts are deemed to be of low significance. The impact of the proposed project on heritage resources is considered to be low, and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented and based on approval from SAHRA • • Implementation of a chance finds procedure as outlined below. **10.1. Chance Find Procedure** The possibility of the occurrence of subsurface finds or previously unknown sites cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place for the project. A short summary of chance find procedures is discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. 11. If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. 12. It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. 13. The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. **10.2. Reasoned Opinion**	Please refer to: Part A h) iv) (1) (a); and Part A t) i)

		The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits associated with the project also outweigh the possible impacts of the development on heritage resource if the correct mitigation measures (i.e. chance find procedure) are included in the EMPr. **10.3. Potential risk** Potential risks to the proposed project are the occurrence of unknown and unmarked graves. Thee possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earthworks. These risks can be mitigated to an acceptable level with the implementation of a chance find procedure as outlined in Section 10.1.	
As mentioned previously a site walkthrough will be conducted before site clearance. Bush clearance will be conducted together with the Botanist and that the necessary permits will be obtained before any protected plants (if present) will be removed/disturbed. The expertise of the Botanist will be included as one of the conditions to this BAR/EMPR.			

l) Environmental impact statement

xiii) Summary of the key findings of the environmental impact assessment;

Please refer to the Environmental Impact Assessment in Appendix I. The key findings of the environmental impact assessment entail the following:

The key findings of the environmental impact assessment entail the following:

- The project entails the excavation mining of sillimanite in an area previously used for mining. Due to the small area used for grazing and mining, mining of sillimanite in the area was identified as a more viable use.
- The mining procedure will only entail the excavation and transporting of the sillimanite by means of a front-end loader upon which it will be loaded onto trucks and transported from the mining site to the stockpiling site. The clients will then acquire the Sillimanite from the stockpiling site.
- The existing roads to the mine area can be used to gain access to the site. No new roads are needed.
- Mining activities will be contained within the boundaries of the permitted site. Proper storm water and waste management however needs to be implemented on the site in order to minimise the potential of pollution.

Mining and Biodiversity Conservation Areas:

- The environmental impact assessment identified a critical biodiversity area (CBA) that extends throughout the boundary of the proposed mining area. This area is also highlighted in terms of the Mining and Biodiversity Guideline as an area of high biodiversity importance with a corresponding rating of high risk for mining.

- In order to preserve the CBA and prevent mining having a negative impact on the biodiversity sensitive area, it is proposed that a 20 m no-go buffer be set from the border of the CBA line in which no mining may take place. The buffer area will reduce the mineable footprint from 4.9 ha to ±3.9 ha. Should the Applicant adhere to the proposed 20 m no-go buffer area (from the border of the CBA) the impact on the biodiversity sensitive area is deemed to be insignificant.

Other Site Specific Environmental Aspects:

- No sites of archaeological or cultural importance were identified during the site inspection located in the mining footprint area.
- The fauna at the site will not be impacts on by the proposed mining activity as they will be able to move away or through the site, without being harmed.
- There are no rivers, streams or wetlands within close proximity of the mining area.
- Although the proposed activity will have a cumulative impact on the ambient noise levels, the development will not take place in a pristine environment, and tithe impact is therefore deemed compatible with the current operations and of low significance.

- As the prevalent wind direction is in a southern direction, the hills and ridges in the surrounding environment will screen dust generated at VZF from the operations/residents. Should the applicant implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance.
- View shed, as mentioned above, the mining area will be established within the hills and ridges which will also act as a visual barrier.

Upon closure the site will be rehabilitated and sloped to insure that the visual impact on the aesthetic value of the area is kept to a minimum. The site will have a neat appearance and be kept in good condition at all times.

xiv) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structure and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as Appendix.

See the map indicating site activities attached as

Appendix C

xv) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Associated Positive Impacts – Temporary Infrastructure:

- Low intensity site establishment;
- Easy movement of infrastructure as processing progress;
- Soils replaced and ameliorated;
- Areas re-vegetated with indigenous plants;
- Re-contouring f area for free surface water draining;
- Reintroduction of fauna attracted to flora in the area; and
- Complete removal of infrastructure at closure of the mine.

The negative impacts associated with the project that was deemed to have a Low-Medium or Medium significance includes:

- Disturbance of the geological strata **Med-High**
- Dust nuisance stemming from proposed project **Low-Med**
- Loss of and disturbance of surface archaeological sites **Low-Med**
- Contamination of area with hydrocarbons or hazardous waste materials **Low-Med**
- Potential for loss of soil and damage to soil characteristics **Low -Med**
- Potential for erosion, loss of soil characteristics, Compaction of soil & degradation through stockpiling **Low-Med**
- Loss of biodiversity **Low-Med**
- Emissions from vehicles and drilling equipment on site **Low-Med**
- Potential hydrocarbon contamination from leaks or spills leaching into the water table **Low-Med**
- Loss of food, nest sites and refugia for fauna **Low-Med**
- Potential hydrocarbon contamination which may reach downstream surface water bodies **Low-Med**
- Potential damage to or destruction of sensitive faunal habitats **Low-Med**
- Pans & watering points **Low-Med**
- Road degradation **Low-Med**

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;

Based on the assessment and where applicable the 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 condition of authorisation.

Management Objectives	Role	Management Outcomes
Visual Aspect	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Ensure that the site have a neat appearance and is kept in good condition at all times. - Remove all infrastructure upon rehabilitation of the processing area and return the area to its prior status.
Dust Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer. Dust monitoring consultant to check dust results and provide guidelines.	- Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. - Limit speed on the access roads to 40km/h to prevent the generation of excess dust. - Spray roads with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. - Assess effectiveness of dust suppression equipment. - Re-vegetate all disturbed or exposed areas as soon as possible to prevent any dust source from being created. - Thoroughly soak all stockpiles to ensure dust suppression on the site. - Conduct formal dust monitoring on a monthly basis.
Noise Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer. Compliance to be monitored by the Noise Monitoring Specialist.	- Ensure that employees and staff conduct themselves in an acceptable manner while on site. - No loud music may be permitted at the prospecting area. - Ensure that all prospecting vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. - Compliance with the appropriate legislation with respect to noise will be mandatory. - Implement formal noise monitoring on a quarterly basis.
Management of weed/invader plants	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	- Implement a weed and invader plant control management plan. - Control declared invader or exotic species on the rehabilitated areas. - Keep the temporary topsoil stockpiles free of weeds.
Surface and Storm water Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	- Divert storm water around the topsoil heaps and access roads to prevent erosion and loss of material. - Divert runoff water around the stockpile areas with trenches and contour structures to prevent erosion of the work areas.
Topsoil management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Strip and stockpile the upper 500 mm of the soil and protect as topsoil. - Remove topsoil at right angles to the slope to slow down surface runoff and prevent erosion. - Conduct topsoil stripping, stockpiling and re-spreading in a systematic way. Ensure topsoil is stockpiled for the minimum possible time. - Protect topsoil stockpiles against losses by water and wind erosion through the establishment of plants on the stockpiles. - Place topsoil stockpiles along the northern and western boundaries of the site. Topsoil heaps may not exceed 1.5m in order to preserve microorganism within the topsoil.

Management Objectives	Role	Management Outcomes
Protection of natural vegetation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Contain all activities within the boundaries of the approved prospecting area. - Demarcate, signpost and manage the 20m buffer area as no-go area around areas with natural vegetation. - Vegetation clearing control - Rep and rehabilitation of unnecessary compacted areas - Adherence to mine roads - Implementation for a no collection and no open fire policy.
Fauna Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Ensure no fauna is caught, killed, harmed, sold or played with. - Instruct workers to report any animals that may be trapped in the working area. - Ensure no snares are set or nests raided for eggs or young.
Management of health and safety risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMP. Compliance to be monitored by the Environmental Control Officer.	- Ensure that workers have access to the correct PPE as required by law. - Ensure all operations comply with the Occupational Health and Safety Act.
Handling of Hazardous Materials and Substance	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer	- Store all hazardous materials or substances in a closed storage facility with an impermeable floor. - Storage area to meet the following conditions: - Construct storage area on a level area. - Floor of the storage area should be impermeable. - Storage area should be outside the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest. - Access to the materials/substances may only take place with the prior notification of the site manager. - Fuel storage tanks should have an impermeable bund wall and base within which the tanks sits, raised above the floor, on plinths. The bund capacity should be sufficient to contain 110% of the tank's maximum capacity. - Consider the distance and height of the bund wall relative to that of the tank to ensure that oil does not spout beyond the confines of the bund. - Establish a formal inspection routine to check all equipment in the bund area, as well as the bund area itself for malfunctions or leakages. Inspection should be at least weekly and any accumulated rainwater should be removed. - All valves and outlets should be checked to ensure that they are intact and closed securely. - Slope the bund base towards a rainwater sump of sufficient size. - Contain contaminated water until it can be collected by a registered hazardous waste handling contractor or be disposed of at a registered hazardous waste handling facility. - Ensure availability of drip trays underneath all stationary equipment or vehicles.

Management Objectives	Role	Management Outcomes
Waste management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	- Ensure no waste storage area is established outside the boundaries of the prospecting area. - Ensure vehicle maintenance only take place within the service bay area of the off-site workshop. If emergency repairs are needed on site, ensure drip trays is present. Ensure all waste products are disposed of in a 200 litre closed container/bin inside the emergency service area. - Ensure diesel bowser is equipped with a drip tray at all times. - Use drip trays during each and every refuelling event. - Ensure the nozzle of the bowser rests in a sleeve to prevent dripping after refuelling. - Keep drip trays clean. No dirty drip trays may be used on site. - Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility. - Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility. File proof on site. - Ensure the availability of suitable covered receptacles at all times and conveniently placed for the disposal of waste. - Place all used oils, grease or hydraulic fluids therein and remove these receptacles from the site on a regular basis for disposal at a registered or licensed hazardous disposal facility. - Store non-biodegradable refuse such as glass bottles, plastic bags etc., in a container with a closable lid at a collecting point. Collection should take place on a regular basis and disposed of at the recognised landfill site. Prevent refuse from being dumped on or in the vicinity of the prospecting area. - Biodegradable refuse to be handled as indicated above.
Management of access roads	Site Manager to ensure compliance with the guidelines as stipulated in the EMP. Compliance to be monitored by the Environmental Control Officer.	- Maintain newly constructed access roads so as to minimise dust, erosion or undue surface damage. - Divert storm water around the access roads to prevent erosion. - Erosion of access road: Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas. - Repair rutting and erosion of the access roads caused by the proposed activities.
Protection of Cultural or Heritage Artefacts	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. - Notify Heritage and the ECO immediately.
Surface and Groundwater Degradation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	- Adherence to water management guidelines - Specific water facility construction - Storm water control - Measurement of water quantity and quality - Implementation of ground water monitoring system.

Management Objectives	Role	Management Outcomes
After care on rehabilitated areas	Site Manager to ensure compliance with the guidelines as stipulated in the EMPr. Compliance to be monitored by the Environmental Control Officer.	• Control run-off water via temporary banks to ensure that accumulation of run-off does not cause down-slope erosion. • Only do topsoil spreading at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal. • Plant a cover crop immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. Fertilize the cover crop for optimum production. • Ensure rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation must not be considered complete until the first cover crop is well established. • Monitor all rehabilitated areas for erosion, and appropriately stabilized if any erosion occurs.

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

The management objectives listed in this report under Point m above should be considered for inclusion in the environmental authorisation.

As mentioned previously a site walkthrough will be conducted before site clearance. Bush clearance will be conducted together with the Botanist and that the necessary permits will be obtained before any protected plants (if present) will be removed/disturbed. The expertise of the Botanist will be included as one of the conditions to this BAR/EMPR.

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site specific information gathered from the property owner, as well as site inspections, and background information gathering.

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

i) Reasons why the activity should be authorised or not.

Should the mitigation measures and monitoring programmes proposed in this document be implemented on site, no fatal flaws could be identified that were deemed as severe as to prevent the activity continuing.

The proposed prospecting operations should strongly be considered for authorisation as such development may result in the upliftment of local community economic growth of the surrounding towns, region as possible province.

ii) Conditions that must be included in the authorisation

The management objectives listed in this report under Point m should be considered for inclusion in the environmental authorisation.

As mentioned previously a site walkthrough will be conducted before site clearance. Bush clearance will be conducted together with the Botanist and that the necessary permits will be obtained before any protected plants (if present) will be removed/disturbed. The expertise of the Botanist will be included as one of the conditions to this BAR/EMPR.

q) Period for which the Environmental Authorisation is required.

The applicant requests the Environmental Authorisation to be valid for a two (2)-year period.

r) Undertaking

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 Basic assessment report and the Environmental Management Programme report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Basic Assessment Report and the Environmental Management Programme report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

i) Explain how the aforesaid amount was derived

The annual amount required to manage and rehabilitate the environment was estimated to be R 17 500, 14.

Please see the explanation as to how this amount was derived at attached as in Section B, f, i. A Bank Guarantee will be provided for the proposed site.

ii) Confirm that this amount can be provided from operating expenditure.

(Confirm that the amount is anticipated to be an operating cost and is provided for as such in the prospecting Work Programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

The prospecting operation will be self-funded through income generated Van Zyl Farms. A bank guarantee will be ceded to the DMR for the required amount.

t) Specific Information required by the competent Authority

iii) Compliance with the provisions of sections 24(4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the: -

(1) Impact on the socio-economic conditions of any directly affected person. (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix)

The following potential impacts were identified that may impact on socio-economic conditions of directly affected persons:

Visual exposure:

The prospecting area was identified to constitute the lowest possible visual impact on the surrounding environment. The surrounding areas have previously been disturbed by prospecting activities and surrounding mines in the area. The applicant should however ensure that housekeeping is managed to standard, as this will mitigate the visual impacts during the operational phase of the mine.

Upon closure the site will be rehabilitated and sloped to insure that the visual impact on the aesthetic value of the area is kept to a minimum. The site will have a neat appearance and be kept in good condition at all times.

Air Quality:

The background air quality of the surrounding area is relatively good due to low industrial activity. Factors contributing to air pollution are the burning of veld and agriculture in the area. Given the surrounding extent of mostly covered areas, no extreme dust generation under windy conditions is experienced.

Dust will be generated by the movement of machinery and vehicles. Dust suppression measures should be implemented to prevent excessive dust on site. Due to the remote setting of the proposed prospecting area the potential impact of dust nuisance on the surrounding environment is deemed to be of low significance.

Noise:

The surrounding areas are characterised by an agricultural setting in which vehicles and farm equipment operate. The traffic on the roads surrounding the property contributes to the ambient noise of the area. The noise to be generated at the proposed site operation is expected to temporarily increase the noise levels of the area. Loading and transportation of the material will generate noise daily. The significance of noise on the surrounding environment is therefore deemed to be of low significance. Mitigation measures should be implemented to ensure employees conduct them in an acceptable manner while on site in order to lessen the noise impact of the proposed activity on the surrounding environment.

Existing Infrastructure:

It is expected that the proposed processing activity will have a very low impact on the surrounding environment as activities will be contained within the boundaries of the site. The proposed footprint area will not require the building of any permanent structures. The proposed prospecting on the property will also reduce the amount of trucks delivering materials, from outside sources. This will have a direct positive impact on the traffic volumes of the surrounding roads and price of the aggregate.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of the Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein).

A Heritage Impact Assessment Report was conducted by a qualified specialist and was included in the FBAR report. The Conclusions and recommendations is included below.

The larger geographical area (Bushmanland) in which the current study area is located is marked by a low-density background scatter of lithics (Beaumont *et al*. 1995). In the Aggeneys area, however, this scatter tends to be quite ephemeral (e.g., Halkett 2010; Morris 2011a, 2011b, 2013; Orton 2015, 2016; Webley & Halkett 2012, Van der Walt & Orton 2019). Field assessments closer to the current area of investigation yielded no sites of significance (e.g., Rossouw 2013 & Orton 2015) and the cultural heritage of the study area interpreted within this context.

Areas around dump 1 -3 have been impacted on by existing mining, dating to 1961 and the dumping of topsoil, clearing and levelling characterise these areas. All of these activities would have impacted on surface indicators of heritage resources if these ever existed in the areas of dump 1 -3. In terms of the prospecting boreholes that would result in a very small impact where borehole one, two and four is sited in Greenfields areas the remaining two boreholes (three & five) are in locations disturbed from a heritage perspective by previous mining activities. The proposed prospecting boreholes are all located on steep slopes of the mountains and ridges in the area of mica-sillimanite schists which do not seem to have been conducive to the formation of rock shelters and no rock art or archaeological sites of significance were recorded in the study areas.

The survey also did not reveal any historical farm steads, colonial era stone-walling (dwellings or kraals), graves or other sites of significance. Human impact (apart from the existing mining and dumps) is limited to isolated farming infrastructure like farm fences, wind pumps and tracks.

The cultural landscape (mining and farming activities) is generally modern without significant cultural landscape elements of concern and impacts are deemed to be of low significance. The impact of the proposed project on heritage resources is considered to be low, and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented and based on approval from SAHRA

- Implementation of a chance finds procedure as outlined below.

Chance Find Procedure

The possibility of the occurrence of subsurface finds or previously unknown sites cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place for the project. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

1. If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the

site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.

2. It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
3. The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Reasoned Opinion

The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA. Furthermore, the socio-economic benefits associated with the project also outweigh the possible impacts of the development on heritage resource if the correct mitigation measures (i.e. chance find procedure) are included in the EMPr.

Potential risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. Thee possibility exists that the study area could contain graves of which surface indicators have been destroyed and subsurface material could be uncovered during earthworks. These risks can be mitigated to an acceptable level with the implementation of a chance find procedure as outlined above.

u) Other matters required in terms of section 24(4) (a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4)

No alternatives sites where considered during this prospecting drilling. If drill sites where found unfeasible due to the natural environment, these drill sites will be relocated to a position possible with minimal impacts associated. Please refer to Figure 4 for the proposed exploration boreholes. Product stockpiles to be prospected are old mining stockpiles. No other alternative sites where investigated due to limited stockpiles on site.

However, the applicant considered two activity alternatives during the planning phase of this project:

1. Temporary Infrastructure (Preferred Alternative) vs. Permanent Temporary Infrastructure:
    a. The use of temporary Infrastructure will entail the use of machinery that is either track-based or can be removed without difficulty. Temporary Infrastructure to be used in the prospecting mining method will entail some temporary offices, storage facility and chemical toilet, with servicing of vehicles and equipment being done off-site at the existing workshop on the applicant’s farm.

Positive Aspects: The positive aspects associated with the use of temporary infrastructure firstly enable the applicant to move the temporary infrastructure within the boundaries of the prospecting mining area as prospecting mining of the mineral progresses. Secondly the decommissioning phase is facilitated as the removal of temporary infrastructure from the prospecting mining area during the rehabilitation of the site is easy and highly effective.

The use of permanent infrastructure will entail the construction of an office building with ablution facilities, and installation of a permanent vehicle service area.

i. The use of permanent Infrastructure will increase the impact of the proposed project on the environment as it will entail the establishment of more structures, lengthen the period required for rehabilitation as well as increase the rehabilitation amount as the permanent Infrastructure will either have to be decommissioned or be maintained after the closure of the site.
ii. The construction of permanent Infrastructure at the site will also increase the visual impact of the proposed project on the surrounding environment and additional mitigation measures will have to be implemented to address the impact.

In the light of the above the use of temporary Infrastructure is deemed to be the most viable preferred alternative.

No-go Alternative:

The 'No Go' option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass. The no-go alternative entails no change to the status quo and is therefore a real alternative that must be considered. In the event that the no-go alternative is implemented it will prevent the prospecting of the study area.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Final Environmental Management Programme.

a) Details of the EAP, (Confirm that the requirements for the provision of the details and expertise of the EAP are already included in Part A, section 1(a) herein as required).

The details and expertise of Yolandie Coetzee of Greenmined Environmental that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix K.

b) Description of the Aspects of the Activity (Confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The aspects of the activity that are covered by the final environmental management programme has been described and included in Part A, section (1)(h).

c) Composite Map

(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

As mentioned under Part a, section (1) (L) (ii) this map has been compiled and is attached as Appendix C to this document.

d) Description of impact management objectives including management statements

iv) Determination of closure objectives. (Ensure that the closure objectives are informed by the type of environment described)

Prospecting activities are to be undertaken in a manner which facilitates site rehabilitation and the restoration of existing land capabilities. The primary objectives for rehabilitation includes:

a) The facilitation of the re-establishment of the land use and capability to as close as reasonably to the original conditions;
b) Removal of all infrastructure and material introduced to site;
c) Removal of all wastes and their and their related disposal; and
d) And promotion of the rapid re-establishment of natural vegetation and the restoration of site ecology.

The disturbed areas shall be rehabilitated to ensure that:

- The biodiversity habitat is encouraged by the new land use after the prospecting;
- Future public health and safety are not compromised;
- The site is reversed to almost its original state;
- Environmental and resources are not subject to physical and chemical deterioration;
- The after-use of the site is beneficial and sustainable in the long term;
- Any adverse socio-economic impacts are minimized; and
- All socio-economic benefits are maximized.

This will be done by complying with the conditions in the environmental management program below, and relevant statuary requirements. The contractor and employee will be made aware of their environmental responsibilities and will be empowered to execute the work program in compliance with the requirements of this EMPR.

The following closure objectives are proposed with regard to rehabilitation of the prospecting area:

- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
  - The topsoil will be placed back as a growth medium and the sides of the excavation will be sloped with acceptable contours to prevent soil erosion.
- No trees to be removed over areas where prospecting is required.
- Rehabilitation will be conducted after the prospect drilling is complete.
- Rehabilitation will be ongoing and conform to 400 m^2 being stripped of topsoil and 400 m^2 being rehabilitated after the oversized and processed soil is worked back into the excavation.
- Thus there will only be 400 m^2 of land open for rehabilitation in operational times.
- Fill and topsoil could be placed over the slopes to provide a suitable medium for the establishment of vegetation.
- No waste will be permitted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the prospecting mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.
- Photographs of the camp and office sites, before and during the prospecting mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.
- Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred.
- All Temporary Infrastructures, equipment, plant, temporary housing and other items used during the prospecting mining period will be removed from the site.

- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting mining area and disposed of at a recognized landfill facility, proof of this removal will be kept on file at the applicant's office. It will not be permitted to be buried or burned on the site.
- Weed / Alien clearing will be done in a sporadic manner during the life of the prospecting activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

v) Volume and rate of water use required for the operation

It is proposed that the prospecting activities will require approximately 2 5000L of water per drill site.

vi) Has a water use licence has been applied for?

N/A. Water will be brought to site every day for use on site. Diamond drilling does not require water, as the RC drilling works with air pressure. Potable water would be bought locally and supplied to site.

vii) Impacts to be mitigated in their respective phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
whether listed or not listed	(volumes, tonnages and hectares or m²)	In which impact is anticipated			
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))			
SITE VISITS BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	**Dust Handling:** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly, especially during times of high dust generation.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
			Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
			Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. Should graves be observed on site during activity progress then all activity should be ceased and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999	Throughout operational and decommissioning phases
			Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. Should graves be observed on site during activity progress then all activity should be ceased and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999	Throughout operational and decommissioning phases
			Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in.	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
			Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with.	Negative impact on fauna that may enter the area: • NEM: BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			• Workers must be instructed to report any animals that may be trapped in the working area. • No snares may be set or nests raided for eggs or young.		
SITE visits BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • Workers must be instructed to report any animals that may be trapped in the working area. • No snares may be set or nests raided for eggs or young.	Negative impact on fauna that may enter the area: • NEM: BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases
			All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks will be cleaned up immediately using an absorbent material.		
			Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received.	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SITE visits BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. O Dirty water must be collected and contained in a system separate from the clean water system. O Dirty water must be prevented from spilling or seeping into clean water systems. O Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). O The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SITE visits BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases

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SITE VISITS BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases
			Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	NWA, 1998	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SITE visits BY VARIOUS SPECIALIST	Entire prospecting right area	Construction / Site Establishment phase	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	NWA, 1998	Throughout operational and decommissioning phases
			All intersections with main tarred roads will be clearly signposted. drivers will be enforced to keep to set speed limits. Trucks will be road-worthy condition. A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road. Ensure directional floodlights are utilized that focus light on the necessary areas and reduce light pollution to surrounding environment.	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.	Throughout operational and decommissioning phases
DESKTOP STUDY		Planning	N/A	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.	Throughout the planning phase
DEMARCATION OF SITE WITH VISIBLE BEACONS.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Demarcation of the site will ensure that all employees are aware of the boundaries of the processing area and that work stay within approved area.	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993	Beacons need to be in place throughout the life of the activity.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.			N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
			Portable toilets will be managed by reputable contractors and inspected daily for potential leaks. No site establishment shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of wetlands and/or riparian zones without consent from the DWS; Avoid stripping of areas within the construction sites; Rehabilitate areas that may have been mistakenly stripped; Storm water upslope of the campsite and drill sites should be diverted around these sites; Proper waste management facilities will be put in place at the campsite and drilling site. Any hydrocarbon spill from the site establishment will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, 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 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 offloading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean storm water, Contaminated water shall be pumped into a container for removal by an approved service	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site. Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704.	Construction / Site Establishment phase and Operational Phase

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			provider; Regular inspections shall be carried out to ensure the integrity of the bund walls; All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; Runoff from this area shall be contained; Spill kits shall be made available and all personnel shall be trained and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas; Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited; Adequate storm water management must be incorporated into the design of the project in order to prevent contamination of water courses and wetlands from dirty water;		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Portable toilets will be managed by reputable contractors and inspected daily for potential leaks. No site establishment shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of wetlands and/or riparian zones without consent from the DWS; Avoid stripping of areas within the construction sites; Rehabilitate areas that may have been mistakenly stripped; Storm water upslope of the campsite and drill sites should be diverted around these sites; Proper waste management facilities will be put in place at the campsite and drilling site. Any hydrocarbon spill from the site establishment will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, 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 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 offloading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean storm water, 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 bund walls; All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; Runoff from this area shall be contained; Spill kits shall be made available and all personnel shall be trained and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas; Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited; Adequate storm water management must be incorporated into the design of the project in order to prevent contamination of water courses and wetlands from dirty water;	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site. Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704.	Construction / Site Establishment phase and Operational Phase
			Portable toilets will be managed by reputable contractors and inspected daily for potential leaks. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented.	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase and Operational Phase

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			• The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management. Loss of soils, erosion of the soils and impacts on land owner's livelihood: No soil stripping will be allowed during site establishment; Should it be necessary to conduct geophysical surveys and geological mapping, ensure minimal disturbance of soil; Any activity that may result into the disturbance of the soils must be rehabilitated immediately on discovery; Machinery to be used for the operation will be of good working conditions; Any hydrocarbon spill from the site establishment will be remediated as soon as possible; Use sites that are unused and that are in the degraded state for the proposed development. This must be done in agreement with the land owner. The siting of the boreholes must be conducted such that rocky ridges, sensitive grass lands, indigenous trees and shrubs, sites of geological importance and farmlands actively used for crop farming are avoided; 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; Institute adequate sedimentation control measures where necessary when excavation or disturbance of the river banks takes place; The time in which soils are exposed during construction activities; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity; 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;		

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	**Visual Mitigation:** • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. Screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites; Lighting will be conducted in a manner that will reduce the impacts on visual aspects at night times; 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 minimize the visual impacts on the residents; 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;	Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users. Vegetation clearance must be limited to demarcated areas only	Throughout operational phase
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	**Dust Handling:** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. All contractors will enforce speed limits. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Roads will be sprayed with water regularly, especially during times of high dust generation.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities.	Throughout operational and decommissioning phases
			Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions. Wet suppression using will be conducted at areas with excessive dust emissions; Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; Rehabilitation of disturbed areas shall be undertaken in tandem with construction activities; 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; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; **Odours:** Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer; All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency; Traffic will be restricted to demarcated areas and traffic volumes and speeds within the construction site will be controlled;	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards. Comply with the requirements of the Minimum Emission Standards	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			Noise Handling: The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Point sources will be enclosed where possible. Silencers will be utilized where possible. Screens will be considered if I&AP complaints are received. The maximum speed limit shall be limited to 40 km/hr subject to risk assessment; Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures; Ensure that the employees are issued with earplugs and that they are instructed to use them; Educate employees on the dangers of hearing loss due to mine machinery noise; 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 must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fan-belts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g. no overloading of machines); Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; Equipment must be operated in such a way that the equipment is operated throughout the working periods instead of operating several items simultaneously; 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; Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00);	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures ensure that the noise levels from the construction sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the prospecting staff and surrounding communities/land owners. Remain within the Noise Regulation Standards for Rural Areas.	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management. Loss of soils, erosion of the soils and impacts on land owner's livelihood: No soil stripping will be allowed during site establishment; Should it be necessary to conduct geophysical surveys and geological mapping, ensure minimal disturbance of soil; Any activity that may result into the disturbance of the soils must be rehabilitated immediately on discovery; Machinery to be used for the operation will be of good working conditions; Any hydrocarbon spill from the site establishment will be remediated as soon as possible; Use sites that are unused and that are in the degraded state for the proposed development. This must be done in agreement with the land owner. The siting of the boreholes must be conducted such that rocky ridges, sensitive grass lands, indigenous trees and shrubs, sites of geological importance and farmlands actively used for crop farming are avoided; 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 stabilized; Institute adequate sedimentation control measures where necessary when excavation or	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			disturbance of the river banks takes place; The time in which soils are exposed during construction activities; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity; 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;		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above. *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 in 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. No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of wetland and riparian areas; General waste will be collected in an adequate number of litter bins located throughout the construction site Bins shall be located no more than 50 m from construction sites; Bins must have lids in order to keep rain water 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 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; 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,	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Implementation of mitigation measures will ensure that the activities in the development of the prospecting sites and associated infrastructure do not have detrimental impacts on the soils, land use and land capability. The mitigation measures will result in reduced the amounts of waste produced, will encourage re-use of material where possible and recycling of the material where possible. Disposal will be utilized as the last resort. The mitigation measures will also ensure that the management of waste will be in accordance with the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			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 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 waste to a registered landfill site;		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	**Loss of natural vegetation in the affected areas:** Use sites with most disturbed vegetation cover for the development; No strip of topsoil and vegetation will be allowed during site establishment; Ensure minimal disturbance of vegetation when conducting geophysical surveys and geological mapping; Use existing track and roads in all instances as far as is practicable; As part of the soil sampling programme, no tracks will be cleared for once-off access to sampling sites; Avoid significant vegetation such as trees and large shrubs in the event that driving through the veld is required to access an identified sampling site; Any area that may result into the disturbance of the vegetation cover must be rehabilitated immediately on discovery; 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; 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; Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project; Implementation of an Alien Invasive Plant Species Management plan; Edge effects of activities including erosion and alien/ weed control will be strictly managed in the affected areas; All sites disturbed by construction activities shall be monitored for colonization 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;	The implementation of mitigation measures will ensure that the establishment of the prospecting site and associated infrastructure/equipment do not have detrimental impact on the area's flora, in particular indigenous species and species that are of conservation importance. Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation	Throughout Construction Phase
			Keep mining in footprint		Throughout operational and decommissioning phases
			Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. Should graves be observed on site during activity progress then all activity should be ceased	<u>Loss of Artefacts and Graves:</u> National Heritage Resources Act No. 25 of 1999	Throughout operational and decommissioning phases

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			and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity. The establishment of the sites will be away from any identified grave site or heritage sites. A buffer of 50 m will be created between the sites and the proposed camp and drilling sites;		
			Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. No site establishment shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of wetlands and/or riparian zones without consent from the DWS; Avoid stripping of areas within the construction sites; Rehabilitate areas that may have been mistakenly stripped; Storm water upslope of the campsite and drill sites should be diverted around these sites; Proper waste management facilities will be put in place at the campsite and drilling site. Any hydrocarbon spill from the site establishment will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, 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 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 offloading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean storm water, 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 bund walls; All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; Runoff from this area shall be contained; Spill kits shall be made available and all personnel shall be trained and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas; Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited; Adequate storm water management must be incorporated into the design of the project in order to prevent contamination of water courses and wetlands from dirty water;	Contamination of surface or groundwater due to hazardous spills not cleaned: Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. 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) (	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. No site establishment shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of wetlands and/or riparian zones without consent from the DWS; Avoid stripping of areas within the construction sites; Rehabilitate areas that may have been mistakenly stripped; Storm water upslope of the campsite and drill sites should be diverted around these sites; Proper waste management facilities will be put in place at the campsite and drilling site. Any hydrocarbon spill from the site establishment will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, 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 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 offloading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean storm water, 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 bund walls; All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; Runoff from this area shall be contained; Spill kits shall be made available and all personnel shall be trained and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas; Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited; Adequate storm water management must be incorporated into the design of the project in order to prevent contamination of water courses and wetlands from dirty water;	NWA, 1998 Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. 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 wetlands and riparian zones without consent from the DWS.	Throughout operational and decommissioning phases
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Operational phase	Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-	<u>Negative impact on fauna that may enter the area:</u> • NEM: BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • Workers must be instructed to report any animals that may be trapped in the working area. • No snares may be set or nests raided for eggs or young. **Migration of animal life due to disturbance caused proposed project:** The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; Site activities will be conducted during daytime hours 07h00 – 17h30 to avoid night time noise disturbances and night time collisions with fauna; Vehicle speed will be reduced, particularly in highly vegetated areas to avoid deaths by vehicle impacts; No trapping or hunting of fauna is 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 faunal 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; Poaching will be prohibited at the prospecting site;		
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Total of 5 drilling site's and 3 dump sire	Construction / Site Establishment phase	Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix?	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
			Traffic: Where existing public roads are used to access the construction C1+I3969 adequate construction signage is in place to inform the public of increased construction activities in the affected areas by placing adequate signage; Traffic signs should warn community road users of the presence of construction vehicles; Local speed limits and traffic laws shall apply at all times to minimize the occurrences of accidents on public roads; Where possible the transportation of construction m+I39aterials and rubbish shall be undertaken outside traffic peak hours to minimize inconveniencing residents; The number of construction vehicles and trips shall be kept to a minimum Materials transported on public roads must be covered.	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow moving vehicles. Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	Throughout Construction Phase
			Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off. Recruitment will not be undertaken on site; Recruitment process shall favour locals, but farm labourers will not employed unless agreed to with the farm owners; Where required, liaise with the SAPD to ensure safety of landowners in the areas;	The identified mitigation measures will result in minimal influx of job seekers to the site	Construction / Site Establishment phase

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
DRILLING FOR CONTINUED RESOURCE EVALUATION	Total of 5 drilling sites	Operational phase	Visual Mitigation: • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites. Lighting will be conducted in manner that will reduce the impacts on visual aspects at night times. Materials transported on public roads must be covered. 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 minimize the visual impacts on the residents. All lighting shall be kept to a minimum within the requirements of safety and efficiency. Where such lighting is deemed necessary, low-level lighting, which is shielded to reduce light spillage and pollution, shall be used. No naked light sources shall be directly visible from a distance. Only reflected light shall be visible from outside the site. External lighting shall use down-lighters shielded in such a way as to minimize light spillage and pollution beyond the extent of the area that needs to be lit. Security and perimeter lighting shall be shielded so that no light falls outside the area needing to be lit Drill rigs shall be located in areas with adequate tree and bush cover to minimize the visual impact on residents. Where no adequate vegetation cover is available for the drill rigs, shade cloths can be used to screen off the drill rigs. 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	Measures will be undertaken by the mine to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives. 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 minimize the visual impact	Throughout operational and decommissioning phases
			Dust suppression must be conducted during the operational phase of the project. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. Maintain a speed limit of 20km/hr during the dry season and or when the wind velocity is likely to result in an increased nuisance dust. Materials transported on public roads must be covered.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) The air quality in the vicinity of the drilling sites and sites' access routes will be maintained to stay within the national air quality standards. Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards	Throughout operational and decommissioning phases
			Limit the maximum speed to 40 km/h or less, subject to risk assessment. Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures. Ensure that the employees are issued with earplugs and that they are instructed to use them. Educate employees on the dangers of hearing loss due to mine machinery noise. Drill sites shall be located as far from private property as is possible to minimize noise impacts	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures will ensure that the noise levels from the sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 guidelines. Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
DRILLING FOR CONTINUED RESOURCE EVALUATION	Total of 5 drilling sites	Operational phase	Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. <u>The drilling operation and use of campsite may result in the generation of surface water runoff contaminated with silt (sedimentation) and possibly hydrocarbon fluids should spillages occur:</u> No prospecting operations will be undertaken within 100 metres from the nearby steams and 500 meters from the nearby steams and 500 meters from the nearby wetland areas. Sumps will be excavated for the collection mud and excess water from the drilling sites. The sump will be sized such that it 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 vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams. The drilling of the exploration boreholes will be undertaken done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. 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. The land owners' borehole water quality and yield will be closely monitored during the drilling operation. Should it be proven that the operation is affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated. All boreholes and sumps will be rehabilitated to pre-drilling conditions. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed to a registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed top registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA	Throughout operational and decommissioning phases
DRILLING FOR CONTINUED RESOURCE EVALUATION		Operational phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. The implementation of the mitigation measures will ensure that the land use and capability of the sites where the operations will be undertaken will	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			• Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management. The drilling of the exploration boreholes will be undertaken in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. 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 top registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. The soils must be used for the backfilling and rehabilitation of the sumps. The rehabilitated sump must be seeded with recommended seed mix.	continue after the proposed project. Retain topsoil integrity for the reuse in rehabilitation.	
DRILLING FOR CONTINUED RESOURCE EVALUATION	Total of 5 drilling sites	Operational phase	Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any drilling. Ensure procedures in place to compensate for damage. All neighbours need to be notified of drilling activity. Ensure that all power-related structures are adequately marked with relevant signs and warnings and fenced off. Safety, intrusion livelihood impacts on the landowners and occupiers: Residents shall be informed of any road closures and other disruptions and maintain roads used for the operation in good order. Clear signage shall be installed around the project area indicating the type of disruption and the time during which the disruptions will occur. Communication with land owners and land occupiers shall be kept open during the operational phase of the project. A record of such communication shall be kept on site. Ensure that negotiations on compensation are undertaken before the drilling programme can commence. This will include any other conditions that the landowners may deem necessary for the prospecting operation. The outcomes of the negotiations shall be recorded and kept in a file on site. Ensure that safety measures are implemented to prevent impacts on land owners and occupiers. Access to private property, outside of the demarcated drill sites, without landowner consent shall be strictly prohibited.	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993 The mine will ensure that all safety standards are met and that access to landowners and occupiers are not detrimentally affected 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	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			Inform staff, contractors and visitors to not harm fauna in the area. Consider the use of bird flappers and balls on the power lines to reduce risk of birds colliding with power lines. Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. Utilize directional lighting and use yellow and orange lighting where possible to reduce impacts on insects. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Conduct annual surveys to monitor faunal biodiversity. Negative impact on fauna that may enter the area: • The site manager must ensure that no fauna is caught, killed, harmed, sold or played with. • Workers must be instructed to report any animals that may be trapped in the working area. • No snares may be set or nests raided for eggs or young. Where possible drill sites shall be located within degraded environments. Poaching will be prohibited at the prospecting sites.	<u>Negative impact on fauna that may enter the area:</u> • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. 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 Ensure successful rehabilitation and/or removal of contaminated soils	Throughout operational phases
			Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds. All disturbed areas must be concurrently rehabilitated. 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 drilling activities. Monitoring of relocation success will be conducted during the operational phase. Monitoring of relocation success shall continue during and beyond the decommissioning and closure phase. All disturbed areas shall be re-vegetated with indigenous riparian species. 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.	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004 The implementation of mitigation measures will ensure that the drilling and sampling activities do not have detrimental impact on the area's flora.	Throughout operational and decommissioning phases
DRILLING FOR CONTINUED RESOURCE	Total of 5	Operational phase Oper	Keep mining in footprint		Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			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 is shall be permitted. Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed. 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. Poaching of wild animals and livestock will be prohibited.	Maintenance of the current status on animal life within the project area.	Throughout Operational Phase
DRILLING FOR CONTINUED RESOURCE EVALUATION	Total of 5 drilling sites	Operational phase	None.	-	Throughout operational and decommissioning phases
			Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
			Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.	Throughout operational and decommissioning phases
			Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. Should graves be observed on site during activity progress then all activity should be ceased and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity The drilling sites will be situated away from any identified grave site or heritage sites. A 50 m buffer will be created between the sites and the proposed camp and drilling sites.	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999 With the implementation of the mitigation measures, the drilling operations will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the L53specialist.	Throughout operational and decommissioning phases
			Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. The drilling operation and use of campsite may result in the generation of surface water runoff contaminated with silt (sedimentation) and possibly hydrocarbon fluids should spillages occur:	NWA, 1998 The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/storm water 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	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			No prospecting operations will be undertaken within 100 metres from the nearby steams and 500 meters from the nearby steams and 500 meters from the nearby wetland areas. Sumps will be excavated for the collection mud and excess water from the drilling sites. The sump will be sized such that it 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 vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams. The drilling of the exploration boreholes will be undertaken done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. 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. The land owners' borehole water quality and yield will be closely monitored during the drilling operation. Should it be proven that the operation is affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated. All boreholes and sumps will be rehabilitated to pre-drilling conditions. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed to a registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed top registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.		
GENERAL ACTIVITIES	Entire Prospecting area	Operational phase	Portable toilets are to be emptied and cleaned regularly. Ensure reputable contractors are utilize for management of facilities. Portable toilets will be managed by a reputable contractor and inspected daily for any potential leaks. Water should not be released into the surrounding environment unless relevant permission obtained from DWA	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase and Operational Phase
			Portable toilets will be managed by reputable contractors and inspected daily for potential leaks	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase and Operational Phase
			Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality.	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	Throughout operational phases
			Pans and artificial watering points must be cordoned off with at least 100m horizontal distance buffer zones and no activity is too take place within these areas. Consideration should be given to create alternative watering point if existing artificial water point will be disturbed.	NWA, 1998	Throughout operational and decommissioning phases
			Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality.	Land use zoning: • Northern Cape LUPA • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.	Throughout operational phase

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Total of 5 drilling site's and 3 dump sire	Decommissioning phase	Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Waste generated on site should be recycled as far as possible and sold/ given to interested contractors. Recycled waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recycle waste for disposal at the municipality. Vegetate rehabilitated area as soon as possible. Vegetable berms and stockpiles. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. Re-vegetate any bare soil immediately. Inspect, especially after first heavy rain falls to ensure adequate surface water drainage. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Loss of topsoil due to incorrect storm water management • Storm water must be diverted around the topsoil heaps, processing and stockpile areas to prevent erosion. • Topsoil heaps must be stockpiled along the northern and western boundaries of the study area to divert runoff water away from the processing area. Site management must weekly monitor the stockpiles and should any signs of erosion become apparent soil erosion protection measures must be implemented. • The effectiveness of the storm water infrastructure needs to be continuously monitored. • The activity must be conducted in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department of Mineral Resources may impose: o Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. o Dirty water must be collected and contained in a system separate from the clean water system. o Dirty water must be prevented from spilling or seeping into clean water systems. o Storm water management must apply for the entire life cycle of the site and over different hydrological cycles (rainfall patterns). o The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into the storm water management. Movement of mine vehicles and machinery will be limited to demarcated routes, which will be rehabilitated when no longer in use. **Re-instatement of soil productivity, land capability and land use:** All infrastructure will be removed from the site in accordance to the rehabilitation plan. Contaminated soils shall be cleaned or disposed of at a registered landfill site in terms of the requirements of the NEM: WA.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. 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	Throughout operational phases
			Ensure soils are replaced to an adequate depth and ensure soil quality is adequate.	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. Rehabilitated areas will be maintained to comply with the closure objectives.	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Total of 5 drilling site's and 3 dump sire	Decommissioning phase	**Dust Handling:** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. • During periods of high wind spells, the stockpiles must be dampened to control dust emission. • The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access roads must be limited to 40km/h to prevent the generation of excess dust. • Gravel roads must be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits. Where necessary, wet suppression will be conducted at areas with excessive dust emissions. Vehicles and machinery will be well maintained. The traffic volumes and speed within the rehabilitation site will be controlled.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.	Throughout operational and decommissioning phases
			Emission Handling: All vehicles will be regularly services to ensure they are in proper working condition and to reduce risk of excessive emissions. Where necessary, wet suppression will be conducted at areas with excessive dust emissions. Vehicles and machinery will be well maintained. The traffic volumes and speed within the rehabilitation site will be controlled.	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	Throughout operational and decommissioning phases
			The applicant must ensure that employees and staff conduct themselves in an acceptable manner while on site. No loud music may be permitted at the processing area. All project-associated vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act. Smaller or less noisy equipment should where possible be used when working near receptors. Equipment will be well maintained and fitted with the correct and appropriate noise abatement measures.	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 Ensure that the noise from the rehabilitation activities do not exceed the SANS 10103 Rating Level. Comply with the Noise Regulation Standards for Rural Areas.	Throughout operational and decommissioning phases
			Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. All leaks will be cleaned up immediately using an absorbent material. Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. Utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company.	Contamination of surface or groundwater due to hazardous spills not cleaned:	Throughout operational and decommissioning phases
			Contamination of surface or groundwater due to hazardous spills not cleaned: • Regular vehicle maintenance may only take place at the workshop on site. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a 200 litter closed container/bin to be removed from the emergency service area to the formal workshop in order to ensure proper disposal. • Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Spills must be cleaned up immediately to the satisfaction of the Regional Manager of DMR by removing the spillage together with the polluted soil and by disposing it at a recognized facility. Proof must be filed. • Suitable covered receptacles must be available at all times and conveniently placed for the disposal of waste. • Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point, collected on a weekly basis, and	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704	Throughout operational and decommissioning phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
			disposed of at a recognized landfill site. Specific precautions must be taken to prevent refuse from being dumped on or near the processing area. • Biodegradable refuse generated must be handled as indicated above.		
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Total of 5 drilling site's and 3 dump sire	Decommissioning phase	Ensure permits are obtained to remove protected species. Relocate all protected species with aid of specialists. Only remove species in areas designated for activity and do not disturb surrounding areas. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetated impacted areas as soon as possible. Eradicate and control all alien invasive species on site. Rehabilitate and revegetated all areas where alien invasive species were removed. Management of weed- or invader plants: • A weed and invader plant management plan must be implemented at the site to ensure eradication of all listed invader plants in terms of the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014. • Management must take responsibility to control declared invader or exotic species on the habilitated areas. The following control methods can be used: o "The plants can be uprooted, felled or cut off and can be destroyed completely." o "The plants can be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide." • The temporary topsoil stockpiles needs to be kept free of weeds.	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	Throughout operational and decommissioning phases
			Rehabilitate disturbed areas with natural indigenous flora. Monitor for cover abundance.	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	Throughout operational and decommissioning phases
			Specialist must be consulted f issues with groundwater are observed and qualities do not fall within the DWA target qualities or water qualities for livestock watering. Any affected registered water user must be compensated if levels an quality are impacted by the mining activities	Contamination of surface or groundwater due to hazardous spills not cleaned:	Throughout operational and decommissioning phases
			Ensure clean and dirty water separation and storm water management systems are established on site prior to construction taking place. All hydrocarbons will be stored in mobile bunded containers fitted with taps. Bunded area will have adequate capacity to capacity to contain leaks. Large leaks will be cleared by reputable oil recycling company. Inspect area for erosion and pooling and rehabilitate if necessary. Continue with surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated immediately in a reputable manner. For large spills Hazmat will called in. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan.	NWA, 1998	Throughout operational and decommissioning phases
			Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. Ensure water management facilities are operating adequately. Clean out silt build up over dry season. The site area will be rehabilitated to be free draining. Erosion protection measures such as the use of contour berms and repair of gullies will be undertaken until such time that the rehabilitated surfaces can be shown to be sustainable. Existing roads should be used where possible and new disturbed areas should be minimised.	NWA, 1998 The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704	Throughout operational and decommissioning phases
			Ensure that all stuff are made aware of all working conditions on site	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	Throughout operational and decommissioning phases
			Inform staff, contractors and visitors to not harm fauna in the area. Conduct annual surveys to monitor faunal biodiversity.	Negative impact on fauna that may enter the area: • NEM:BA, 2004	Throughout operational phases

NAME OF ACTIVITY	SIZE AND SCALE OF DISTURBANCE	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
				• Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Total of 5 drilling site's and 3 dump sire	Decommissioning phase	Keep mining in footprint. Excavation areas will be sloped during rehabilitation to even out depressions.		Throughout operational and decommissioning phases
			Monitor, especially after first heavy rain falls to ensure adequate surface water drainage The site area will be rehabilitated to be free draining. Erosion protection measures such as the use of contour berms and repair of gullies will be undertaken until such time that the rehabilitated surfaces can be shown to be sustainable. Existing roads should be used where possible and new disturbed areas should be minimised.	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters	Throughout operational and decommissioning phases
			<u>Visual Mitigation:</u> • The site must have a neat appearance and be kept in good condition at all times. • The height of the stockpiles must be controlled to manage the visual impact on the surrounding environment. • Upon rehabilitation of the processing area all infrastructure must be removed and the area must be returned to its prior status. Screens will be considered if I&AP complaints are received. Directional lighting and soft lighting will be utilized to ensure that only areas required to be lit are lit. screens will be considered if I&AP complains are received. Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.		Throughout operational phase
			Precautionary measures such as fire breaks would be taken into account and the company will join the local FPA. Should it be found that after mining operation have ceased, that the natural vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous s grass seed mix.	Every precaution must be taken to prevent contamination. The precautionary principal must apply. 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	Throughout operational and decommissioning phases

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ();

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
whether listed or not listed	(Including the potential impacts for cumulative impacts)		In which impact is anticipate	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..)	
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc. Etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.	
SITE VISITS BY VARIOUS SPECIALIST	Dust Generation	Dust	Construction / Site Establishment phase	Control: Dust suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)
	Emissions	Emissions		Control: Emissions	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)
	Loss and disturbance to surface archaeological sites	Archaeology		**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999
	Potential hydrocarbon contamination from leeching into the water table	Groundwater		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	loss of food, nest sites and refugia	Fauna		Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
	Potential damage to or destruction of sensitive faunal habitats: Pans & Watering Points	Fauna		Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
	Increased noise levels	Noise		**Control:** Noise control measures	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination	Soils		**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas:

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
					• NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
SITE visits BY VARIOUS SPECIALIST	Potential hydrocarbon contamination topsoil's		Construction / Site Establishment phase	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
	increased risk of erosion			**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
	Potential for damage or destruction of sensitive faunal habitats: Pans and watering points			Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998
	Potential hydro carbonation contamination form leaks or spills which may reach downstream surface water bodies			Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998
	Road degradation. Increased potential for road incidences Potential distraction to road users	All road users will be affected		Control & Remedy: Road management	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.
DESKTOP STUDY	None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	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 Authorization.
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	N/A	Construction / Site Establish	N/A	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993
ESTABLISHMENT OF TEMPORARY	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	N/A	Construction /	N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Portable Toilets Potential harm through sewage leaks	Groundwater	Construction / Site Establishment phase	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site. Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704.
	Portable Toilets Potential harm through sewage leaks	Surface Water		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site. Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704.
	Portable Toilets Potential harm through sewage leaks Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Soils		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Deterioration in visual aesthetics of the area	The visual impact may affect the aesthetics of the landscape.		Control: Implementation of proper housekeeping Rehabilitation of areas cleared of vegetation	Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users. Vegetation clearance must be limited to demarcated areas only
	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Dust will be contained within the property boundaries and will therefore affect only the landowner.		Control: Dust suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities.
	Emissions caused by vehicles and equipment	Emissions will be contained within the property boundaries and will therefore affect only the landowner.		Control: Emissions	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards. Comply with the requirements of the Minimum Emission Standards
	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	The noise impact should be contained within the boundaries of the property, and will represent the current noise levels of the farm.		**Control:** Noise control measures 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 day time and the implementation of an open and transparent channel of communication	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures ensure that the noise levels from the construction sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
					prospecting staff and surrounding communities/land owners. Remain within the Noise Regulation Standards for Rural Areas.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora	Construction / Site Establishment phase	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.		**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.
	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed		Control: Waste management	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Implementation of mitigation measures will ensure that the activities in the development of the prospecting sites and associated infrastructure do not have detrimental impacts on the soils, land use and land capability. The mitigation measures will result in reduced the amounts of waste produced, will encourage re-use of material where possible and recycling of the material where possible. Disposal will be utilized as the last resort. The mitigation measures will also ensure that the management of waste will be in accordance with the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)
	Migration of fauna due to disturbance caused by the proposed project	Fauna		Relocation of affected species of conservation importance	The implementation of mitigation measures will ensure that the establishment of the prospecting site and associated infrastructure/equipment do not have detrimental impact on the area's flora, in particular indigenous species and species that are of conservation importance. Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation
	Alteration of topography	Topography		Control: Surface water Monitoring	
	Loss of and disturbance to surface archaeological sites	Artefacts or graves		**Control:** Survey area before site clearance	<u>Loss of Artefacts and Graves:</u> National Heritage Resources Act No. 25 of 1999

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Groundwater pollution	Construction / Site Establishment phase	Control: Proper site management. Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Contamination of surface or groundwater due to hazardous spills not cleaned: Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. 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) (
	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Surface water Bodies		Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. Monitoring through rehabilitation and management of spoil sites	NWA, 1998 Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. 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 wetlands and riparian zones without consent from the DWS.
	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away		Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use		Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.
	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use		Rehabilitation of areas cleared of vegetation and dust control	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow moving vehicles. Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Social		Control through proper site management	The identified mitigation measures will result in minimal influx of job seekers to the site
DRILLING FOR CONTINUED RESOURCE EVALUATION	Deterioration in visual aesthetics of the area 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 Aesthetics	Operational phase	Control: Implementation of proper housekeeping Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Measures will be undertaken by the mine to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives. 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 minimize the visual impact
	Dust nuisance due to excavation activities 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 will be contained within the property boundaries and will therefore affect only the landowner.		Control: Dust Suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) The air quality in the vicinity of the drilling sites and sites' access routes will be maintained to stay within the national air quality standards.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
					Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
DRILLING FOR CONTINUED RESOURCE EVALUATION	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operational phase	Control: Noise Control Measures Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures will ensure that the noise levels from the sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 guidelines. Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table 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 pollution		Control: Proper site management. Rehabilitation of affected areas and control using bunds	The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Loss of topsoil will affect the rehabilitation of the processing area and the future agricultural potential of the site.		**Control:** Storm water management Site Management Soil Management Rehabilitation of affected areas	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. The implementation of the mitigation measures will ensure that the land use and capability of the sites where the operations will be undertaken will continue after the proposed project. Retain topsoil integrity for the reuse in rehabilitation.
	Health and Safety Risk by Drilling Activities. Potential danger to surrounding communities It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialized 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	The Unsafe working conditions should only impact the applicant. Safety measures will be implemented		Control: Implementation of safety control measures Control of times during which operation activities will take place	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993 The mine will ensure that all safety standards are met and that access to landowners and occupiers are not detrimentally affected 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

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
DRILLING FOR CONTINUED RESOURCE EVALUATION	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals. 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.	The impact of the fauna of the area will not be significant as vibration and noise will drive the fauna away	Operational phase	Control: Implementation of fauna protection measures 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	Negative impact on fauna that may enter the area: • NEM: BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. 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 Ensure successful rehabilitation and/or removal of contaminated soils
	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment 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; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Flora		**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM: BA, 2004 The implementation of mitigation measures will ensure that the drilling and sampling activities do not have detrimental impact on the area's flora.
	Alteration of topography	Topography		Control: Surface water Monitoring	
	Fauna			-	Maintenance of the current status on animal life within the project area.
	Disturbance of geological strata	Geology		N/A	-
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Land use		Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.
	Contamination of area with hydrocarbons or hazardous waste materials	Contamination may cause surface or ground water pollution if not addressed		Control: Waste management	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.
	Loss of and disturbance to surface archaeological sites	Artefacts or graves		**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999 With the implementation of the mitigation measures, the drilling operations will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the L53specialist.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
DRILLING FOR CONTINUED RESOURCE EVALUATION	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water. 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 Bodies	Operational phase	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. Control through management and monitoring of surface runoff	NWA, 1998 The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/storm water 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
GENERAL ACTIVITIES	Potential for more employment	Social		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Portable Toilets Potential harm through sewage leaks	Groundwater		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Portable Toilets Potential harm through sewage leaks	Surface Water		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Portable Toilets Potential harm through sewage leaks	Soils		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Portable Toilets Potential harm through sewage leaks	Social		Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Potential harm through littering			Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM: BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
	Potential contamination through littering			Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Potential contamination through littering			Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Potential contamination through littering			Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998
	Potential contamination through littering			Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.
	Potential contamination through littering			Control: Implementation of proper housekeeping	Land use zoning: • Northern Cape LUPE • Local Municipality: Land Use Planning Bylaws • The property is zoned for agriculture as primary use.
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	Soil	Decommissioning phase	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. No removal of vegetation outside of demarcated areas.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
					Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) S	Soils replaced and ameliorated	Soil	Decommissioning phase	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. Rehabilitated areas will be maintained to comply with the closure objectives.
	Dust nuisance caused during landscaping activities 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 will be contained within the property boundaries and will therefore affect only the landowner.	Decommissioning phase	Control: Dust Suppression Dust control measures and rehabilitation of areas stripped of vegetation	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
	Emissions caused by vehicles and equipment	Emissions	Decommissioning phase	#REF!	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)
	Noise nuisance caused by machinery 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 Decommissioning phase	Control: Noise Management Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 Ensure that the noise from the rehabilitation activities do not exceed the SANS 10103 Rating Level. Comply with the Noise Regulation Standards for Rural Areas.
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Groundwater pollution	Decommissioning	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:
	Contamination of area with hydrocarbons or hazardous waste materials 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.	Contamination may cause surface or ground water pollution if not addressed	Decommissioning phase	Control: Waste management 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.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	Flora	Decommissioning phase	**<u>Control & Remedy:</u>** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Area revegetated with indigenous plants	Flora	Decommissioning phase	**<u>Control & Remedy:</u>** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004
SLO PIN G, LAN DSC API NG AND	Improve response to issues relating to deterioration of groundwater quality or quantity	Groundwater improvement	Dec omm issio	<u>Control:</u> Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm 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.	Surface water Bodies	Decommissioning phase	<u>Control:</u> Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Surface water Bodies	Decommissioning phase	<u>Control:</u> Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. 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.	NWA, 1998 The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704
SLOPING, LANDSCAP ING AND REPLACEM ENT OF TOPSOIL OVER DISTURBE	Health and safety risk posed by un-sloped areas	The impact on health and safety due to un-sloped areas will be contained within the site boundary.	Decommissi oning phase	<u>Control:</u> Sloping of areas upon decommission	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993
SLOPING, LANDSCAP ING AND REPLACEM ENT OF TOPSOIL OVER DISTURBE	Reintroduction of fauna attracted to flora to the area	Fauna returning to area	Decommissi oning phase	<u>Control:</u> Implementation of fauna protection measures	<u>Negative impact on fauna that may enter the area:</u> • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.
SLO PIN G, LAN DSC API NG AND	Alteration of topography	Topography	Dec omm issio	<u>Control:</u> Surface water Monitoring	
SLOPI NG, LANDS CAPIN G AND REPLA CEME NT OF	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Topography	Decom mission ing	<u>Control:</u> Surface water Monitoring	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED
SLOPING, LANDSCAPING AND REPLACEMENT OF	Improved aesthetics through rehabilitation	The visual impact may affect the aesthetics of the landscape.	Decommissioning phase	Control: Implementation of proper housekeeping	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming 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.	Land use	Decommissioning phase	Control: Fire	Every precaution must be taken to prevent contamination. The precautionary principal must apply. 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

f) Impact Management Actions

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

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
whether listed or not listed	(Including the potential impacts for cumulative impacts)	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..)		
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	E.g. Modify through alternative method. Control through noise control. Control through management and monitoring. Remedy through rehabilitation.		
SITE VISITS BY VARIOUS SPECIALIST	Dust Generation	Control: Dust suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	Construction / Site Establishment phase
	Emissions	Control: Emissions	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	
	Loss and disturbance to surface archaeological sites	**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999	
	Potential disruption to grave sites	**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999	
	Potential hydrocarbon contamination from leeching into the water table	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	
	loss of food, nest sites and refugia	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	
	Potential damage to or destruction of sensitive faunal habitats: Pans & Watering Points	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	
	Loss of biodiversity.			
	Increased noise levels	**Control:** Noise control measures	**Noise Handling:** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987	
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	
SITE VISITS BY VARIOUS SPECIALIST	Potential hydrocarbon contamination topsoil's	**Control:** Storm water management Site Management Soil Management		Throughout operational and decommissioning phases

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	increased risk of erosion	**Control:** Storm water management Site Management Soil Management		
	Potential for damage or destruction of sensitive faunal habitats: Pans and watering points	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998	
	Potential hydro carbonation contamination form leaks or spills which may reach downstream surface water bodies	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998	
	Road degradation. Increased potential for road incidences Potential distraction to road users	Control & Remedy: Road management	Degradation of the gravel access road: • NRTA, 1996 The gravel access road needs to be monitored for signs of degradation. Should any signs become apparent immediate rectification actions must be implemented.	
DESKTOP STUDY	None	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	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 Authorization.	Throughout the planning phase
DEMARCATION OF SITE WITH VISIBLE BEACONS.	No impact could be identified other than the beacons being outside the boundaries of the approved processing area.	N/A	Processing of the waste rock/stone is only allowed within the boundaries of the approved processing area. • MHSA, 1996 • OHSA, 1993	Beacons need to be in place throughout the life of the activity.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	If the infrastructure is established within the boundaries of the approved mining area, no impact could be identified.	N/A	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase
	Portable Toilets Potential harm through sewage leaks	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site. Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704.	
	Portable Toilets Potential harm through sewage leaks	Control through proper site management		
	Portable Toilets Potential harm through sewage leaks Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	
	Deterioration in visual aesthetics of the area	Control: Implementation of proper housekeeping Rehabilitation of areas cleared of vegetation	Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users. Vegetation clearance must be limited to demarcated areas only	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Dust nuisance caused by the disturbance of soil. Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Control: Dust suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities.	Throughout operational and decommissioning phases
	Emissions caused by vehicles and equipment	Control: Emissions	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards. Comply with the requirements of the Minimum Emission Standards	

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Noise nuisance caused by machinery stripping and stockpiling the topsoil. Increase in ambient noise due to movement of construction vehicles and machinery	**Control:** Noise control measures 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 day time and the implementation of an open and transparent channel of communication	**<u>Noise Handling:</u>** NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures ensure that the noise levels from the construction sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the prospecting staff and surrounding communities/land owners. Remain within the Noise Regulation Standards for Rural Areas.	
	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils.	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion.	
	Contamination of area with hydrocarbons or hazardous waste materials	Control: Waste management	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Implementation of mitigation measures will ensure that the activities in the development of the prospecting sites and associated infrastructure do not have detrimental impacts on the soils, land use and land capability. The mitigation measures will result in reduced the amounts of waste produced, will encourage re-use of material where possible and recycling of the material where possible. Disposal will be utilized as the last resort. The mitigation measures will also ensure that the management of waste will be in accordance with the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)	
	Migration of fauna due to disturbance caused by the proposed project	Relocation of affected species of conservation importance	The implementation of mitigation measures will ensure that the establishment of the prospecting site and associated infrastructure/equipment do not have detrimental impact on the area's flora, in particular indigenous species and species that are of conservation importance. Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation	
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE.	Alteration of topography	Control: Surface water Monitoring		Throughout operational and decommissioning phases
	Loss of and disturbance to surface archaeological sites	**Control:** Survey area before site clearance	<u>Loss of Artefacts and Graves:</u> National Heritage Resources Act No. 25 of 1999	
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table Contamination of groundwater from hydrocarbon spillages	Control: Proper site management. Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Contamination of surface or groundwater due to hazardous spills not cleaned: Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. 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) (	
	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies.	Control: Surface water Management Implement storm water control measures.	NWA, 1998 Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in Compliance with the regulations under the GN704. Retain topsoil integrity for the reuse in rehabilitation	

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water.	Measures will be implemented as subscribed by DWS. Monitoring through rehabilitation and management of spoil sites	Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of wetlands and riparian zones without consent from the DWS.	
	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals.	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	
	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow moving vehicles. Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	
	Influx of unsuccessful job seekers which may informally settle in area. Potential danger to surrounding communities	Control through proper site management	The identified mitigation measures will result in minimal influx of job seekers to the site	
DRILLING FOR CONTINUED RESOURCE EVALUATION	Deterioration in visual aesthetics of the area 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.	Control: Implementation of proper housekeeping Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Measures will be undertaken by the mine to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives. 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 minimize the visual impact	
	Dust nuisance due to excavation activities 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.	Control: Dust Suppression	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) The air quality in the vicinity of the drilling sites and sites' access routes will be maintained to stay within the national air quality standards. Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards	
DRILLING FOR CONTINUED RESOURCE EVALUATION	Noise nuisance generated by drilling equipment= The drilling activities will also result in an increase in noise in the vicinity of the project.	Control: Noise Control Measures Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 The mitigation measures will ensure that the noise levels from the sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 guidelines. Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.	Throughout operational and decommissioning phases
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table 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.	Control: Proper site management. Rehabilitation of affected areas and control using bunds	The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM:WA	

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	**Control:** Storm water management Site Management Soil Management Rehabilitation of affected areas	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. The implementation of the mitigation measures will ensure that the land use and capability of the sites where the operations will be undertaken will continue after the proposed project. Retain topsoil integrity for the reuse in rehabilitation.	
	Health and Safety Risk by Drilling Activities. Potential danger to surrounding communities It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialized 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: Implementation of safety control measures Control of times during which operation activities will take place	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993 The mine will ensure that all safety standards are met and that access to landowners and occupiers are not detrimentally affected 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	
	Alienation of animals from the area. Potential risk to avifauna. Potential harm through littering. Loss of food, nest sites and refugia Hindrance to nocturnal animals and change in behaviour of nocturnal prey and predators. New habitat available to fauna in the area and reduced activity should result in influx of animals to the area. Impact to nocturnal insects and their predators and other nocturnal animals. 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.	Control: Implementation of fauna protection measures 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	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities. 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 Ensure successful rehabilitation and/or removal of contaminated soils	
DRILLING FOR CONTINUED RESOURCE EVALUATION	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment 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; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004 The implementation of mitigation measures will ensure that the drilling and sampling activities do not have detrimental impact on the area's flora.	Throughout operational and decommissioning phases
	Alteration of topography	Control: Surface water Monitoring		
	Fauna	-	Maintenance of the current status on animal life within the project area.	
	Disturbance of geological strata	N/A	-	

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming	Control: Fire	• Every precaution must be taken to prevent contamination. The precautionary principal must apply.	
	Contamination of area with hydrocarbons or hazardous waste materials	Control: Waste management	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply.	
	Loss of and disturbance to surface archaeological sites	**Control:** Survey area before site clearance	Loss of Artefacts and Graves: National Heritage Resources Act No. 25 of 1999 With the implementation of the mitigation measures, the drilling operations will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the L53specialist.	
	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm water. 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: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. Control through management and monitoring of surface runoff	NWA, 1998 The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA. Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/storm water 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	
GENERAL ACTIVITIES	Potential for more employment	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	Construction / Site Establishment phase and Operational Phase
	Potential harm through littering	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	
	Potential contamination through littering	Control through proper site management	Not applicable as these are mobile and will be removed during rehabilitation and closure of the site.	
	Potential contamination through littering	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential compaction of soils in neighbouring areas. Potential contamination through littering. Potential for loss of soil & damage to soil characteristics. Initial increased potential for loss of soils and soil erosion. Potential hydrocarbon contamination to soils. 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.	**Control:** Storm water management Site Management Soil Management	Loss of topsoil due to incorrect storm water management: • NEMA, 1998 • NWA, 1998 • NEMBA, 2004 • GNR 598 and 599 of 2014 • The replacement of the topsoil is of utmost importance to ensure the effective future use of the area for agricultural purposes. Loss of soil due to un- vegetated areas: • NEMBA (Act No. 10 of 2004). • NEMA, 1998 Bare areas need to be re-vegetation to prevent soil erosion. 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	Throughout decommissioning phases
	Soils replaced and ameliorated	**Control:** Storm water management Site Management Soil Management		
	Dust nuisance caused during landscaping activities 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.	Control: Dust Suppression Dust control measures and rehabilitation of areas stripped of vegetation	Dust Handling: • NEM:AQA, 2004 Regulation 6(1) Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.	
	Emissions caused by vehicles and equipment	Control: Emissions	Dust Handling: • NEM:AQA, 2004 Regulation 6(1)	

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Noise nuisance caused by machinery 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.	Control: Noise Management Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers	Noise Handling: _NEM: AQA, 2004 Regulation 6(1) All project related vehicles must be in a road worthy condition in terms of the Road Transport Act, 1987 Ensure that the noise from the rehabilitation activities do not exceed the SANS 10103 Rating Level. Comply with the Noise Regulation Standards for Rural Areas.	
	Potential hydrocarbon contamination leeching into the water table. Reduction of local groundwater. Potential contamination through littering leeching into the groundwater table	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:	
	Contamination of area with hydrocarbons or hazardous waste materials 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: Waste management 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.	Contamination of surface or groundwater due to hazardous spills not cleaned: • NWA, 1998 • NEM: WA, 2008 • Every precaution must be taken to prevent contamination. The precautionary principal must apply. Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704	
	Loss of biodiversity. Potential damage to vegetation in neighbouring areas. Alien invasive encroachment	**Control & Remedy:** Implementation of weed control and weed/invader plant management plan Management of buffer areas and demarcation of work areas. Modify: Consider use of a less sensitive area	Management of weed- or invader plants: • NEMBA (Act No. 10 of 2004). • Alien and Invasive Species Regulation GNR 598 and 599 of 2014. Negative impact on biodiversity of the area (Site Alternative 1): • NEM:BA, 2004	
	Area re-vegetated with indigenous plants			
	Improve response to issues relating to deterioration of groundwater quality or quantity	Control: Proper site management.	Contamination of surface or groundwater due to hazardous spills not cleaned:	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Potential silt-loading of drainage lines, downstream and surrounding water bodies. Potential hydrocarbon contamination which may reach downstream surface water bodies. Potential surface water contamination if leaks escape into the environment. Potential impact of mining activities on the runoff and infiltration of storm 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.	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS.	NWA, 1998	Throughout decommissioning phases
	Containment of dirty water. Improve response to issues relating to deterioration of surface water quality or quantity. free drainage resorted to area. Revegetation of disturbed areas reduces risk of silt loading on downstream water bodies. Large area of surface water runoff return to catchment	Control: Surface water Management Implement storm water control measures. Measures will be implemented as subscribed by DWS. 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.	NWA, 1998 The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters Maintain the water quality of water course in the project area Ensure that dirty storm water and runoff is diverted from the water courses and wetland areas Comply with the requirements of GN704	
	Health and safety risk posed by un-sloped areas	Control: Sloping of areas upon decommission	The Occupational Health and safety act in conjunction with the Mine Health and Safety act as mitigation measure. • MHSA, 1996 • OHSA, 1993	
	Reintroduction of fauna attracted to flora to the area	Control: Implementation of fauna protection measures	Negative impact on fauna that may enter the area: • NEM:BA, 2004 • Site management has to strive to eliminate the impact on fauna in the surrounding environment for the duration of the processing activities.	
	Alteration of topography			

NAME OF ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	COMPLIANCE WITH STANDARD / STANDARD TO BE ACHIEVED	TIME PERIOD FOR IMPLEMENTATION
	Eradication of trenches and berms. Re-contouring of area for free surface water drainage. Eradication of stockpiles	Control: Surface water Monitoring	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters	
	Improved aesthetics through rehabilitation	Control: Implementation of proper housekeeping		
	Veldt fire might seriously impact on surrounding land-use (livestock/irrigation of neighbouring farmers). Degrading of grazing potential for livestock farming 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.	Control: Fire	Every precaution must be taken to prevent contamination. The precautionary principal must apply. 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	
FEASIBILITY STUDY AND DATA ANALYSIS	N/A	N/A	N/A	N/A

i) Financial Provision

(1) Determination of the amount of Financial Provision.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

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 and stockpile sampling will be initiated.

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 primary objective is to obtain a closure certificate at the end of the life of the prospecting at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act. To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPR and of the Provincial Department of Mineral Regulation;
- Demolish / rehabilitate all roads with no post -prospecting use potential;
- Clear all carbonaceous material from site;
- Clear boulders form site;
- Remove all waste from site;
- Any wetlands in the area should not be compromised or destructed;
- Future public health and safety are not compromised;
- Ensure that no threat to surface and underground water quality remains;
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff;
- Shape and contour all disturbed areas in compliance with the EMPR;
- The stockpiled topsoil will be spread over the disturbed area to a depth of at least 500 mm;
- Make safe any dangerous excavations or subsidence on the surface;
- Rehabilitate all disturbed areas in compliance with the EMPR and of the Provincial Department of Mineral Regulation;
- Ensure that all rehabilitated areas are safe, stable and self-sustaining in terms of vegetation;
- Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area;
- The applicant will comply with the minimum closure objectives as prescribed by DMR;
-

- Any adverse socio-economic impacts are minimised; and
- All socio-economic benefits are maximised.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

This report, the Final Basic Assessment Report, includes all the environmental objectives in relation to closure and will be made available for perusal of I&AP's and stakeholders. Any additional comments received during the commenting period will be added to the Final Basic Assessment Report to be submitted to DMR for approval.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main prospecting activities, including the anticipated prospecting area at the time of closure.

The requested rehabilitation plan is attached in

Appendix F. Upon closure of the prospecting activity all infrastructure will be removed. The compacted areas will be ripped and levelled upon which the topsoil will be replaced. No permanent structures will remain upon closure of the site. The rehabilitation plan shall entail removal of all generated waste, infrastructures and materials, re-vegetation of disturbed and cleared areas, rehabilitation of access roads, ensuring the growth of the existing grasses and plants species and cleaning of spillages etc.

The drilling process is determined by the local conditions but can generally be based on 25m deep per rig per day for a week. A number of diamond drill holes will be drilled in the strategic locations to fill the gaps and confirm existing holes and information derived from the magnetic field survey.

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.
- 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 covers of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved after 6 months.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation of the prospecting area as indicated on the rehabilitation plan attached as

Appendix CE will comply with the minimum closure objectives as prescribed by DMR and detailed below, and therefore is deemed to be compatible:

The following closure objectives are proposed with regard to rehabilitation of the processing area:

- Rehabilitation will be ongoing and conform to 400 m^2 being stripped of topsoil and 400 m^2 being rehabilitated after the oversized and processed soil is worked back into the excavation.
- Thus there will only be 400 m^2 of land open for rehabilitation in operational times. One excavator will be used to excavate the alluvial soil.
- Fill and topsoil could be placed over the slopes to provide a suitable medium for the establishment of vegetation.
- No waste will be permitted to be deposited in the excavations.
- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002):
    - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
    - The topsoil will be placed back as a growth medium and the sides of the excavation will be sloped with acceptable contours to prevent soil erosion.
    - The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- Photographs of the camp and office sites, before and during the prospecting mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.
- Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.
- All Temporary Infrastructures, equipment, plant, temporary housing and other items used during the prospecting mining period will be removed from the site.
- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting mining area and disposed of at a recognized landfill facility, proof of this removal will be kept on file at the applicant's office. It will not be permitted to be buried or burned on the site.
- Weed / Alien clearing will be done in a sporadic manner during the life of the prospecting activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The calculation of the quantum for financial provision was according to Section B of the working manual.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	Sillimanite
Saleable mineral by-product	N/A

Primary Risk Class

According to Tables B.12 or B.13

Primary risk ranking	Class C
Revised risk ranking	N/A

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine	Low

Level of information

According to Step 4.1

Level of information available	Extensive

Identification of closure components

According to Table B.5 and site-specific conditions

Component No.	Main description	Applicability of closure components (Circle Yes or No)	
		Prospecting	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	**NO**
2(A)	Demolition of steel buildings and structures	-	**NO**
2(B)	Demolition of reinforced concrete buildings and structures	-	**NO**
3	Rehabilitation of access roads		**NO**
4(A)	Demolition and rehabilitation of electrified railway lines	-	**NO**
4(B)	Demolition and rehabilitation of non-electrified railway lines	**-**	**NO**
5	Demolition of housing and facilities	**-**	**NO**
6	Opencast rehabilitation including final voids and ramps	-	**NO**
7	Sealing of shafts, adits and inclines	**YES**	**-**
8(A)	Rehabilitation of overburden and spoils	**YES**	**-**
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	**NO**
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	**NO**
9	Rehabilitation of subsided areas	-	**NO**
10	General surface rehabilitation, including grassing of all denuded areas	**YES**	**-**
11	River diversions	-	**NO**
12	Fencing	-	**NO**
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	**NO**
14	2 to 3 years of maintenance and aftercare	**-**	**NO**

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components. The master rate from the DMR Master Rates table for financial provision of 2019 has been used.

Component No.	Main description	Master rate	Multiplication factor
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	-	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	-	-
6	Opencast rehabilitation including final voids and ramps	-	-
7	Sealing of shafts, adits and inclines	R 122	-
8(A)	Rehabilitation of overburden and spoils	R159 131	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	R 118 924	-
11	River diversions	-	-
12	Fencing	-	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	-	-

<u>Determine weighting factors</u>

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00 (Undulating)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.10 (Remote)

<u>Calculation of closure costs</u>

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 17 500,14. Prospecting will be conducted one drill site at a time. Not more than 1 site will be drilled at a time.

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 closure costs were calculated to be R 17 500,14 as shown in

Table 36.

Table 36: Table B.10 Template for Level 2: "Rules-base" assessment of the quantum for financial provision

CALCULATION OF THE QUANTUM							
Mine:	Van Zyl Farms	**Location:**	Pela, Northern Cape				
Evaluators:	Yolandie Coetzee Greenmined Environmental	**Date:**	07-22-19				
			A	**B**	**C**	**D**	**E=A*B*C*D**
No.:	**Description:**	**Unit:**	**Quantity**	**Master rate**	**Multiplication factor**	**Weighting factor 1**	**Amount (Rands)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant & related structures (incl. overland conveyors & Power lines)	m^3		R 16,00	1,00	1,20	R 0,00
2 (A)	Demolition of steel buildings & Structures	m^2	0,00	R 228,00	1,00	1,20	R 0,00
2 (B)	Demolition of reinforced concrete buildings & structures	m^2	0,00	R 336,00	1,00	1,20	R 0,00
3	Rehabilitation of access roads	m^2	0,00	R 41,00	1,00	1,20	R 0,00
4 (A)	Demolition & rehabilitation of electrified railway lines	m	0,00	R 395,00	1,00	1,20	R 0,00
4 (B)	Demolition & rehabilitation of non-electrified railway lines	m	0,00	R 216,00	1,00	1,20	R 0,00
5	Demolition of housing &/or administration facilities	m^2	0,00	R 455,00	1,00	1,20	R 0,00
6	Opencast rehabilitation including final voids & ramps	ha		R 238 697,00	0,04	1,20	R 0,00
7	**Sealing of shafts, adits & inclines**	m^3	**1,00**	R 122,00	**1,00**	1,20	R 146,40
8 (A)	Rehabilitation of overburden & spoils	ha	0,03	R 159 131,00	1,00	1,20	R 5 728,72
8 (B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha	0,00	R 198 195,00	1,00	1,20	R 0,00
8 (C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha	0,00	R 575 653,00	0,51	1,20	R 0,00
9	Rehabilitation of subsided areas	ha	0,00	R 133 249,00	1,00	1,20	R 0,00
10	**General surface rehabilitation**	ha	**0,04**	R 126 059,00	**1,00**	1,20	R 6 050,83
11	River diversions	ha	0,00	R 126 059,00	1,00	1,20	R 0,00
12	Fencing	m	0,00	R 144,00	1,00	1,20	R 0,00
13	Water management	ha	0,00	R 47 931,00	0,17	1,20	R 0,00
14	2 to 3 years of maintenance & aftercare	ha	0,00	R 16 776,00	1,00	1,20	R 0,00
15 (A)	Specialist study					1,20	R 0,00
15 (B)	Specialist study					1,20	R 0,00
							R 11 925,95
						Sub Total 1 (Sum of items 1 to 15 Above)	
Weighting factor 2 (step 4.4)		Change according to urban, peri-urban and remote				**1,10**	**R 13 118,54**
		6.0% of Subtotal 1					R 787,11
2	Contingency	10.0% of Subtotal 1					R 1 311,85
						Sub Total 3 (Subtotal 1 plus sum of management & contingency)	**R 15 217,51**

	VAT (15%)	R 2 282,63
(Subtotal 3 plus VAT)	**GRAND TOTAL**	**R 17 500,14**

(f) Confirm that the financial provision will be provided as determined.

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

(g) Monitoring of Impact Management Actions

(h) Monitoring and reporting frequency

(i) Responsible persons

(j) Time period for implementing impact management actions

(k) Mechanisms for monitoring compliance

Table 37: Compliance monitoring

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
whether listed or not listed			(FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc. Etc.)				
SITE VISITS BY VARIOUS SPECIALIST	Management of Access Roads • The condition of the access road must be continuously monitored.	Management of Access Roads: • Dust suppression equipment such as a water car and dispenser. • Grader to restore the road surface when needed. Inspect intersections and roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in worthy condition with reflective strips	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Divert storm water around the access roads to prevent erosion. • Restrict vehicular movement to existing access routes to prevent crisscrossing of tracks through undisturbed areas. • Repair rutting and erosion of the access roads caused by the processing activities	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control
DEMARCATION OF SITE WITH VISIBLE BEACONS.	Maintenance of beacons	• Visible beacons need to be established at the corners of the processing area. • A 20m buffer area (if applicable) from any natural areas need to be demarcated. • A 30m buffer area from a watercourse needs to be demarcated if applicable.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure beacons are in place throughout the life of the activity.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. GENERAL ACTIVITIES	Groundwater Surface Water	Monitor portable toilets for any leaks	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure beacons are in place throughout the life of the activity.	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	Soils Soil Management Topsoil Management Soil erosion: • Loss of reinstated topsoil after rehabilitation.			
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) GENERAL ACTIVITIES DRILLING FOR CONTINUED RESOURCE EVALUATION	Monitoring of visual impacts. Inspect area for illegal littering and dumping	• Ensure that the site have a neat appearance and is kept in good condition at all times. • Control the height of the stockpiles to minimize the visual impact on the surrounding environment. • Remove all infrastructure upon rehabilitation of the processing area and return the area to its prior status.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Minimize the visual impact of the activity on the surrounding environment	• Throughout Operational Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. DRILLING FOR CONTINUED RESOURCE EVALUATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Dust Monitoring: • The dust generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Dust Handling and Monitoring: • Dust suppression equipment such as a water car and water dispenser. The applicant already has this equipment available. Dust Monitoring will also be conducted on site on a monthly basis.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Dampen the stockpiles during periods of high wind spells. • Assess effectiveness of dust suppression equipment. • Limit speed on the access roads to 40km/h to prevent the generation of excess dust. • Spray gravel roads with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products) if dust is generated above acceptable limits.	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Monthly compliance monitoring of site by fallout dust monitoring consultant. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. SITE VISIST BY VARIOUS SPECIALIST SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Emission Monitoring: • The emissions generated by the processing activities must be continuously monitored, and addressed by the implementation of dust suppression methods.	Emission Handling and Monitoring: • Emissions will be monitored	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • All vehicles in good working order to reduce risk of emissions	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Monthly compliance monitoring of site by fallout dust monitoring consultant. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. SITE VISIST BY VARIOUS SPECIALIST DRILLING FOR CONTINUED RESOURCE EVALUATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	**Noise Monitoring** • The noise impact should be contained within the boundaries of the property, as it will represent the current activities.	**Noise Handling and Monitoring:** • Site manager to ensure that the vehicles are equipped with silencers and maintained in a road worthy condition. • Compliance with the appropriate legislation with respect to noise will be mandatory.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure that employees and staff conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the processing area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the Road Transport Act.	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. DRILLING FOR CONTINUED RESOURCE EVALUATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	**Management of weed or invader plants** • The presence of weed and/or invader plants must be continuously monitored, and any unwanted plants must be removed. Loss of natural vegetation.	Inspect progress of construction & ensure activity is in designated areas. Inspect area for damage to flora species. Establish alien invasive monitoring programme Management of weed or invader plants: • Removal of weeds must be manually or by the use of an approved herbicide. Management of buffer areas: • Site management has to ensure the use of visible beacons to demarcate the boundaries of the approved area. Protection of fauna: • Site management has to protect fauna that enters the processing area.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Implement a weed and invader plant management plan. • Control declared invader or exotic species on the rehabilitated areas. • Keep the temporary topsoil stockpiles free of weeds.	• Throughout Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer
EST ABL ISH MEN T OF TEM POR ARY BUI LDI NGS AND INF	Soil Management Topsoil Management	**Soil Handling:** • Excavating equipment to remove the first 500 mm	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.	• Throughout Construction, Operational and Decommissioning Phase

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	Soil erosion: • Loss of reinstated topsoil after rehabilitation.	of topsoil from the proposed work areas. The applicant already has this equipment available. • Berms to be made to direct storm- and runoff water around the stockpiled topsoil area. • Ensure that topsoil is being kept separate form overburden. **Erosion monitoring:** • Grader to restore areas prone to soil erosion. • Planting of a cover crop to stabilize re-instated soil • Erosion prevention equipment.	• Compliance to be monitored by the Environmental Control Officer. Role: • Strip and stockpile the upper 500 mm of the soil and protect as topsoil. • Remove topsoil at right angles to the slope to slow down surface runoff and prevent erosion. • Conduct topsoil stripping, stockpiling and re-spreading in a systematic way. Ensure topsoil is stockpiled for the minimum possible time. • Protect topsoil stockpiles against losses by water and wind erosion through the establishment of plants on the stockpiles. • Topsoil heaps may not exceed 1.5 m in order to preserve microorganism within the topsoil. • Conduct the activity in accordance with the Best Practice Guideline for small-scale mining as stipulated by DWS.	• Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) DRILLING FOR CONTINUED RESOURCE EVALUATION	Waste Management: • Management of waste must be a daily monitoring activity. • Hydrocarbon spills need to be cleaned immediately and the site manager must check compliance daily.	Waste Management: • Closed containers for the storage of general of hazardous waste until waste is removed to the appropriate landfill site. • A hydrocarbon spill kit to enable sufficient clean-up of contaminated areas. • Drip trays must be available to place underneath equipment parked for the night. • Should a vehicle have a break down, it must be decommissioned immediately and removed from site to be serviced. • Waste disposal register and file for the keeping of safe disposal records. • Ensure that hazardous substances if any are stored within a securely fenced area.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure regular vehicle maintenance only take place within the service bay area of the on-site workshop. If emergency repairs are needed on site, ensure drip trays is present. Ensure all waste products are disposed of in a 200 litter closed container/bin inside the emergency service area. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. • Clean spills immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility. File proof. • Ensure the availability of suitable covered receptacles at all times and conveniently placed for the disposal of waste. • Store non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point. Collection must take place on a regular basis and waste must be disposed of at the recognized landfill site at Robertson. Prevent refuse from being dumped on or near the processing area. • Biodegradable refuse to be handled as indicated above. • Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment. • Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drop pan and concrete slabs, in order to prevent soil and water pollution.	• Throughout Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRACTURE WITHIN BOUNDARIES OF SITE. SITE VISIST BY VARIOUS SPECIALIST DRILLING FOR CONTINUED RESOURCE EVALUATION	Protection of Cultural and Heritage Artefacts	Should any artefacts be discovered the area needs to be demarcated and work needs to be stopped.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) GENERAL ACTIVITIES DRILLING FOR CONTINUED RESOURCE EVALUATION SITE VISIST BY VARIOUS SPECIALIST	Groundwater	**<u>Groundwater Monitoring:</u>** Equipment's needs to be monitored to prevent any hydrocarbon spills.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) GENERAL ACTIVITIES DRILLING FOR CONTINUED RESOURCE EVALUATION SITE VISIST BY VARIOUS SPECIALIST	Surface water Bodies	**<u>Surface water Monitoring:</u>** Ensure no litter or contaminants lie on the ground.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. GENERAL ACTIVITIES SITE VISIST BY VARIOUS SPECIALIST DRILLING FOR CONTINUED RESOURCE EVALUATION SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Protection of fauna	Monitor any ecologically sensitive species should they be observed on site.	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Contain all activities within the boundaries of the approved processing area. • Demarcate, signpost and manage the 20 m buffer area as no-go area around areas with natural vegetation. • Ensure no fauna is caught, killed, harmed, sold or played with. • Instruct workers to report any animals that may be trapped in the working area. • Ensure no snares are set or nests raided for eggs or young.	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control
ESTABLISHMENT OF TEMPORARY BUILDINGS AND INFRASTRUCTURE WITHIN BOUNDARIES OF SITE. SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION) DRILLING FOR CONTINUED RESOURCE EVALUATION	Fire Management	Fire Management	Responsibility: Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer. Role: Do not collect fire wood In the event of a fire an alarm will be activated to alert all employees and contractors; Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate based fire extinguisher for chemical and electrical fires; In the event of a small fire the fire extinguishers placed around the mine will be used to contain and extinguish the fire;	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

NAME OF ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			In the event of a large fire, the fire department will be notified and must react timeously; A Fire Association will be set up with the mine and surrounding land owners to facilitate communication during fire events and assist in fighting fires, where necessary; Report all fires • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	
SLOPING, LANDSCAPING AND REPLACEMENT OF TOPSOIL OVER DISTURBED AREA (FINAL REHABILITATION)	Social Health and Safety Risk	Health and Safety Management	Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Ensure workers have access to the correct personal protection equipment (PPE) as required by law. • Manage all operations in compliance with the Occupational Health and Safety Act as well as the Mine Health and Safety Act.	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control
GENERAL ACTIVITIES SITE VISIST BY VARIOUS SPECIALIST	Sensitive Landscapes		Responsibility: • Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the Environmental Control Officer. Role: • Immediately stop work should any evidence of human burials or other heritage artefact be discovered during the execution of the activities. • Notify Heritage Northern Cape and the ECO immediately. • Work may only commence once the area was cleared by Heritage Northern Cape .	• Throughout Construction, Operational and Decommissioning Phase • Daily compliance monitoring by site management. • Quarterly compliance monitoring of site by an Environmental Control Officer. • Annual compliance monitoring of site by an Independent Environmental Control Officer.

(l) Indicate the frequency of the submission of the performance assessment/environmental audit report.

The Mineral and Petroleum Resources Development Regulations stipulates that performance assessment reporting should be done annually. The applicant commits to submitting the performance assessment reports of the proposed processing activity annually to DMR for perusal.

(m) Environmental Awareness Plan

(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

The purpose of this section is to outline the methodology that will be used to educate the mine's employees and contractors of any environmental risks associated with their work and the manner in which these risks must be dealt with so as to avoid pollution and minimize the degradation of the environment.

Once prospecting of the proposed area starts a copy of the Basic Assessment Report and Environmental Management Programme report will be handed to the site manager during the site establishment meeting. Issues such as topsoil handling, site clearance, fire principals and hazardous waste handling will be discussed. An induction meeting will be held with all the site workers to inform them of the Basic Rules of Conduct with regard to the environment.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments. An Environmental Control Officer needs to check compliance of the prospecting activities to the management programmes described in the EMPR.

Training Needs

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

After the training needs have been identified, it is the responsibility of the SHE Office to ensure that personnel attend the relevant identified training.

Training will also address the specific measures and actions as listed in the EMPR. This Environmental Awareness Plan (EAP) is intended to supplement the Safety, Health and Environmental (SHE) training and awareness requirements. Issues such as topsoil handling, site clearance, fire principals and waste handling will be discussed with the manager to ensure that he understands the goals as set out in the EMPR. An induction meeting will also be held with all the site workers to inform them of the basic steps towards environmental awareness with regard to the environment.

Table 38: Environmental Awareness Plan

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
Senior Management including Process Managers and Head of Department	Managing the Social & Environmental Assessment & Management System (SEAMS), and the Safety, Health & Environmental (SHE) Management System	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the significant impacts as described in the EIA/EMP during the various phases		
		Knowledge of the commitments made in the EMP relevant to the various phases		
		Setting and reviewing the mine's Environmental objectives		
		Directing the SEAMS and SHE management system, and monitoring their progress		
		Accessing the legal register and searching for details	Training on the legal register	Once off
		Emergency preparedness and response		
Environmental Management Representative, SHE Officer & Internal Auditor	Managing the SEAMS and the SHE Management System Monitoring and auditing	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the significant impacts as described in the EIA/EMP during the various phases		
		Knowledge of the commitments made in the EMP relevant to the various phases		
		Directing the SEAMS and SHE management system, and monitoring their progress		
		Current knowledge of South African regulatory requirements, best practice guidelines and applicable legislation	Training on the legal register	On going
		Emergency preparedness and response		
		Knowledge in spill management, stockpile management, discard management, water management and waste management	Meetings and Talk Topics	Continuous
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge of the SABS standards and other relevant legislation regarding the correct storage of chemicals	Training on the SABS standards and other legislation	Annual
		Knowledge of auditing techniques and report writing	Auditor training	Annual
Section Managers & Section Engineers	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases		
		Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.	Meetings and talk topics	Continuous
		Knowledge in stockpile management, discard management, water management and waste management		
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge in the correct storage of chemicals		
Engineering HOD & General Engineering Supervisor	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System	General in-house, management training	Once off
		Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases		
		Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.		
		Knowledge in spill management and waste management	Meetings and talk topics	Continuous
		Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge in the correct storage of chemicals		
Mine Captain & General Engineering Supervisors	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.	General in-house, management training	Once off
		Knowledge in spill management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage and handling of chemicals Understanding the requirements for not polluting the environment	Meetings and talk topics	Continuous
Supervisors, Shift Boss & Forman	General Environmental Awareness and job specific impacts	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in spill management and waste management Understanding the requirements for not polluting the environment	General in-house, management training	Once off

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
Operators, tradespersons & Floor Employees	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the SEAMS Management Plan relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual
General Administration Staff	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the SEAMS Management Plan relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual
Security	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training	Annual
Senior Management including Process Managers and Head of Department	Managing the Social & Environmental Assessment & Management System (SEAMS), and the Safety, Health & Environmental (SHE) Management System	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the significant impacts as described in the BAR/EMP during the various phases Knowledge of the commitments made in the EMP relevant to the various phases Setting and reviewing the mine's Environmental objectives Directing the SEAMS and SHE management system, and monitoring their progress	General in-house, management training	Once off
		Accessing the legal register and searching for details Emergency preparedness and response	Training on the legal register	Once off
Environmental Management Representative, SHE Officer & Internal Auditor	Managing the SEAMS and the SHE Management System Monitoring and auditing	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the significant impacts as described in the EIA/EMP during the various phases Knowledge of the commitments made in the EMP relevant to the various phases Directing the SEAMS and SHE management system, and monitoring their progress	General in-house, management training	Once off
		Current knowledge of South African regulatory requirements, best practice guidelines and applicable legislation Emergency preparedness and response	Training on the legal register	On going
		Knowledge in spill management, stockpile management, discard management, water management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Meetings and Talk Topics	Continuous
		Knowledge of the SABS standards and other relevant legislation regarding the correct storage of chemicals	Training on the SABS standards and other legislation	Annual
		Knowledge of auditing techniques and report writing	Auditor training	Annual
Section Managers & Section Engineers	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases	General in-house, management training	Once off
		Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives. Knowledge in stockpile management, discard management, water management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage of chemicals	Meetings and talk topics	Continuous
Engineering HOD & General Engineering Supervisor	Implementation and daily management of the SEAMS and the SHE Management System	Understanding the purpose of the SEAMS and SHE Management System Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives.	General in-house, management training	Once off
		Knowledge in spill management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage of chemicals	Meetings and talk topics	Continuous
Mine Captain & General Engineering Supervisors	Implementation and daily management of the SEAMS and the SHE Management System		General in-house, management training	Once off
			Meetings and talk topics	Continuous

OCCUPATION CATEGORY	ENVIRONMENTAL MANAGEMENT RESPONSIBILITY / ROLE	REQUIRED KNOWLEDGE AND INPUT	TRAINING REQUIRED	INTERVAL
Supervisors, Shift Boss & Forman	General Environmental Awareness and job specific impacts	Understanding the purpose of the SEAMS and SHE Management System. Knowledge of the relevant department's significant impacts as described in the BAR/EMP during the construction and operational phases Actively implementing actions to achieve SEAMS Management Plans and Environmental Objectives. Knowledge in spill management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage and handling of chemicals Understanding the requirements for not polluting the environment	General in-house, management training	Once off
Operators, tradespersons & Floor Employees		General Awareness of aim and purpose of the SEAMS and SHE Management System Understanding the SEAMS Management Plan relevant to their operations Understanding the requirements for not polluting the environment	Environmental Awareness Training	Annual
General Administration Staff				
Security				

Specialized Skills

The Training Department in conjunction with the SHE Officer are responsible for ensuring job specific training for personnel performing tasks, which can cause significant environmental and social impacts (e.g. receipt of bulk hazardous chemicals/fuel, hazardous materials handling, responding to emergency situations etc.). The Prospecting Right Manager with the assistance of the SHE Officer must identify relevant personnel and training courses.

On the job training is an essential tool in environmental awareness. Employees must be given details of the expected environmental issues and concerns specifically related to their occupation. Employees must be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

Review of Training Material

Effectiveness of the environmental management training will be done by the management through task observations and during internal and external audits.

All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organizational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed, any short comings and non-compliancy will be highlighted and management measures incorporated or improved upon within the training material.

Records

Records from the implementation of this EAP will be kept and controlled in accordance with the SHE Management System Control of Records Procedure, which is required to be implemented so as to provide evidence of conformity and effective operation of the relevant requirements of the SHE management system.

(2) Manner in which risk will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any prospecting takes place. An Environmental Control Officer needs to check compliance of the prospecting activity to the management programmes described in the EMPR.

EMERGENCY RESPONSE PLAN AND PROCEDURES

As part of its management tools, a mine must have an Emergency Response Plan. These plans will be disseminated to all employees and contractors in the event of an emergency. In the case of a medical accident or problem, the mine has first aid kits available at various points and an emergency room. A First Aid officer will be on duty at all times. In the event of an emergency the checklist of emergency response units must be consulted and the relevant units notified.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine. Should the emergency have the potential to affect the surrounding communities, they will be alerted via alarm signals or contacted in person.

Emergency services will be sourced from the nearest main town, Kuruman wherever possible. Contact details for the emergency services and local authorities are listed below; these will be displayed on site and made available to all employees and contractors.

Police Station (Aggeneys):	**054 983 2437**
Police Department (Pofadder):	**054 933 1100**
Ambulance:	**082 749 7412**
Fire Department:	**054 332 4254**
Hospital:	**053 712 8100**
Department of Water and Sanitation:	**056 811 5834**
Department of Mineral Resources:	**053 807 1700**
Department of Environment and Nature Conservation:	**053 807 7300**
Department of Roads and Public Works:	**053 839 2100**
Department of Economic Development and Tourism:	**053839 4000**
Department of Agriculture, land reform and rural development:	**053 838 9100**

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks.

Site Management

- Stay within boundaries of site – do not enter adjacent properties;
- Keep tools and material properly stored;
- Smoke only in designated areas; and
- Use toilets provided – report full or leaking toilets.

Water Management and Erosion

- Check that rainwater flows around work areas and are not contaminated;
- Report any erosion;
- Check that dirty water is kept from clean water;

- Do not swim in or drink from streams; and
- Any of the above actions will be included in the performance assessment report to the Department of Mineral Resources (DMR).

Flooding

There is potential for flooding during the rainy season. This could result in a large volume of water flowing downstream or accumulating in a water containment facility and could cause major damage to equipment and endanger the lives of employees on site. Procedures must be put in place to ensure that there is a quick response to flood events and damage is kept to a minimum.

The procedure for flooding is as follows:

- DWS's flood warning system will be reviewed annually;
- Mine management will be made aware of any such event so they can take appropriate action to ensure production losses are kept to a minimum;
- All contaminated water will be contained on site, as far as possible and discharges to the environment will only occur if absolutely necessary in an extreme flood event.
- Check that rainwater flows around work areas and are not contaminated;
- Report any erosion;
- Check that dirty water is kept from clean water; and
- Do not swim in or drink from streams or the quarry.

Waste Management

- Take care of your own waste;
- Keep waste separate into labelled containers – report full bins;
- Place waste in containers and always close lid;
- Don't burn waste; and
- Pick-up any litter laying around.

Hazardous Waste Management (Petrol, Oil, Diesel, Grease)

Hydrocarbons such as diesel, petrol, and oil which are used as fuel for mine machinery which is kept on site, increases the possibility that spillage may occur. As this is a product mine there is also the possibility of a product spillage occurring. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment.

Diesel, engine oil and hydraulic oil are the most likely hydrocarbons identified during impact assessments that can result in an emergency situation.

The following procedure applies to a hydrocarbon spill:

- If any spills take place the contaminant together with the soil will be removed and placed in acceptable container to be removed with industrial waste to a recognised licence facility or licenced company.
- Bioremediation will be done on site to the satisfaction of DEA
- A spill clean-up kit is available at the storage yard
- All personnel will be trained n spill clean-up methodologies.
- Every precaution will be taken to prevent the spill from entering the surface water environment;
- In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be made available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil will be removed and treated at a special soil rehabilitation facility;
- If the spill is larger than 100 litres the Department of Environmental Affairs and Tourism (DEAT) will be notified by fax and or phone within 24-hour of the event.
- Reasonable measures must be taken to stop the spread of hydrocarbons and secure the area to limit access;
- Dispatch necessary services;
- The incident must be reported to the Environmental coordinator immediately;
- The Environmental Coordinator will assess the situation from the information provided, and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident;
- When investigating the incident, priority must be given to safety;
- Once the situation has been assessed, the Environmental Coordinator must report back to the Mine Manager;
- The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible any remediation measures that can be taken;
- The source / reason of the spill or leak will be addressed immediately;
- Never mix general waste with hazardous waste;
- Use only sealed, non-leaking containers;
- Keep all containers closed and store only in approved areas;
- Always put drip trays under vehicles and machinery;
- Empty drip trays after rain;
- Stop leaks and spills, if safe;
- Keep spilled liquids moving away;
- Immediately report the spill to the site manager/supervision;
- Locate spill kit/supplies and use to clean-up, if safe;
- Place spill clean-up wastes in proper containers; and
- Label containers and move to approved storage area.

<u>Breakdown of vehicles or equipment outside vehicle maintenance yard:</u>

If any equipment of vehicles breaks down inside the pit or outside the storage yard the following emergency procedure will be followed:

- Drip pans will be placed at all point s where diesel, oil or any hydraulic fluid can rip and contaminate the oil;
- All efforts will be made to remove the vehicle or equipment to the storage area;
- If the vehicle or equipment cannot be removed the broken part will be drained of all fluid and the specific part remove to the service area;
- No repairs will be allowed to take place outside the maintenance yard or service area; and
- Any spills will be managed as described in the hydrocarbon section above.

Explosions

Explosions can occur in the plant and workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance.

The procedure to be followed is:

- Alternative evacuation routes will be devised, should a rock fall occur as a result of the explosion; and
- All relevant emergency response units must be notified and hospitals informed of incoming patients.

Discoveries:

- Stop work immediately;
- Notify site manager/supervisor; and
- Includes – Archaeological finds, Cultural artefacts, Contaminated water, Pipes, Containers, Tanks and drums, Any buried structures.

Air Quality:

- Wear protection when working in very dusty areas;
- Implement dust control measures:
- Sweep paved roads;
- Water all roads and work areas;
- Minimize handling of material; and
- Obey speed limit and cover trucks.

Driving and Noise

- Use only approved access roads;
- Respect speed limits;
- Only use turn-around areas – no crisscrossing through undisturbed areas;
- Avoid unnecessary loud noises; and
- Report or repair noisy vehicles.

Flora and Fauna

- Do not remove any plants or trees without approval of the site manager;
- Do not collect fire wood;

- Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site;
- Report any animal trapped in the work area; and
- Do not set snares or raid nests for eggs or young.

Fire Management

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers will be placed around the mine.

The following procedures apply to fires:

- In the event of a fire an alarm will be activated to alert all employees and contractors;
- Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate based fire extinguisher for chemical and electrical fires;
- In the event of a small fire the fire extinguishers placed around the mine will be used to contain and extinguish the fire;
- In the event of a large fire, the fire department will be notified and must react timeously;
- All staff will receive training in response to a fire emergency on site;
- A Fire Protection Association will be set up with the mine and surrounding land owners to facilitate communication during fire events and assist in fighting fires, where necessary;
- Fire breaks has been established and will be maintained around the prospecting area for the duration of the project;
- If possible all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains
- In case of a chemical or petroleum fire, run-off from the area will be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier;
- Contaminated run-off must be diverted into an oil sump, or cleaned up;
- All firefighting equipment will be inspected at least monthly to ensure that these are functioning;
- Do not light any fires on site, unless contained in a drum at demarcated area;
- Put cigarette butts in a rubbish bin;
- Do not smoke near gas, paints or petrol;
- Know the position of firefighting equipment;
- Report all fires; and
- Don’t burn waste or vegetation.

In addition to the induction meeting to be held with the site employees to inform them of the basic steps towards environmental awareness, the operators of earth moving equipment should be informed of the following requirements:

- Prospecting within demarcated areas;
- No-go areas;
- Establishment of access roads;

- Handling of hazardous waste and their storage facilities;
- Handling of biodegradable and non-degradable waste;
- Vehicle maintenance;
- Mining methods to be followed;
- Handling and storing of topsoil;
- Capping of drill holes;
- Speed control in order to reduce dust;
- Emergency procedure awareness;
- Labourers must be informed of the following during “toolbox talks”:
- Reporting of unusual observations to management (e.g. fossils, graves, etc.);
- Reporting of spills to management;
- Felling or damaging trees for firewood not allowed;
- Making fires not allowed;
- Hunting and killing of animals not allowed;
- Demarcated areas for mining;
- Establishing of access roads and erection of gates in fence lines;
- Toilet facilities and hygiene measures;
- Handling of waste;
- Vehicle maintenance and vehicle maintenance yard;
- Handling of topsoil; and
- Emergency procedures awareness.

g) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually)

The applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMR for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

Effectiveness of the environmental management training will be done by the management through task observations and during internal and external audits. All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organizational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed, any short comings and non-compliancy will be highlighted and management measures incorporated or improved upon within the training material.

2) Undertaking

The EAP herewith confirms

a) the correctness of the information provided in the reports X

b) the inclusion of comments and inputs from stakeholders and I&AP's X

c) the inclusion of inputs and recommendations from the specialist reports where relevant, and X

d) that the information provided by the EAP to interested and affected parties and any response by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein X

Signature of the environmental assessment practitioner:

Greenmined Environmental

Name of Company:

16 September 2019

Date:

-END-

APPENDIX LIST

Appendix A ***Regulation 2.2 Map***

Appendix B 1:250 000 Map

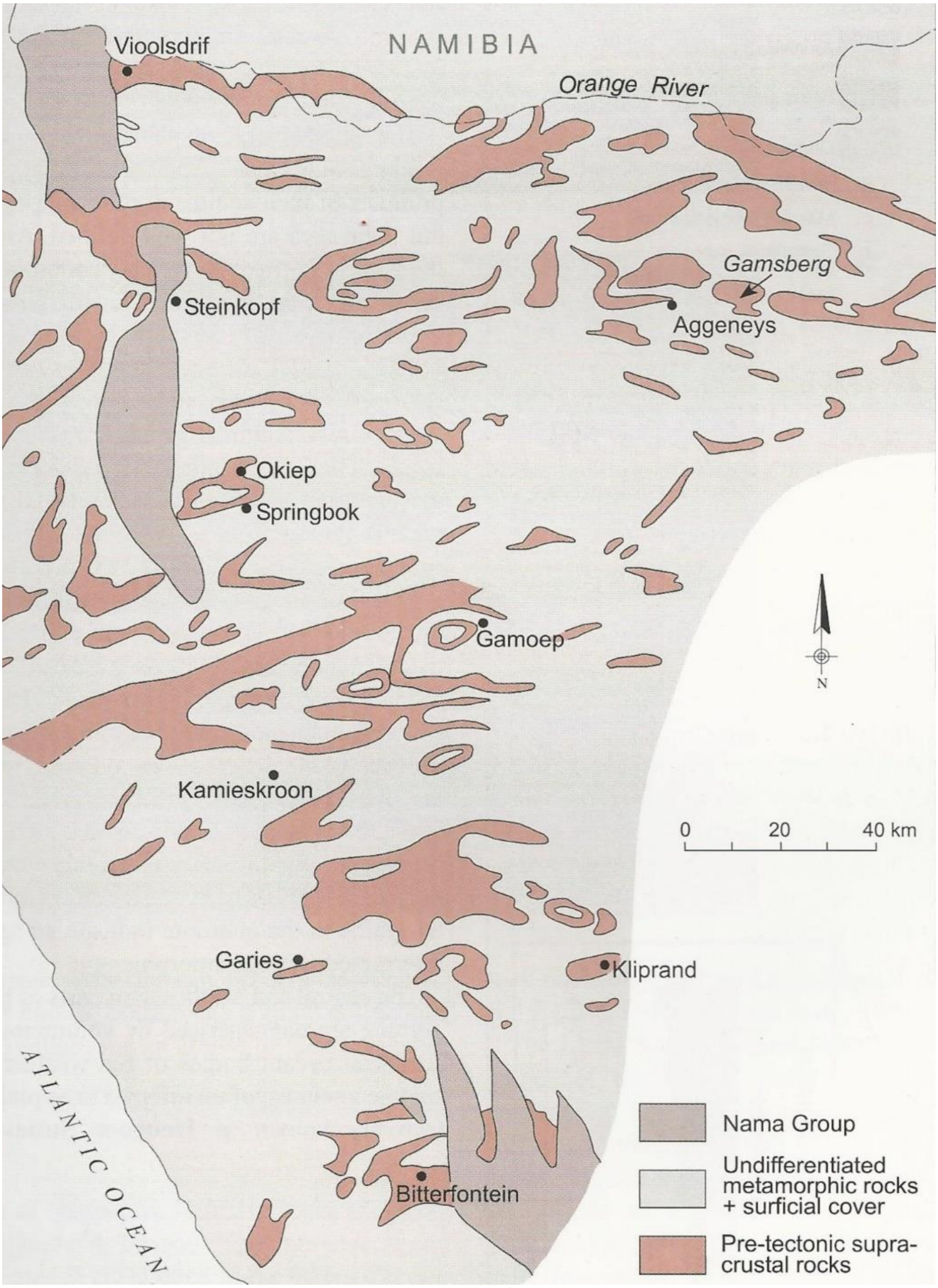
Appendix C Prospecting Activities Map

Appendix D Locality Map

Appendix E Surrounding Land Use Map

Appendix F Rehabilitation Plan

Appendix G Geology Plan


NAMIBIA
Vioolsdrif
Orange River
Steinkopf
Gamsberg
Aggeneys
Okiep
Springbok
Gamoep
N
Kamieskroon
0
20
40 km
Garies
Kliprand
ATLANTIC OCEAN
Bitterfontein
Nama Group
Undifferentiated metamorphic rocks + surficial cover
Pre-tectonic supra-crustal rocks

Appendix H	***Public Participation Documents***
Appendix G1	***Landowner Consent***
Appendix G2	***Comments and Response Report***
Appendix G3	***Proof of Consultation***

Appendix I ***Supporting Impact Assessment***

Appendix J ***Photographs of the site***

VAN ZYL FARMS –PROSPECTING RIGHT APPLICATION

ADJACENT LANDOWNERS AND I&AP'S	
	
	

ROADS

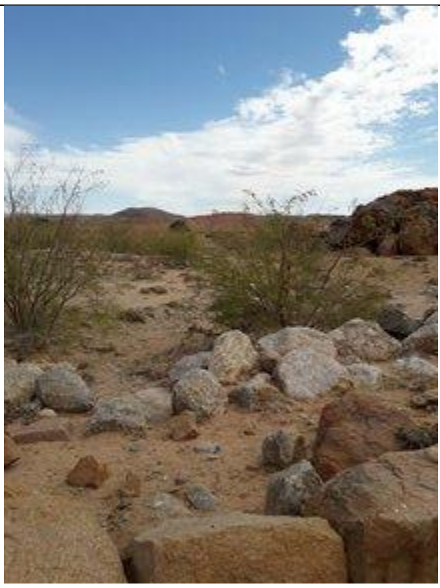
SITE PHOTOGRAPHS	
	
	
	





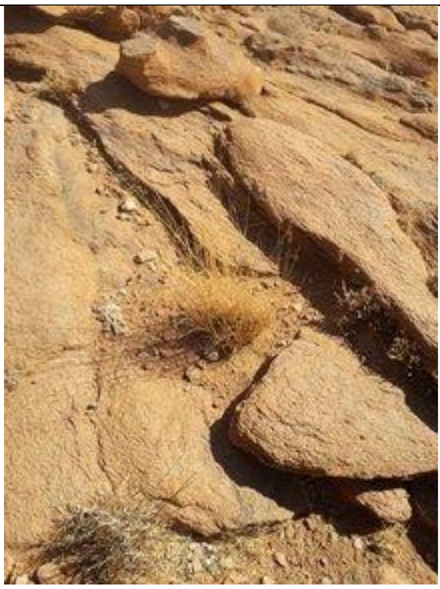

	
	
	

	
	
PLANTS IN THE AREA	
	

Euphorbia Sp.	Prosopis glandulosa
	
 Prosopis glandulosa	 Oscularia spp.

 Boscia albitrunca	
	 Oscularia spp.

	 Euphorbia Sp.
	
CEMETRY ON SITE	
	


HIER RUS
ONS LIEFLING BROER
CORNELIUS ROBERT
VAN DEN HEEVER
GEB. 3 - 5 - 1894
OORL. 12 - 10 - 1959
DIT WAS GODS WIL
R. I. V.

Appendix K CV and Experience Record of EAP

Appendix L Alien Invasive Management Plan

Appendix M Specialist Reports

Appendix N Environmental Awareness Plan