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## **BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**THE PROPOSED PROSPECTING RIGHT WITHOUT BULK SAMPLES, COMBINED WITH A WASTE LICENCE APPLICATION FOR SAXON HEAVY MINERALS (PTY) LTD FOR THE MINING OF HEAVY MINERALS (GENERAL), RUTILE (HEAVY MINERAL), ILMENITE (HEAVY MINERAL), ZIRCON (HEAVY MINERAL), MONAZITE (HEAVY MINERAL) AND LEUCOXENE (HEAVY MINERAL) NEAR SPRINGBOK ON THE FARM NUTTABOOI 199, REGISTRATION DIVISION: NAMAQUALAND, NORTHERN CAPE PROVINCE.**

<b>NAME OF APPLICANT</b>	<b>Saxon Heavy Minerals (Pty) Ltd</b>
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## CLAUSE

This report has been compiled by Milnex CC, using information provided by **Saxon Heavy Minerals (Pty) Ltd** the client as well as third parties, which information has been presumed to be correct. While Milnex CC have made every endeavour to supply accurate information, and exercised all care, skill and diligence in the drafting of this report, errors and omissions may occur. Accordingly, Milnex CC does not warrant the accuracy or completeness of the materials in this report. Milnex CC does not accept any liability for any loss or damage which may directly or indirectly result from any advice, opinion, information, representation or omission, whether negligent or otherwise, contained in this report. Milnex CC does not accept any liability for any loss or damage, whether direct, indirect or consequential, arising out of circumstances beyond the control of Milnex CC, including the use and interpretation of this report by the client, its officials or their representatives or agents. This document contains information proprietary to Milnex CC and as such should be treated as confidential unless specifically identified as a public document by law. Milnex CC owns all copyright and all other intellectual property rights in this report. The document may not be copied, reproduced in whole or in part, or used for any manner without prior written consent from Milnex CC. Copyright is specifically reserved in terms of the Copyright Act 98 of 1987 including amendments thereto. By viewing this disclaimer and by accepting this document, you acknowledge that you have read and accepted these Terms of Use and undertake to keep the information contained herein confidential and not to do any act or allow any act which is in breach of these Terms of Use.

### **IMPORTANT NOTICE**

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

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

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

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

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

### **BASIC ASSESSMENT REPORT PROCESS**

- 1) The environmental outcomes, impacts and residual risks of the proposed activity must be set out in the basic assessment report.

### **OBJECTIVE OF THE BASIC ASSESSMENT PROCESS**

- 2) The objective of the basic assessment process is to, through a consultative process—
  - a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
  - b) identify the alternatives considered, including the activity, location, and technology alternatives;
  - c) describe the need and desirability of the proposed alternatives[.];
  - d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage[ ], and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on **[the]** these aspects to determine—
    - i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - ii) the degree to which these impacts—
      - aa) can be reversed;
      - bb) may cause irreplaceable loss of resources; and
      - cc) can be avoided, managed or mitigated; and
  - 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 avoid, manage or mitigate identified impacts; and
    - iii) identify residual risks that need to be managed and monitored.

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**SCOPING OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORT**

1) Contact Person and correspondence address

**A) DETAILS OF:**

**i) THE EAP WHO PREPARED THE REPORT**

**ii) EXPERTISE OF THE EAP**

Name of Practitioner	Qualifications	Contact details
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**Summary of the EAP’s past experience.** (Attach the EAP’s curriculum vitae as **Appendix 2**)

Milnex CC was contracted by **Saxon Heavy Minerals (Pty) Ltd** as the independent environmental consultant to undertake the BAR and EMPr process for a Prospecting Right application without Bulk Samples, combined with a Waste Licence Application for the mining of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province. The property is situated approximately 50km West of Springbok, along the R355 towards Kleinzee and in the Buffels River valley. Milnex CC does not have any interest in secondary developments that may arise out of the authorisation of the proposed project.

The Applicant proposes to prospect for heavy minerals by means of non-invasive methods such as desktop analyses, remote sensing, surface mapping and surveying of the deposit, and by means of invasive methods such as truck-mounted RC drills and hand-held auger drilling. The target areas are both the virgin areas south and east of the old mine pit and the overburden dumps north and east of the pit as well as the slimes dam deposits west of the pit.

The proposed non-invasive prospecting methods will cover the entire prospecting lease area, while invasive prospecting (drilling) will be concentrated in those areas recognised as having potential for the concentration of heavy minerals. Where possible, existing mine roads and tracks will be utilised for access to the various prospecting sites, and environmentally sensitive areas will be avoided as far as is practically possible. All prospecting will be conducted in terms of the directives as contained in the Environmental Management Programme (EMP), which will be submitted to the DMR as part of the Prospecting Right Application process.

Milnex CC is a specialist environmental consultancy with extensive experience in the mining industry which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Milnex CC benefits from the pooled resources, diverse skills and experience in the environmental and mining field held by its team that has been actively involved in undertaking environmental studies for a wide variety of mining related projects throughout South Africa. The Milnex CC team has considerable experience in environmental impact assessment and environmental management, especially in the mining industry.

Percy Schaole, Lizanne Esterhuizen & Danie Labuschagne have experience consulting in the environmental field. Their key focus is on environmental assessment, advice and management and ensuring compliance to legislation and guidelines. They are currently involved in undertaking EIAs for several projects across the country (refer to **Appendix 2** for CV)

No processing of materials will take place on site and all sample preparation and analyses will take place in off-site laboratories and other existing off-site facilities.

**B) DESCRIPTION OF THE PROPERTY.**

<b>Farm Name:</b>	Farm Nuttabooi 199
<b>Application area (Ha)</b>	4872.98 hectares
<b>Magisterial district:</b>	Namakwa District Municipality
<b>Registration Division</b>	Namaqualand  Municipality: Nama Khoi
<b>Distance &amp; direction from nearest town</b>	The application property is situated 55km west of Springbok, along the R355 towards Kleinsee and in the Buffels River valley.
<b>21 digit Surveyor General Code for each farm portion</b>	1) C05300000000019900000
<b>Minerals Applied for</b>	Heavy Minerals (General) Rutile (Heavy Mineral) Ilmenite (Heavy Mineral) Zircon (Heavy Mineral) Monazite (Heavy Mineral) Leucosene (Heavy Mineral)

**III. FARM CO-ORDINATES**

<b>Farm</b>	<b>Longitude</b>	<b>Latitude</b>
1) Farm Nuttabooi 199	17° 20' 42.076''' E	29° 33' 48.953''' S
	17° 20' 9.089''' E	29° 36' 22.478''' S
	17° 22' 45.894''' E	29° 36' 50.152''' S
	17° 23' 6.022''' E	29° 37' 16.122''' S
	17° 25' 4.573''' E	29° 34' 22.922''' S
	17° 27' 12.683''' E	29° 35' 8.124''' S



	17° 26' 58.135''' E	29° 34' 46.171''' S
	17° 26' 53.675''' E	29° 34' 35.623''' S
	17° 26' 54.791''' E	29° 34' 22.955''' S
	17° 26' 53.639''' E	29° 34' 11.370''' S
	17° 26' 49.510''' E	29° 34' 0.574''' S
	17° 26' 43.210''' E	29° 33' 49.964''' S
	17° 26' 30.563''' E	29° 33' 33.995''' S
	17° 26' 23.939''' E	29° 33' 30.114''' S
	17° 26' 10.669''' E	29° 33' 4.349''' S
	17° 25' 57.680''' E	29° 32' 53.693''' S
	17° 25' 34.572''' E	29° 32' 41.849''' S
	17° 25' 19.074''' E	29° 32' 46.547''' S
	17° 25' 6.038''' E	29° 32' 58.819''' S
	17° 24' 57.301''' E	29° 33' 4.957''' S
	17° 24' 42.800''' E	29° 33' 19.670''' S
	17° 24' 17.190''' E	29° 33' 30.672''' S
	17° 23' 58.744''' E	29° 33' 25.398''' S
	17° 23' 43.278''' E	29° 33' 13.500''' S
	17° 23' 30.451''' E	29° 32' 55.594''' S
	17° 23' 13.139''' E	29° 32' 43.984''' S
	17° 22' 56.690''' E	29° 32' 45.578''' S
	17° 22' 37.358''' E	29° 32' 49.117''' S
	17° 22' 28.949''' E	29° 32' 57.858''' S
	17° 22' 23.088''' E	29° 33' 1.094''' S
	17° 22' 9.354''' E	29° 33' 2.189''' S
	17° 21' 52.409''' E	29° 33' 5.224''' S
	17° 21' 38.657''' E	29° 33' 5.375''' S
	17° 21' 13.925''' E	29° 33' 43.387''' S

**C) LOCALITY MAP** (show nearest town, scale not smaller than 1:250000 attached as **Appendix 3**).

A Locality map is attached in **Appendix 3** and on figure 1 below.

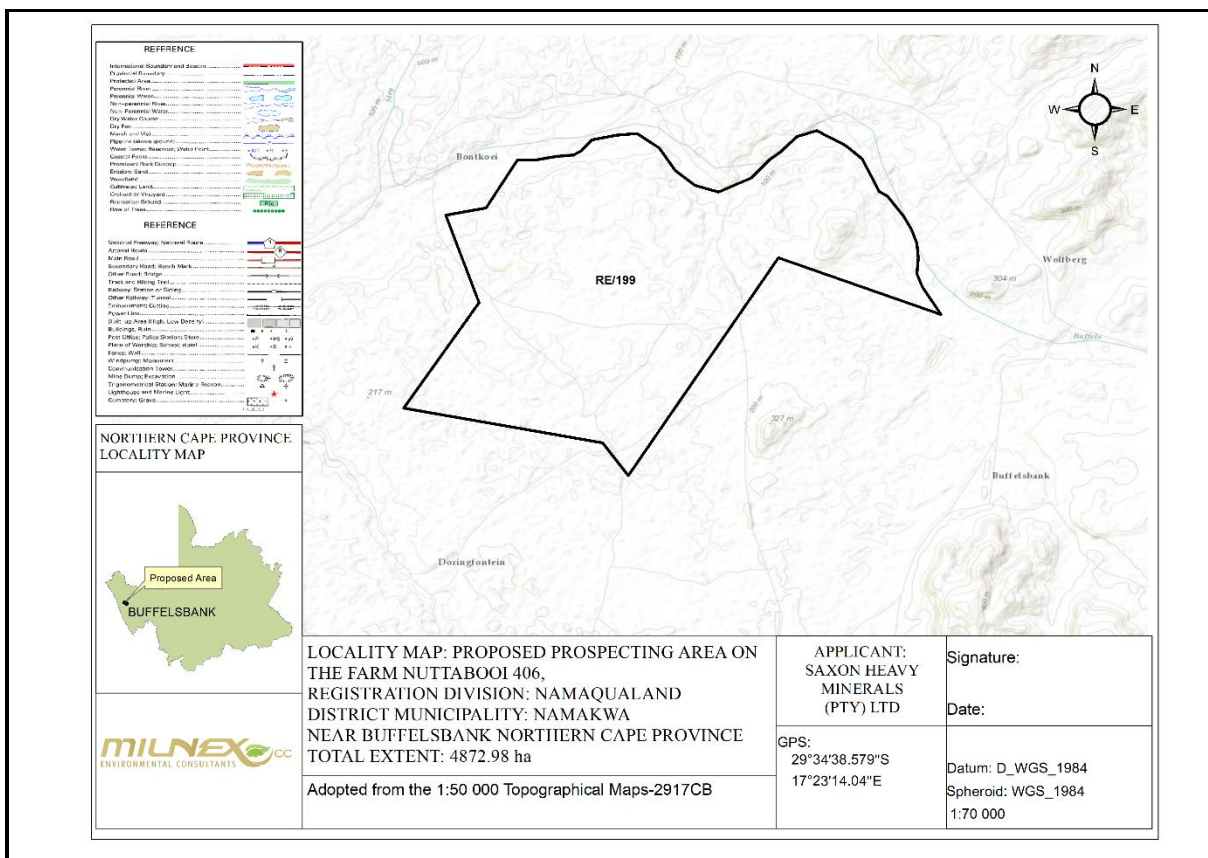


Figure 1: Locality Map

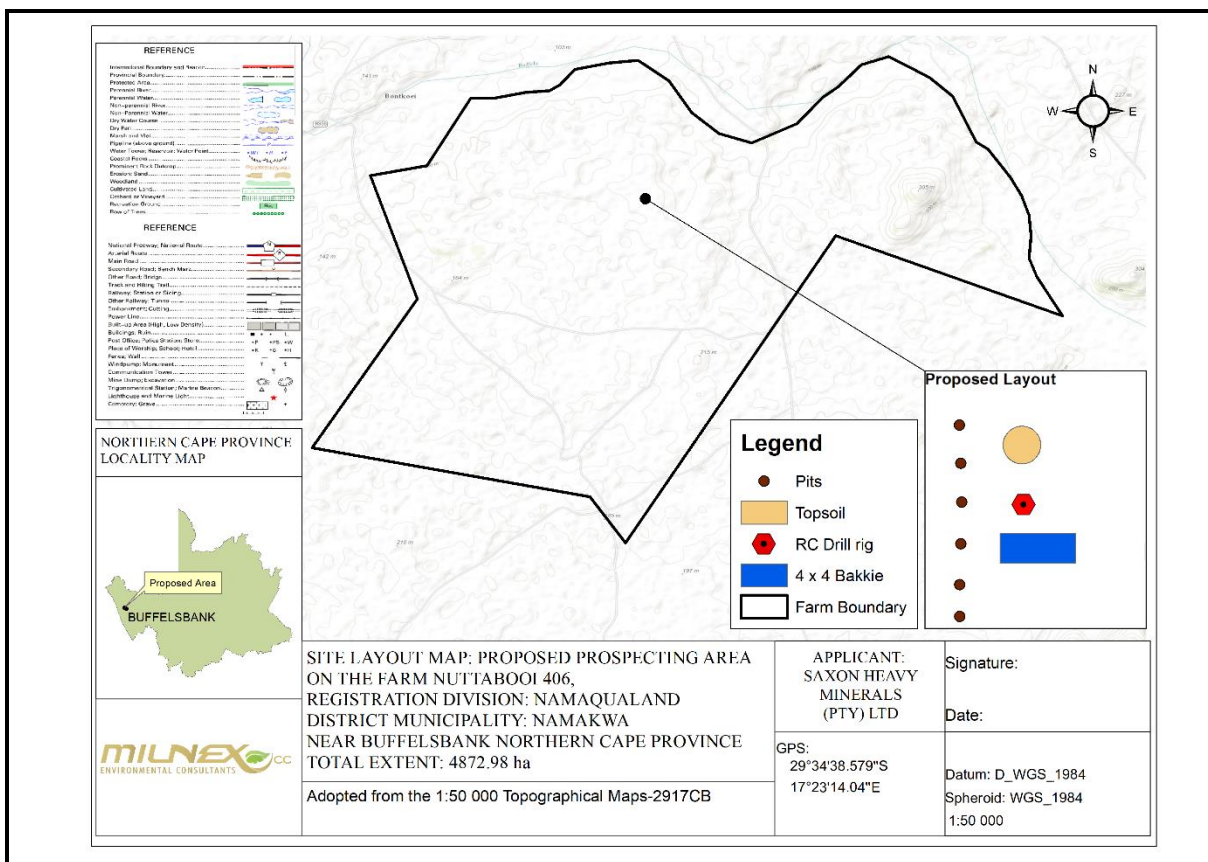


Figure 2: Site Plan Map

**D) DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.**

**i) LISTED AND SPECIFIED ACTIVITIES**

<b>NAME OF ACTIVITY</b>  <b>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</b> <b>E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</b>	<b>Aerial extent of the Activity</b>  <b>Ha or m<sup>2</sup></b>	<b>LISTED ACTIVITY</b>  (Mark with an <b>X</b> where applicable or affected).	<b>APPLICABLE LISTING NOTICE</b>  <b>(GNR 324, GNR 325 or GNR 326)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  (Indicate whether an authorisation is required in terms of the Waste Management Act).  <b>(Mark with an X)</b>
<b>Prospecting Right without bulk sampling:</b>  <b>Drilling</b> 68 RC boreholes shall be drilled by the appointed contractor. Percussion drilling methods will be used to drill boreholes at a depth of 30m with hole diameters of at least 300mm.	4872.98 ha	<b>X</b>	<b>GNR. 327 Activity 20</b>	-
<b>Clearance of indigenous vegetation:</b>  <b>Drilling</b> 68 RC boreholes shall be drilled by the appointed contractor. Percussion drilling methods will be used to drill boreholes at a depth of 30m with hole diameters of at least 300mm.	Disturbance of vegetation while drilling.	<b>X</b>	<b>GNR. 327 Activity 27</b>	-
<b>NEM:WA 59 of 2008</b>  Residue stockpiles or residue deposits  Category A: (15) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit, in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).				

**Listed activities**

<p><b>Description of the overall activity.</b> (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)</p>	<p>1. <b>Listing Notice GNR 327, Activity 27:</b> "The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</p> <p>2. <b>Listing Notice GNR 327, Activity 20:</b> "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—</p> <ul style="list-style-type: none"> <li>a) associated infrastructure, structures and earthworks, directly related to 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)]</li> <li>b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</li> </ul> <p>Prospecting of <b>Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral)</b> without bulk sampling.</p> <div style="background-color: #d9e1f2; text-align: center; padding: 5px;"><b>NEM:WA 59 of 2008</b></div> <p><b>Residue stockpiles or residue deposits</b></p> <p>3. Category A: (15) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit, in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>
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**ii) DESCRIPTION OF THE ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT**

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

**Saxon Heavy Minerals (Pty) Ltd** has embarked on a process for applying for a Prospecting Right without Bulk Samples, combined with a Waste Licence Application for the mining of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province. These portions are preferred due to the sites expected mineral resources. **Saxon Heavy Minerals (Pty) Ltd** requires a prospecting right without bulk sampling in terms of NEMA and the Mineral and Petroleum Resources Development Act to prospect for minerals mentioned above within the Pixley Ka Seme District Municipality, Northern Cape Province (refer to a locality map attached in **Appendix 3**).

#### Access roads

Access will be obtained from R355 gravel road and existing roads will also be used on the proposed area.

#### Water Supply

Additional water requirements related to the portable water supply for employees and workers will be supplied.

#### Ablution

Chemical toilets shall be used, no french drains and pits shall be permitted.

#### Storage of dangerous goods

During the prospecting activities, limited quantities of diesel and fuel, oil and lubricants if any will be stored on site. These goods should be placed in a bunded area one and a half times the volume of the total amount of goods to be stored.

#### Prospecting activities and phases

Please find the Prospecting Work Programme attached as **Appendix 9**.

- (i) **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.).

The proposed prospecting activities will be undertaken in six main phases as described below.

#### **PHASE 1**

##### **Phase 1: Non-invasive Prospecting**

Non-invasive prospecting will cover the entire prospecting area, and will include the following sub-phases:

**Phase 1a** will involve the following desk-top activities: data acquisition from government and private sources, and analysis of any existing/previous prospecting and drilling data, satellite (Landsat and ASTER) imagery, aerial photos, and terrain data, as well as geological map interpretation. The synthesis and interpretation of such information will contribute towards providing a clear picture of the location and characteristics of the heavy mineral deposit/s and will guide the in-field prospecting programme.

**Phase 1b:** Surface mapping will be conducted by the project geologist (Dr J Hattingh) and assistants, and will take place over a period of 2 months. Such mapping will encompass GPS controlled traverses, and aerial photo mapping.

**Phase 1c** will involve surveying and pegging of the anticipated deposit. This sub-phase will include the following activities:

Surveying of the mapped area to be prospected. A grid (250m x 250m) will be marked on the map, after which those positions will be marked in the field by a surveyor with labelled droppers (pegs) along the existing mine fronts. Channel sampling will take place at these positions along the faces of the existing mine fronts (see Phase 2a below).

Access routes to the drill sites will also be located (existing roads will be used wherever possible).

**Phase 1d:** The information gained from the above non-invasive prospecting may result in a review of the proposed drilling positions/prospecting grid. These specific areas cannot be determined at the time of writing of this Prospecting Work Programme. In order to expedite this procedure, the following is recommended as a way forward:

The EMP (to be submitted as part of the Prospecting Right Application) should identify no-go areas based on information such as sensitive vegetation (if available). At the time of identifying the target areas, a specialist botanist should be appointed to confirm the presence or absence of any critically endangered or endangered vegetation types, bearing in mind that the majority of the area is expected to comprise Namaqualand Strandveld, which (although not statutorily conserved) is not considered by the South African National Biodiversity Institute (SANBI) to be an endangered vegetation type.

If the prospecting auger drill hole grid requires adjustment, then such amendments/appendices (to both the Prospecting Work Programme and the EMP) will be lodged with the DMR. Note however that although the positions of the drill holes may alter slightly, the method and environmental impact mitigation measures are not expected to require any revision.

- (ii) **DESCRIPTION OF PLANNED INVASIVE ACTIVITIES:** (These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

## **PHASE 2**

### **Invasive Prospecting (Drilling)**

Phase 2 will be initiated after the detailed analysis of all the Phase 1 results have been collated, and by convening the appropriate persons to conduct the following task:

- Educate/train the staff conducting the prospecting programme on environmental issues (the details of which are discussed in the EMP).

### **Invasive prospecting includes the following sub phases:**

**Phase 2a:** Drilling will either be conducted by a truck-mounted RC drill rig or by a hand-held engine-powered auger drill. Approximately 68 RC drill holes are anticipated to be drilled to a maximum depth of approximately 40m each. The RC drill uses compressed air that raises the drilled material to the surface for sampling purposes. The hand-held auger has a 30cm core barrel at the end of the drill rods that catches the sediment as is progress in a batch approach.

**Phase 2b:** This sub-phase will involve a second round of infill drilling. Additional drill holes will be drilled to check for continuity of the heavy mineral deposits. The number of additional holes required will be determined by the results of the first phase of drilling (Phase 2a). The same drilling methods will be implemented as described for Phase 2a above.

### **Drilling Grid Layout**

The Applicant's consulting geologists have, through past experience and aerial photo interpretation, been able to roughly delineate the heavy mineral reserve and as such will

reduce the application area to encompass specific portions of the two farms. Access to the drill sites will be by existing farm roads or fence line tracks wherever possible.

### **Drilling Programme**

The prospecting right is required for a period of two years (24 months). Note that this application has been lodged for 24 months to allow for any delays which may occur or any further amendments which may be required. Drilling is proposed to take place in two 1-month periods separated by an analysis phase. The first phase of drilling will require the drilling of approximately 68 drill holes, followed by a second round of infill drilling. This will allow for phased chemical analyses of the samples, and a decision after each period as to whether to continue with the prospecting programme or not. It is anticipated that the drill rig will require between two and three hours to complete drilling activities on each drill site. Note that only one of each drill type (auger and one reverse circulation) will be on site at any one time.

### **PHASE 3**

#### **Sample Processing and Data Analysis**

Drill samples will be taken from the material raised by the drilling process before the hole is backfilled in reverse order. Samples will be removed by a 4x4 “bakkie”. This phase will also consist of an analysis of all the information received from the invasive and non-invasive prospecting activities. The economic feasibility studies, required to determine the economic and metallurgical viability of the project will be conducted by analysing the results of the data gathered from the prospecting programme, and the pre-feasibility studies will be finalised.

The sample processing will serve to assess the expected mine yield and will guide the design aspects for potential future mining, if a measured resource is the outcome of this processing programme.

#### **Calculation**

$7\text{m} \times 4\text{m} = 28\text{m}^2$  (size of area needed for drill rig and related equipment for drilling one borehole.)

$3\text{m} \times 2.5\text{m} = 7.5\text{m}^2$  (size of area needed for sampling tubes for one borehole.)

$28\text{m}^2 + 7.5\text{m}^2 = 35.5\text{m}^2$  (sum of the above mentioned.)

$35.5\text{m}^2 / 10\,000 = 0.00355\text{ha}$

$0.00355\text{ha} \times 68\text{boreholes} = 0.24\text{ha}$

The area to be disturbed will be approximately 0.24ha in 24 Months & 0.12ha in 12 months

### **PHASE 4**

#### **Decision-making**

The following activities will be undertaken as part of this final phase (Phase 4) of the proposed Prospecting Work Programme: The results of the non-invasive and invasive prospecting methods will be fully assessed and analysed to obtain a detailed understanding of the geology of the project area. This will entail computer generation of models to simulate the deposit. Various reports, as are required in terms of the MPRDA, will be submitted to the DMR throughout the prospecting process.

The Applicant (in consultation with the project team) will make a decision regarding the way forward. The Applicant will have three possible options to choose from regarding the way to proceed, namely:

Submit a Mining Right Application: Should prospecting yield positive results, a Mining Right Application may be lodged with the DMR.

Continue prospecting: If the prospecting results are non-conclusive, the Applicant might decide to continue prospecting. Should such a course of action be chosen, an application for a Prospecting Right Renewal may have to be lodged with the DMR, if required. Continued prospecting could include additional auger drilling and/or bulk sampling. Discontinue the entire operation: If the results of the prospecting activities are negative, the Applicant will most likely decide to discontinue the entire operation. Should this option be chosen, the Applicant will be required to conduct full rehabilitation of the drill and bulk sampling sites and any other disturbed areas. A Closure Application will, in this event, be lodged with the DMR.

**PHASE 5**  
**Rehabilitation**

Each drill hole site will be rehabilitated as prospecting proceeds. Rehabilitation will be in accordance with the directives contained in the EMP. The EMP also describes mitigation measures for the environmental impacts that might be associated with the proposed drilling activities.

It should be noted that some of the proposed prospecting phases will be undertaken in parallel.

**1) POLICY AND LEGISLATIVE CONTEXT**

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b> (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);	<b>REFERENCE WHERE APPLIED</b>
The Constitution of South Africa (Act No. 108 of 1996)	-
The National Environmental Management Act (Act No. 107 of 1998)	S24(1) of NEMA S28(1) of NEMA
The National Water Act (Act No. 36 of 1998)	S21 of NWA
The National Water Act (Act No. 36 of 1998) GN704 – Regulation on use of water for mining and related activities aimed at the protection of water resources.	
Management: Air Quality Act (Act No. 39 of 2004)	S21
The National Heritage Resources Act (Act No. 25 of 1999)	-
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	-
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	-
National Infrastructure Plan	-
National Forests Acts, Act 84 of 1998	Chap 3 (Part 1) 1998 S12(1) S15(1)



Milnex CC: BAR157 – BAR & EMPr: Prospecting Right application without Bulk Samples, combined with a Waste Licence Application for the mining of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province

National Veld & Forest Fires Act (Act 101 of 1998)	
Mine, Health and Safety Act 29 of 1996	
National Environmental Management: Waste Act 59 of 2008	
National Environmental Management: Biodiversity Act 10 of 2004	
Namakwa District Municipality Integrated Development Plan (IDP)	-
Nama Khoi Local Municipality Integrated Development Plan (IDP)	

**POLICY AND LEGISLATIVE CONTEXT**

<b>Legislation/Policy</b>	<b>Description</b>
<b>The Convention on Biological Diversity (Rio de Janeiro, 1992).</b>	The purpose of the Convention on Biological Diversity is to conserve the variability among living organisms, at all levels (including diversity between species, within species and of ecosystems). Primary objectives include (i) conserving biological diversity, (ii) using biological diversity in a sustainable manner and (iii) sharing the benefits of biological diversity fairly and equitably.
<b>South African Constitution 108 of 1996</b>	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
<b>Strategic Framework for Sustainable Development in South Africa</b>	The development of a broad framework for sustainable development was initiated to provide an overarching and guiding National Sustainable Development Strategy. The Draft Strategic Framework for Sustainable Development (SFSD) in South Africa (September 2006) is a goal orientated policy framework aimed at meeting the Millennium Development Goals. Biodiversity has been identified as one of the key crosscutting trends in the SFSD. The lack of sustainable practices in managing natural resources, climate change effects, loss of habitat and poor land management practices were raised as the main threats to biodiversity.
<b>National Environmental Management Act 107 of 1998</b>	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the ‘precautionary approach’, ‘polluter pays’ principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities.
<b>Environmental Impact Assessment (EIA) regulations</b>	New regulations have been promulgated in terms of Chapter 5 of NEMA and were published on 08 December 2014 in Government Notice No. R. 985. Development and land use activities which require Environmental Authorisation in terms of the NEMA EIA Regulations, 2014, are in Listing Notice 3 (GG No. R.983, LN3) identified via geographic areas with the intention being that activities only require Environmental Authorisation when located within designated sensitive areas. These sensitive/geographic areas were identified and published for each of the nine (9) Provinces.

<p><b>National Environmental Management: Biodiversity Act No 10 of 2004</b></p>	<p>The Biodiversity Act provides listing threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems.</p>
<p><b>Conservation of Agricultural Resources Act 43 of 1967</b></p>	<p>The intention of this Act is to control the over-utilization of South Africa’s natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorised a large number of invasive plants together with associated obligations of the land owner, including the requirement to remove categorised invasive plants and taking measures to prevent further spread of alien plants.</p>
<p><b>National Forest Act 84 of 1998</b></p>	<p>The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).</p> <p><b>Prohibition on destruction of trees in natural forests</b></p> <p>(1) No person may -</p> <p>(a) cut, disturb, damage or destroy any indigenous tree in a natural forest; or</p> <p>(b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from a tree contemplated in paragraph (a), except in terms of-</p> <p>(i) a licence issued under subsection (4) or section 23; or</p> <p>(ii) an exemption from the provisions of this subsection published by the Minister in the <i>Gazette</i> on the advice of the Council.</p>
<p><b>National Environmental Management: Protected Areas Act 57 of 2003</b></p>	<p>This Act provides for the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes. It also seeks to provide for the</p>

	sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
<b>Mine, Health and Safety Act 29 of 1996</b>	The Mine Health and Safety Inspectorate was established in terms of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996), as amended, for the purpose of executing the statutory mandate of the Department of Mineral Resources to safeguard the health and safety of mine employees and communities affected by mining operations.
<b>National Environmental Management: Waste Act 59 of 2008</b>	The Act reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.
<b>National Environmental Management: Biodiversity Act 10 of 2004</b>	This Act provides for the management and conservation of South Africa’s biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith

## **2) NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.**

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Mining has played a vital role in the economy of South Africa for over 100 years. In 2015 the mining industry contributed R286 billion towards South African Gross Domestic Product (GDP) representing 7.1% of overall GDP. Mining is a significant contributor to employment in the nation, with 457 698 individuals directly employed by the sector in 2015. This represents just over 3% of all employed nationally.

## **3) MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE INCLUDING A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED 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.

### **Location of the site**

The property is situated approximately 55km West of Springbok, along the R355 towards Kleinsee and in the Buffels River valley.

### **Preferred activity**

The prospecting of the below mentioned minerals is one of the optimum preferred activities for the site and the other may be livestock grazing. According to the Baseline Ecological Desktop Assessment (**Appendix 7**), most of the site is natural, consisting of low shrubland and already existing Mine 1 bare area. In the northern corner of the study site, mining activities are taking place. The Buffels River traverses the site in the northern region.

### **Technology alternatives**

In terms of the technologies proposed, these have been chosen based on the long term success of their prospecting history. The prospecting activities proposed in the Prospecting Work Programme (**Appendix 9**) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

## **4) A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE, INCLUDING:**

### **i) DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED;**

- **Consideration of alternatives**

The DEAT 2006 guidelines on ‘assessment of alternatives and impacts’ proposes the consideration of four types of alternatives namely, the no-go, site, activity, and technology alternatives. It is however, important to note that the regulation and guidelines specifically

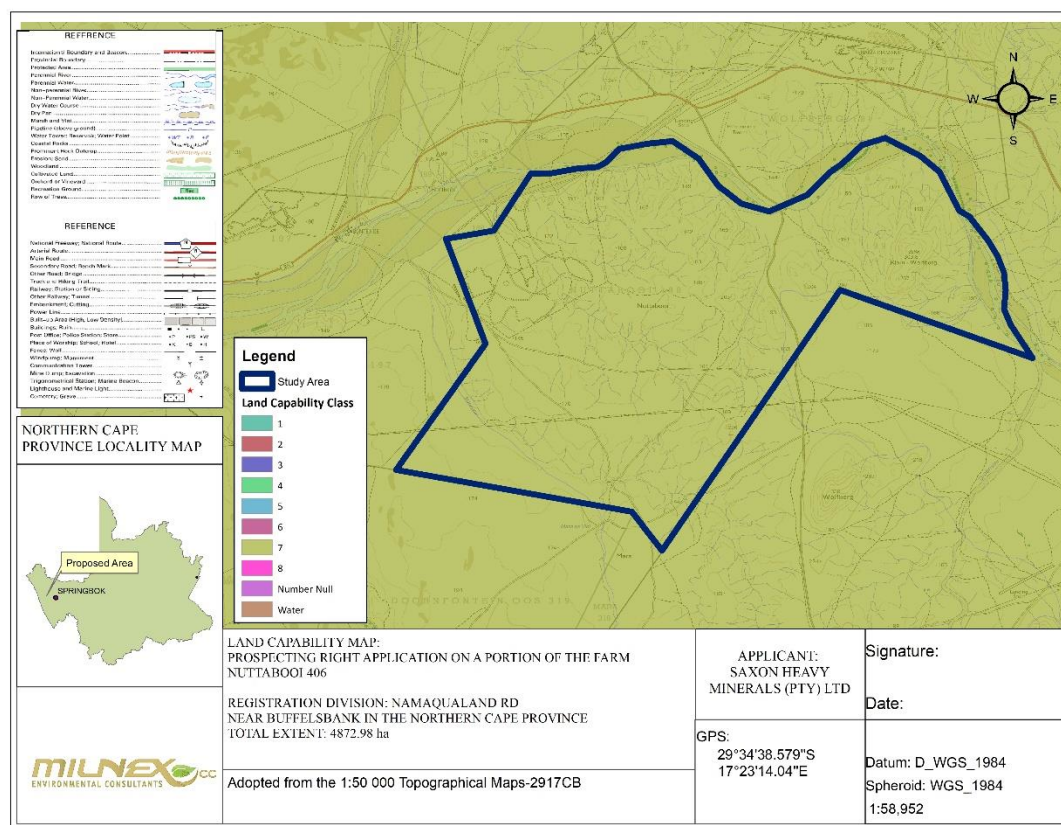
state that only ‘feasible’ and ‘reasonable’ alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer, the EAP and Interested and affected parties, which in some instances culminates in a single preferred project proposal. The following sections explore each type of alternative in relation to the proposed activity.

- **Location alternatives**

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Also, it is expected that the applied for minerals have been deposited on this farm and therefore the applicant would like to commence with their prospecting activities.

Land capability is the combination of soil suitability and climate factors. The proposed development falls within Land in Class 7.

(refer to Land capability map on **figure 3** and attached as **Appendix 5**).



**Figure 3:** Land Capability Map

- **Activity alternatives**

The environmental impact assessment process also needs to consider if the development of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral), prospecting would be the most appropriate land use for the particular site.

Prospecting of other commodities – from the surface and desktop assessment there are no indications that there are other commodities to be mined on the site Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral).

- **Design and layout alternatives**

The location of activities will be determined based on the location of the prospecting activities, which is outlined on the PWP. All the infrastructure will be temporary and/or mobile.

- **Operational alternatives**

Due to the nature of the prospecting activities, no permanent services in terms of water supply, electricity, or sewerage services are required.

The objective of the prospecting work programme is to target all minerals in question seams available with a view of increasing the geological confidence factor to assess its bulk sampling potential.

- **No-go alternative**

This alternative considers the option of ‘do nothing’ and maintaining the status quo. The description provided in section H of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. Should the proposed activity not proceed, the site will remain unchanged

- **Technology alternatives**

In terms of the technologies proposed, these have been chosen based on the long term success of their prospecting history. The prospecting activities proposed in the Prospecting Works Programme (**Appendix 9**) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

The preferred technology for the proposed prospecting activity, will be to drill boreholes

68 drill holes using a truck mounted RC drill rig or a hand-held auger drill to an average depth of approximately 30m. The total drilling depth (Phase 2a only) will therefore be in the order of 2 250m.

### **Reverse Circulation Drilling (RC drilling)**

#### Drill Structure

RC drilling is usually a large piece of apparatus, that requires a lot of space, not just for the rig itself, but the supporting vehicles and the pit for collecting waste runoff.

The drill cutting is transferred to the surface inside drill rods, which are linked together to create a ‘drill string’. Drill bits attached to the end of the hammer are made from tungsten-steel, and are usually around 13-20cm in diameter. These also have metal nodules attached at the end to allow cutting through particularly tough rock. Most RC drilling uses a dual-tube drill rods, with one tube inside another. The tubes inside overlap and provide a path for drilled

rock from the ground to the surface. Inner tubes can be sealed together, meaning that the RC drill can sample up to very large depths, often around 500m.

Another type of RC drilling is ‘centre sample’ drilling. This is a modern variation, in which a central hammer, with a hollow centre, allows the sample to immediately enter the drill pipe, without the need to travel past the hammer (AZOMining, 2012)

Sample Extraction

The samples produced from RC drilling are dry chips of the drilled rock. To create the sample, the hammer acts like a pneumatic piston and pushes a tungsten-steel drill bit on to the rock, breaking it up. Before the drill bit hits the rock, it is dried out using an air compressor, so that the rock chips are dry at the surface.

Water is often used down the hole to cool the drill bit and reduce dust, as well as assisting with the transportation of sample bits to the surface. Air is blown down the drill rods to create a pressure difference, allowing the sample chips and water to rise through the inner tube. The sample then reaches a bell at ground level, which transports the sample to a cyclone where it dries out and is deposited into sacks (AZOMining, 2012).

Applications

RC drilling is a technique used in most stages of mine development.

As it is cheaper than diamond core drilling, it is often used in first stage exploration mining to delineate a potentially extractable ore body. It is also preferable to RAB or air-core drilling when trying to reach great depths, but RC drilling is slower and more expensive than either of these two methods.

RC drilling is also consistently used during in-pit grade control and the development stage of an ore body (AZOMining, 2012).

Pros & Cons of the alternative RC drilling

Advantages	Disadvantages
Direct drilling cost reductions in the range of 25% to 40%.	Less geological information from sample.
Faster completion of drill programs with quicker delivery of results.	Holes can deviate (Spiral Stabiliser Subs keep holes straighter)
Reduced man-hours at the drill with decreased exposure to potential accidents.	Diamond drill can usually drill to greater depth although depths up to 800m have been achieved with.
Reduced contractor activity in the mine reduces mine support burden.	
Indirect cost reductions gained from a simplified sampling process.	

Pros & Cons of the alternative Diamond Core Drilling

Advantages	Disadvantages
Highly accurate cutting	Drill bits are often not very big and they are mostly able to cut through only stone, rock and cement.



A reduced risk of inadvertently causing structural damage	There is a powerful kick back from the machinery so caution needs to be applied when using diamond core drilling.
Less debris is produced	While dust will not accumulate in large quantities some dust is likely to go into the drilling machine which can have an effect on its functioning and effectiveness.
Suitable for just about any working environment	
Very little noise and no dust	
Equipment is lightweight and portable	
Can be done remotely which limits the safety hazards.	
Drill to great depth	

### Percussion rotary air blast (RAB)

Percussion rotary air blast drilling is a commonly used drilling technique used for exploratory drilling i.e. when minerals are being searched for. Percussion rotary air blast drilling is also often used for water bore drilling and blasthole drilling of mines.

This drilling technique makes use of pneumatic pressure to drive the steel drill bit into the ground in order to create a hole. It is a hammer like process that is easily able to penetrate rock in order to find mineral and ore deposits. The drill bits used are hollow. The debris which results from the **drilling process** shoots out of the earth and lands next to the machine. The unwanted material will land on the surface, next to the machine, by the use of air compression that is forced into the mine shaft. This is method of drilling is not always the best method to use when it comes to exploratory drilling as the materials to be sampled can be damaged when the materials are blasted from the earth. The percussion rotary air blast drilling procedure can usually be completed within a day.

**Percussion rotary air blast drilling** is the perfect method to be used when the exploratory drilling needs to be done on hard material such as rock. The percussion rotary air blast drilling method can penetrate up to 25 metres. If a mining company simply wants to have a small sample of the product which they are mining, then this method is simple and cost effective to be use. When there is a rock layer sitting on top of the soil which needs to be analysed for mineral presence, percussion rotary air blast drilling can be used to break away the top layer of rock so that the underneath soil can be explored.

Pros & Cons of the alternative Percussion rotary air blast (RAB):

Advantages	Disadvantages
Can be completed very quickly and easily through almost every different type of rock, this is the biggest advantage to percussion rotary air blast drilling.	The biggest disadvantages to percussion rotary air blast drilling are that for the effective use of the machinery, an experienced operator needs to be employed and while the machine can break through almost all types of rock, it cannot break through rock which is reinforced by steel.
Simple to operate and maintain	Slow, compared with other methods
Suitable for a wide variety of rock	Equipment can be heavy

Operation is possible above and below the water-table	Problems can occur with unstable rock formations.
Possible to drill to considerable depths	Water is needed for dry holes to help remove currensgs.

According to the PWP Percussion drilling methods will be used to drill boreholes

When it comes to dust suppression two main methods were considered, namely molasses stillage and the wetting (water) of roads. The table below provides a short summary of the advantages and disadvantages of each.

Water	Molasses stillage
More cost effective	Much more expensive
Could lead to the depleting of water resources	Requires less water
No damage (only if used excessively)	The product may be toxic to aquatic organisms. (As this product could have physical effects on aquatic organisms for e.g. floating, osmotic damage)
No harm to humans or animals(Only a high quantity will have harm to humans or animals)	Not Hazardous or toxic. Could cause irritation to eyes, skin or when ingested and inhaled.
Non-flammable	Non-flammable
Eye-wash fountains not needed	Eye-wash fountains in the work place are strongly recommended
	Working procedures should be designed to minimize worker exposure to this product.
Basic storing methods	Storing methods are a bit more complicated. Should be stored in a plastic, plastic lined or stainless steel, tight closed containers between 5 and 40 degrees Centigrade.

Considering the above mentioned information, water will be used for dust suppression purposes.

**ii) 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.

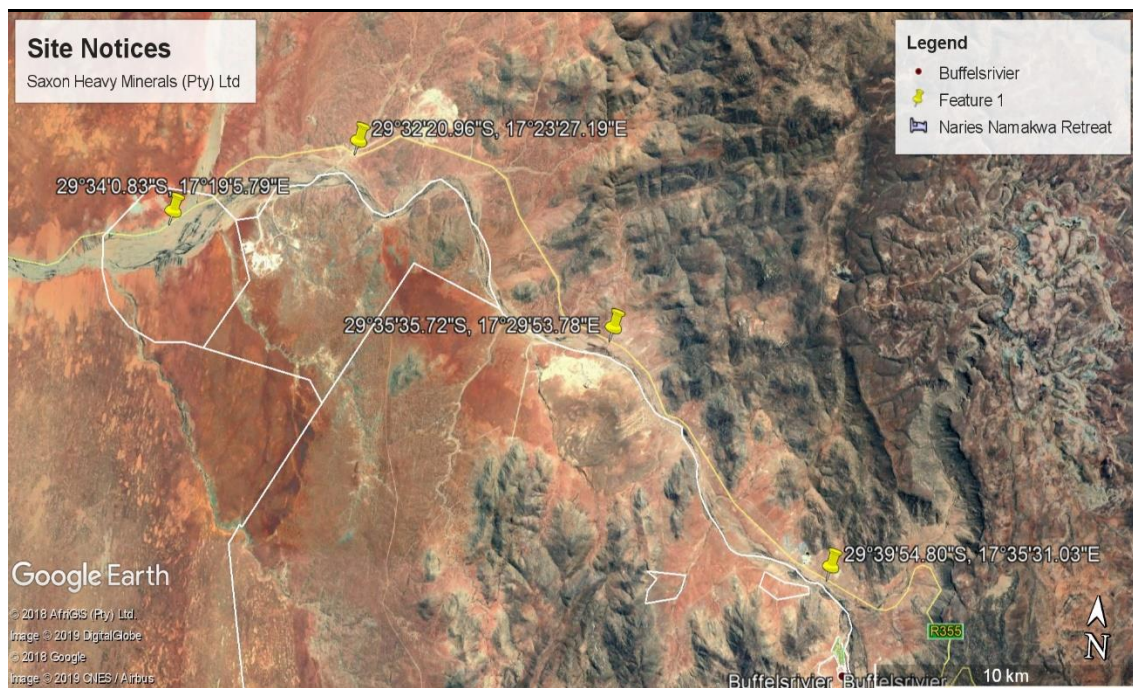
**Advertisement and Notices**

**1. Newspaper advertisement**

An advertisement was placed in English in the local newspaper (**Gemsbok**) on **14 June 2019** (see **Appendix 6**) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Milnex CC. I&APs were given the opportunity to raise comments within 30 days of the advertisement.

## 2. Site notices

Site notices was placed (as anticipated on the coordinates below) on site in English to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs will be given the opportunity to raise comments. Photographic evidence of the site notices will be included in **Appendix 6**. Below are the coordinates where the site notices were placed.



**Figure 4:** Site notice co-ordinates

## 3. Direct notification and circulation of Basic Assessment Report to identified I&APs, surrounding land owners and occupiers

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the **Basic Assessment Report** via registered post on **31 May 2019** and were requested to submit comments by **1 July 2019**. A copy of the report is also available at the Milnex offices in Schweizer-Reneke, 4 Botha Street, Schweizer-Reneke and Potchefstroom (Waterberry Street, Waterberry Square, 1st floor, Office 5B, Potchefstroom), between 7:30AM and 5PM, Monday to Friday. For a complete list of stakeholder details and for proof of registered post see **Appendix 6**. The consultees included:

**Table 1:** List of Stakeholders, Landowners, & surrounding landowners

Stakeholders	Landowners	Surrounding Landowner
Northern Cape Department of Environmental Affairs and Nature Conservation (DENC)	Emerald Panther Inv 78 Pty Ltd (West Coast Resources)	National Government of The Republic of South Africa: Department of Rural Development and Land Reform:  Me. Cynthia Nkoane

		Gemeenskap Van Komaggas
Department of Water & Sanitation (DWS)		Kasimira Trading 82 Pty Ltd
Department of Mineral Resources (DMR)		Emerald Panther Inv 78 Pty Ltd
NC Department of Agriculture, Forestry and Fisheries (DAFF)		Yolandy Trust Dirk Olivier
Northern Cape Department of Agriculture, Land Reform & Rural Development		
Department of Public Works, Roads and Transport in NC (DPWRT)		
Wildlife and Environment Society of South Africa (WESSA)		
SANRAL Western Region (Northern Cape)		
Namakwa District Municipality		
Municipal Manager at the Khai-Ma Local Municipality		
Local Councilor at the Khai-Ma Local Municipality		

It was expected from I&APs to provide their inputs and comments within 30 days after receipt of the notification or Basic Assessment Report. When the comment period ends, all comments received will be included in the final Basic Assessment Report & EMP Report.

#### **4. Consultation**

The Public Meeting is scheduled for **19 June 2019 at 12:00pm – 13:00pm** approximately 52km from Springbok on the R355 heading towards Kleinsee alongside the road (49min drive) and 50km from Kleinsee, at the coordinates mentioned below.

##### **Coordinates**

29°35'17.42"S,

17°28'56.78"E

##### **Directions to Public Meeting**

- In Springbok head towards Kleinsee on the R355.
- Drive for 56km on the R355 heading towards Kleinsee.
- After 56km there will be Milnex personnel waiting alongside the road At the Veggat/ Buffelsbank turnoff between the farms Kamaggas 200 and Grace`s Puts 201.



**Figure 5:** Directions to the public meeting

### **5. Public Meeting**

Please note that the Stakeholders & Interested and Affected Parties were informed about the proposed project with the use of press advertisement and registered letters.

Milnex representative Mr. Mandi Sibanyoni & Mr Anton Meyer attended the meeting.

The following were raised during the meeting:

- Water in the area is a big concern.

Attached as **Appendix 6** is the attendance register for the meeting.

### **6. Issues Raised by Interested and Affected Parties**

Comments received were included in the comments and response table/form (See Appendix 6 for comments and response form).

**iii) TABLE 2: SUMMARY OF ISSUES RAISED BY I&APS**

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

<b>Interested And Affected Parties</b>		<b>Issues Raised</b>	<b>Eaps Response To Issues As Mandated By The Applicant</b>	<b>Section And Paragraph Reference In This Report Where The Issue And Or Response Where Incorporated</b>
<b>List The Names Of Persons Consulted In This Column, And Mark With An X Where Those Who Must Be Consulted Were In Fact Consulted.</b>				
<b>Organisation</b>	<b>Contact Person</b>			
<b>Landowner</b>				
<b>Nuttabooi RE/199</b>	Emerald Panther Inv 78 Pty Ltd (West Coast Resources)	No Comments Received		
<b>Surrounding Landowners</b>				
<b>Kamaggas 5/200 Witbergs Kloof RE/186</b>	National Government of The Republic Of South Africa: Department of Rural Development And Land Reform:  Me. Cynthia Nkoane  Gemeenskap Van Komaggas	No Comments Received		
<b>Wolfberg RE/187</b>	Kasimira Trading 82 Pty Ltd			

<b>Staan Hoek RE/198</b> <b>Stryd Rivier RE/188</b> <b>Doornfontein Oos RE/319</b>	Emerald Panther Inv 78 Pty Ltd			
<b>Bontekoe RE/197</b>	National Government Of The Republic Of South Africa: Department Of Rural Development And Land Reform:  Me. Cynthia Nkoane  Uitvoerende Bestuur Van Die Verteenwoordigende Kleurlingraad			
Mara RE/318	<b>Yolandy Trust</b> Dirk Olivier	No Comments Received		
Doornfontein Oos 1/319	<b>Yolandy Trust</b> Gert Olivier	Mr Gert called on 07/05/2019 to find out about the application information		
<b>The Municipality In Which Jurisdiction The Development Is Located</b>				
Khai-Ma Local Municipality	Municipal Manager: Mr Obakeng J Isaacs	No Comments Received		
<b>Municipal Councilor Of The Ward In Which The Site Is Located</b>				
Khai-Ma Local Municipality	Ward 8 Councillor Ward 9 Councillor	No Comments Received		
<b>Organs Of State Having Jurisdiction</b>				
Northern Cape Department Of Environmental Affairs And Nature Conservation (DEANC)	Mrs. Doreen Werth	No Comments Received		
DMR Department Of Mineral Resources, Northern Cape. (DMR)	Mr. Pieter Swart	No Comments Received		

The Department Of Water & Sanitation (DWS)	Mr. G. Van Dyk	No Comments Received		
NC Department Of Agriculture, Forestry And Fisheries (DAFF)	To Whom It May Concern	No Comments Received		
	Chief Forester Mrs. J. Mans	No Comments Received		
	Mr. Harm Vorster	No Comments Received		
Northern Cape Department Of Agriculture, Land Reform & Rural Development	Mr. W.J.J. De Bruyn	No Comments Received		
Department Of Roads And Public Works (DRPW)	<b>HOD: Ms. Ruth Palm</b> Mr Tshiamo Pitso	No Comments Received		
Northern Cape Department Of Rural Development & Land Reform,	Land Claims Commissioner: Regional Offices  Ms' Mkalipi	No Comments Received		
<b>Other-</b>				
Namakwa District Municipality	Municipal Manager: Mr Christiaan J Fortuin	No Comments Received		
WESSA (National Office)	To Whom It May Concern	No Comments Received		
SANRAL Western Region (Northern Cape)	South African National Roads Agency Ltd	No Comments Received		



#### **iv) THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES**

##### **Baseline Environment**

The baseline environment is described with specific reference to geotechnical conditions, ecological habitat and landscape features, Soil, land capability and agricultural potential, climate and the visual landscape.

##### **Type of environment affected by the proposed activity.**

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

The application property is situated 55km west of Springbok, along the R355 towards Kleinsee and in the Buffels River valley.

The Buffels River Mouth is situated just to the north of the application area. This river was, at the time of deposition, a very large meandering high discharge river. The substrate geology of Nuttabooi and surroundings consists of Precambrian and Palaeozoic basement rocks. The most prominent is gneisses of the mid-Proterozoic Namaqua Metamorphic Complex. Tertiary fluvial and aeolian sand overlies the basement rocks. The surficial sands and dunes are dark red in colour.

The Proto-Buffels River, responsible for the large volumes of heavy mineral sediment deposited, was bedrock controlled, meandering system with a low meander amplitude and low gradient. Remnants of essentially cut-off meanders occur on both flanks of the present-day lower Buffels River. Here, the Proto-Buffels River left behind well-defined asymmetrical channel geometry, incised into the gneissic bedrock. Well-developed sets of joints probably played a large role in the determination of the channel pattern.

An escarpment was formed close to the present-day coastline shortly after the break-up of Gondwana. This escarpment was aggressively eroded and eventually cut back during the Africa-erosion cycle (late-Cretaceous to early Miocene), to reach its present position by the late-Miocene. Diamonds from the interior were supplied by early to middle Cretaceous age rivers to the edge of the escarpment, from where they were reworked by coastal rivers such as the Buffels River during the denudation process on the coastal plains, just beneath the escarpment. There are also indications that diamonds and heavy minerals, eroded from pre-Cambrian Nama rocks (that form the present-day substratum of the edge of the escarpment) were concentrated during the cutback of the escarpment during the denudation process.

Ilmenite and zircon are the dominant heavy minerals found in the area, followed by rutile, monazite, garnet and titaniferous alteration products after ilmenite. The high titanium content of the ilmenite (51%) and predominantly almandine garnet suggest metamorphic source rocks. The heavy minerals within the project area are therefore most likely derived from the Namaqualand Metamorphic Complex, which is their primary source.

##### **Ecological habitat and landscape features**

##### **Vegetation**

The proposed site for prospecting falls within two recognised Biomes, namely the Succulent Karoo and Azonal Vegetation (Mucina & Rutherford 2006), overlapping with three (3) different vegetation types (**Figure 6**). **Table 3** overleaf provides an overview of the vegetation types associated with the study site.

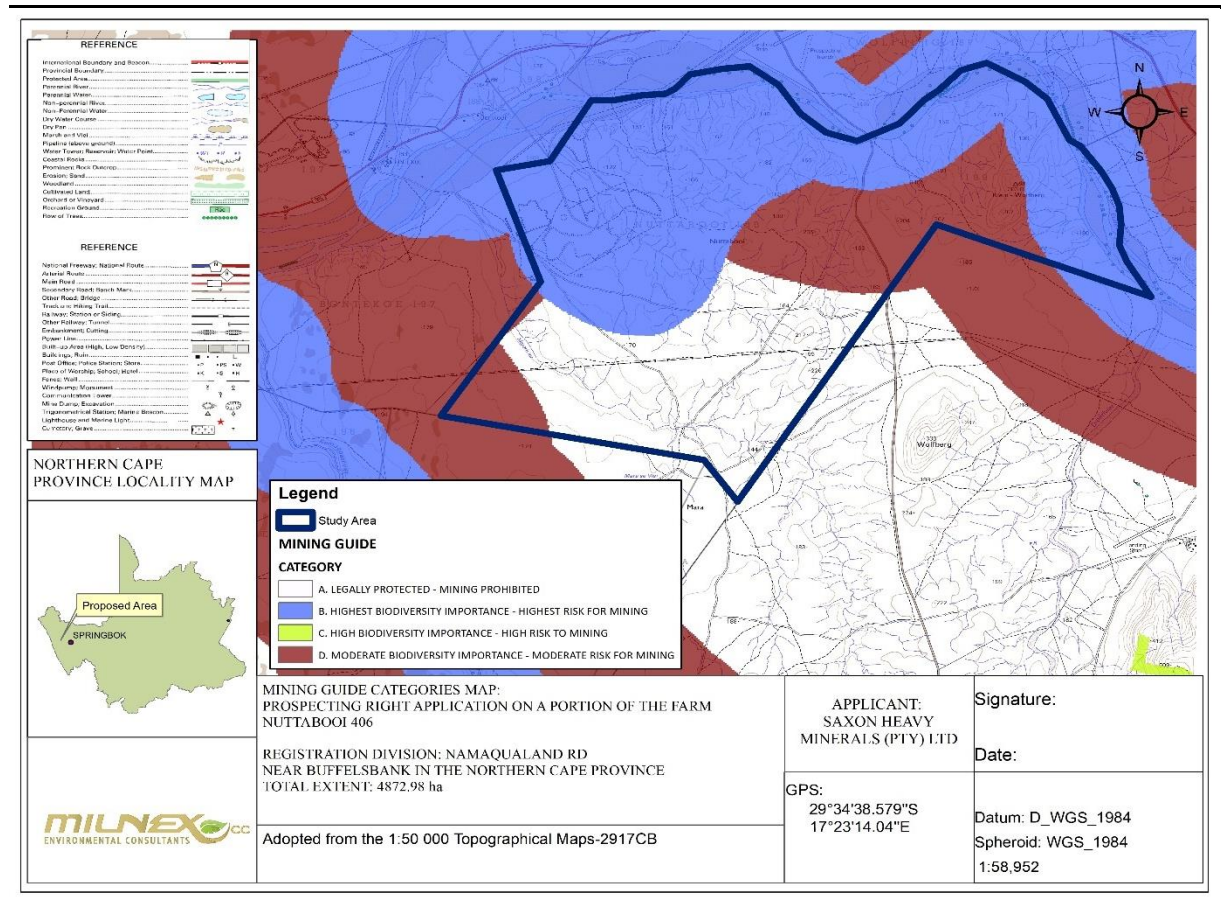


**Table 3:** Vegetation types and their ecological importance

Vegetation Type	Biome	Bioregion	Conservation Status	Important Species
Namaqualand Heuweltjiveld (SKn 4)	Succulent Karoo	Namaqualand Hardeveld	Least Concern 28% Target 11% Protected	<u>Biogeographically Important Taxa:</u> (Namaqualand endemics): <b>Succulent Shrubs:</b> <i>Psilocaulon foliosum</i> (d), <i>Stoeberia frutescens</i> (d). <b>Low Shrub:</b> <i>Tetragonia namaquensis</i> .
Namaqualand Strandveld (SKs 7)	Succulent Karoo	Namaqualand Sandveld	Least Concern 26% Target 0% Protected	<u>Endemic Taxa:</u> <b>Succulent Shrubs:</b> <i>Lampranthus suavissimus</i> , <i>Tylecodon decipiens</i> , <i>T. fragilis</i> . <b>Low Shrubs:</b> <i>Afrolimon</i> sp. nov. ( <i>Mucina</i> 210103/1 STEU), <i>Gorteria</i> sp. nov. ( <i>Le Roux, Karis &amp; Mucina</i> 050905/2 STEU), <i>Sutera multiramosa</i> . <b>Geophytic Herbs:</b> <i>Lachenalia valeriae</i> , <i>Romulea sinispinosensis</i> .
Namaqualand Riviere (AZi 1)	Azonal Vegetation	Inland Saline Vegetation	Least Threatened 24% Target Very small area protected	<u>Endemic Taxon:</u> Dry river bottoms <b>Succulent Shrub:</b> <i>Sarcocornia terminalis</i> (d).

## Biodiversity Priority Areas for Mining

Based on **Figure 7**, a large area of the northern part of the study site overlaps with Category B, Highest Risk for Mining, and therefore has highest biodiversity importance. Rigorous evaluation of the biodiversity content of applications is required, as well as the application of the mitigation hierarchy to reduce impacts on biodiversity in these areas. Some areas overlap with Category D, Moderate Risk for Mining with moderate biodiversity importance.



**Figure 7:** Biodiversity priority areas, in accordance with the Mining of Biodiversity Guidelines, associated with the study site.

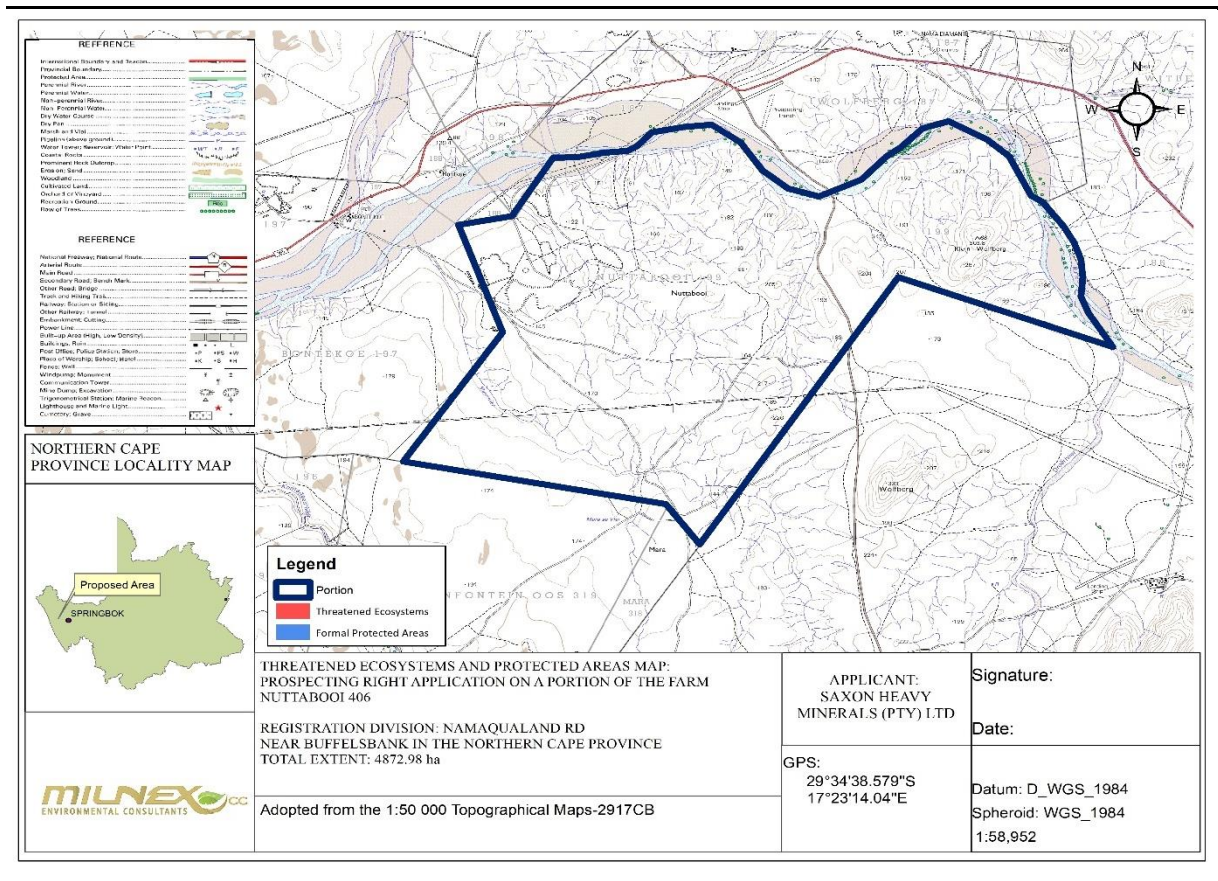
## Threatened Ecosystems

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver *et al.* 2011). Datasets have been developed by SANBI (2016) in order to outline threatened ecosystems, with the primary objective of limiting the rate of ecosystem extinctions. Four established categories group these ecosystems namely: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Protected.

No threatened terrestrial ecosystems were identified within the vicinity of the study site.

## Protected Areas

Formally protected areas are protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map (**Figure 8**), the study site does not overlap with any formally protected area. Therefore, the location of the study site is not expected to have an impact on any formally protected areas.



**Figure 8:** Protected areas and Threatened Ecosystems near the study area.

### Critical Biodiversity Areas

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of high biodiversity value that need to be conserved and maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services (MTPA, 2014). According to the National Environmental Management Act (NEMA) (Act no. 107 of 1998) certain activities have strict guidelines or are prohibited within CBAs and ESAs. Refer to the listed activities under the NEMA: Environmental Impact Assessment Regulations of 2014 (GNR 982) as promulgated in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) [as amended] for a comprehensive breakdown. The following terms are used to categorise the various land used types according to their biodiversity and environmental importance:

- Critical Biodiversity Area One (CBA1);
- Critical Biodiversity Area Two (CBA2);
- Ecological Support Area (ESA);
- Other Natural Areas (ONA); and
- Protected Area (PA).

Based on the desktop information (**Figure 9**), most of the study site overlaps with CBA1s and CBA2s, with some ESAs and other Natural Areas located towards the West.

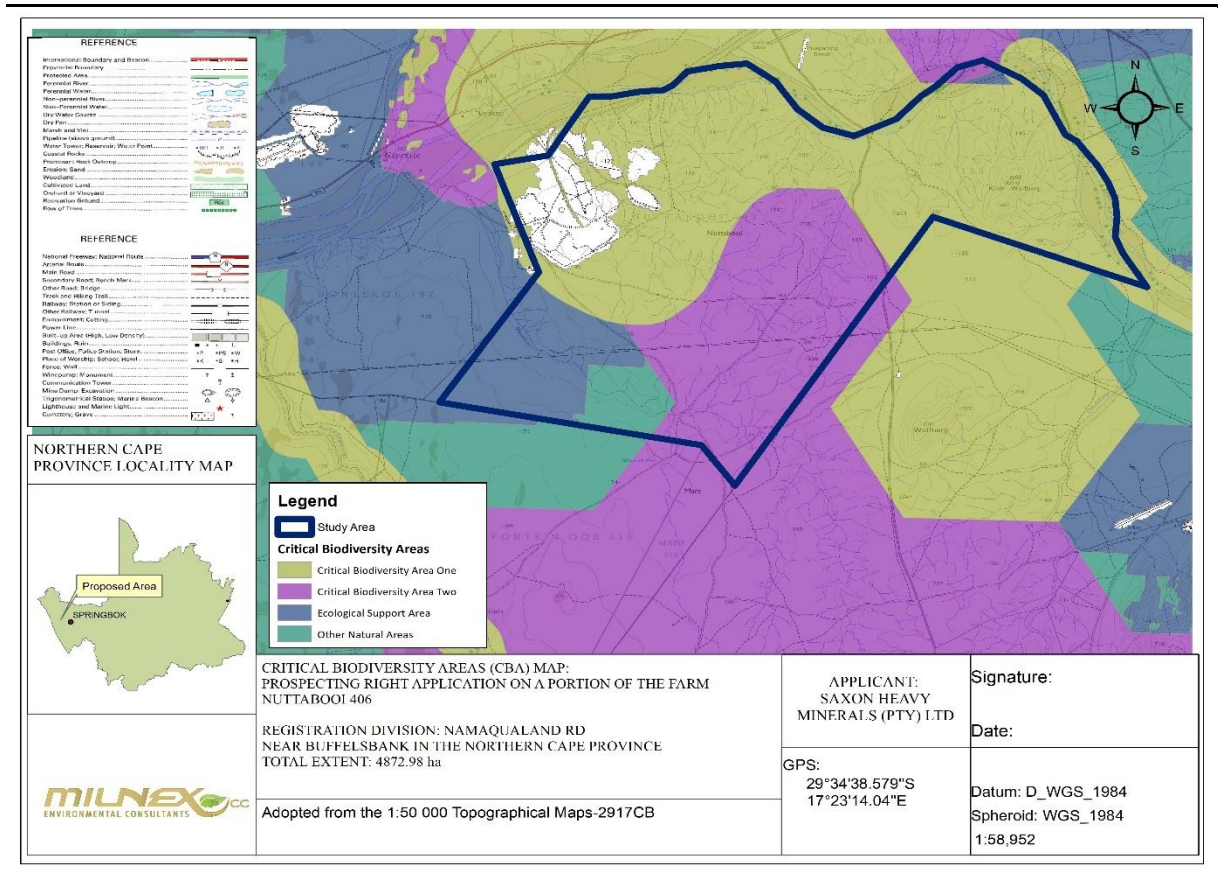
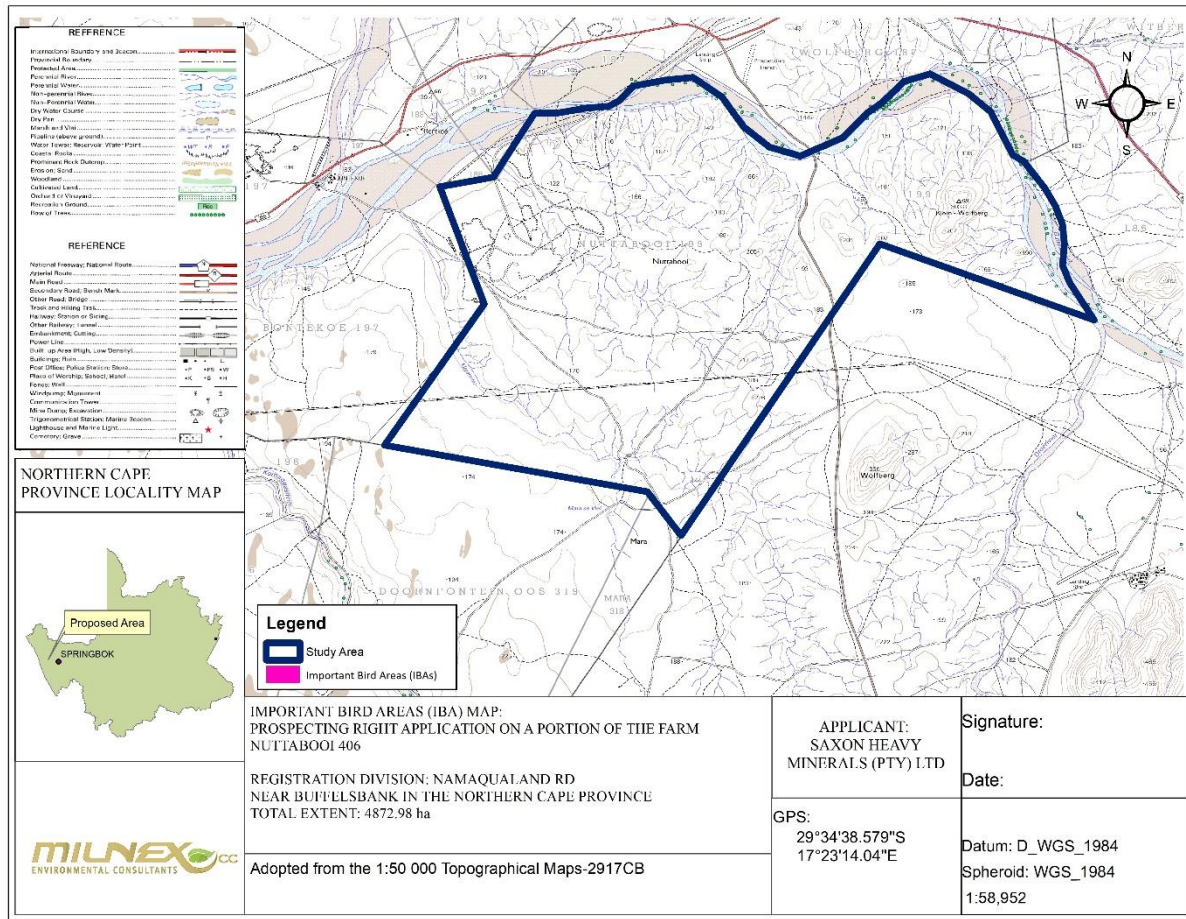


Figure 9: Critical Biodiversity Areas (CBAs) associated with the study site.

### Important Bird and Biodiversity Areas

Important Bird and Biodiversity Areas (IBAs) are a network of sites that are significant for the long-term viability of naturally occurring bird populations (Birdlife 2019). Many sites are also important for other forms of biodiversity; therefore, the conservation of Important Bird & Biodiversity Areas ensures the survival of a correspondingly large number of other animals and plants.

No IBAs were identified within the vicinity of the study site (Figure 10).



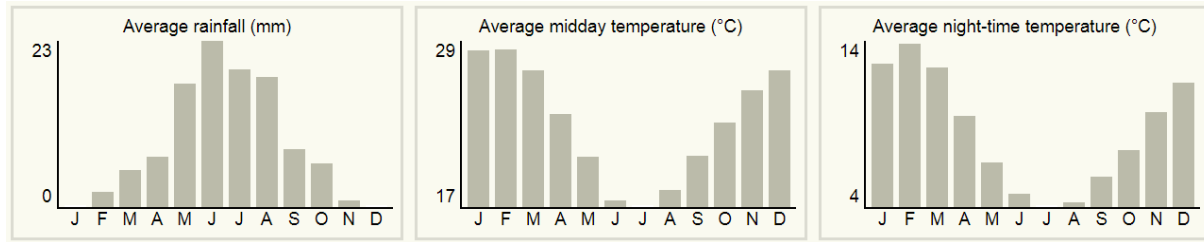
**Figure 10:** Important Bird and Biodiversity Areas associated with the study site.

**Land capability and agricultural potential**

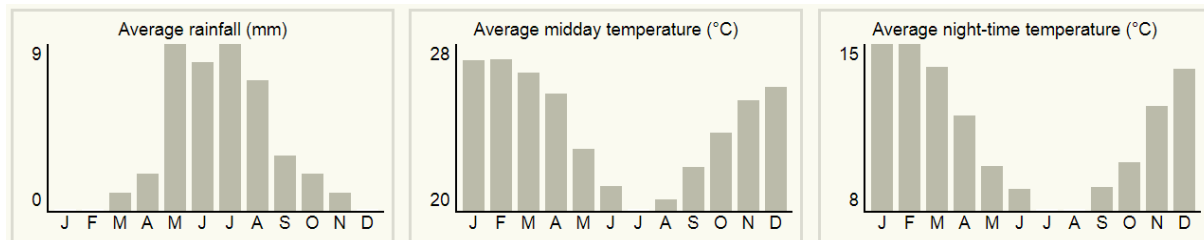
- Climate and water availability

The property is situated approximately 55km West of Springbok, along the R355 towards Kleinsee and in the Buffels River valley.

Springbok normally receives about 106mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for Springbok per month. It receives the lowest rainfall (0mm) in January and the highest (23mm) in June. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Springbok range from 16.5°C in July to 28.3°C in February. The region is the coldest during July when the mercury drops to 3.8°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures (SAExplorer, 2014).



Kleinzee normally receives about 42mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for Kleinzee per month. It receives the lowest rainfall (0mm) in January and the highest (9mm) in May. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Kleinzee range from 19.7°C in July to 27.2°C in February. The region is the coldest during July when the mercury drops to 8°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures (SAExplorer, 2014).



**Description of the socio-economic environment**

Nama Khoi Local Municipality is part of Namakwa District Municipality.

**MDB code:** NC062

**Description:**

The Nama Khoi Local Municipality is a Category B municipality situated on the north-western side of the Northern Cape Province in the Namakwa District. It is one of the six municipalities that make up the district. Nama and Khoisan people occupied this area for hundreds of years.

The town of Springbok is the administrative centre. Springbok is the most densely populated area, is close to the N7, and functions as the sub-regional centre for administrative, commercial and higher-order social facilities. Mining used to form the backbone of the economy, with tourism being seen as the new frontier for economic development.

**Area:** 17 990km<sup>2</sup>

**Cities/Towns:** Bulletrap, Carolusberg, Concordia, Kleinzee, Komaggas, Nababeep, O’Kiep, Springbok, Steinkopf

**Main Economic Sectors:** Mining, tourism, government departments, private sector

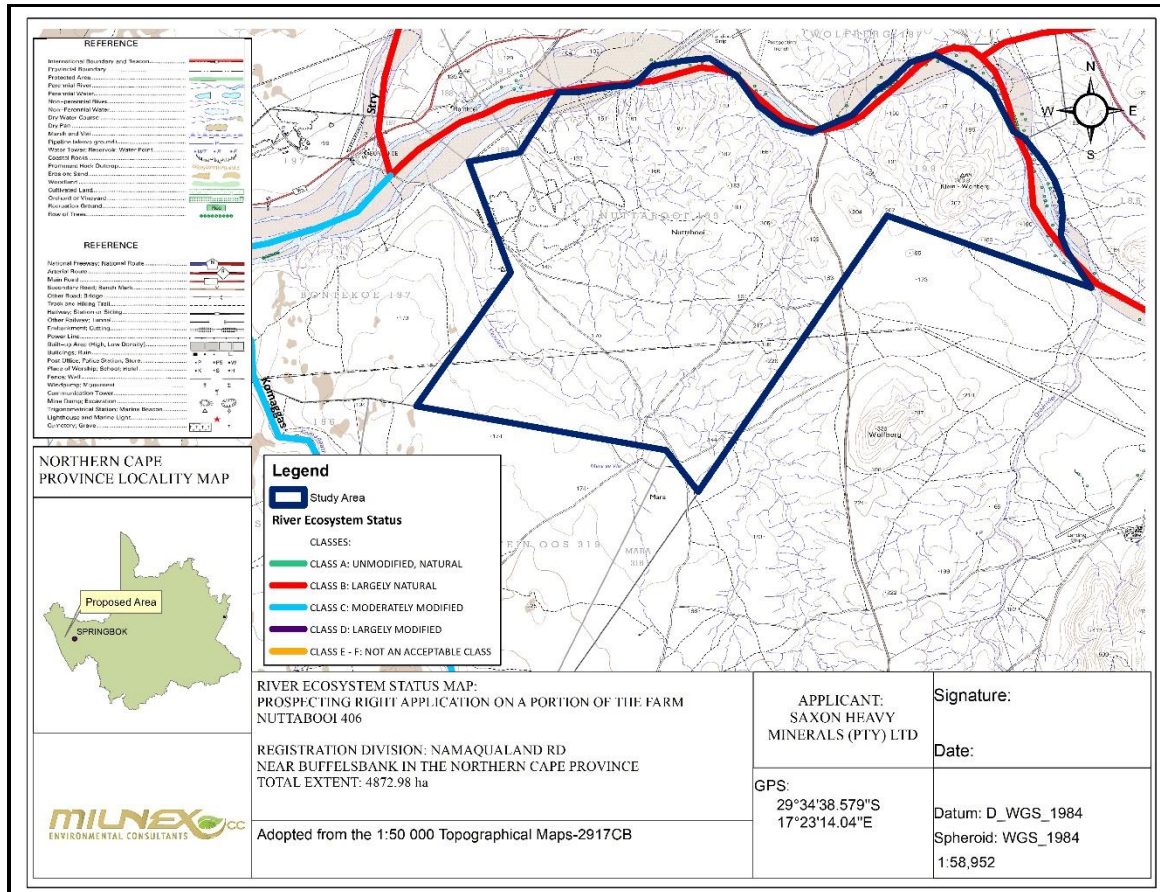






### River Ecosystem

According to **Figure 14**, the status of the Buffels River traversing the boundary of the study site to the North and East, are classed Largely Natural (Class B).



**Figure 14:** Ecosystem status of the rivers occurring in close proximity to the study site.

**v) IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS -**

- (aa) can be reversed;
- (bb) may cause irreplaceable loss of resources; and
- (cc) can be avoided, managed or mitigated;

### Significance of potential impacts

The following sections present the outcome of the significance rating exercise. The results suggest that the prospecting activities will have an impact on the natural vegetation and the agricultural activities, if not properly mitigated.

#### INITIAL CLEARANCE AND SITE PREPARATION PHASE

**Direct impacts:** During this phase minor negative impacts are foreseen over the short term. The latter refers to a period of weeks. The site preparation may result in the loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, soil

erosion, hydrology, and temporary noise disturbance, generation of waste, visual intrusions, increase in heavy vehicle traffic, and risk to safety, livestock and farm infrastructure, and increased risk of veld fires. The abovementioned impacts are discussed in more detail below:

- Loss, destruction or fragmentation of indigenous natural fauna and flora:

According to the specialist study, Baseline Ecological Desktop Assessment, the proposed site for prospecting falls within two recognised Biomes, namely the Succulent Karoo and Azonal Vegetation (Mucina & Rutherford 2006), overlapping with three (3) different vegetation types

<b>Loss or fragmentation of indigenous natural fauna and flora</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Definite (4)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
<b>Significance</b>	<b>Negative high (51)</b>	<b>Negative low (24)</b>
Can impacts be mitigated?	<p>If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures – refer to section (f) of the EMPr.</p> <p>The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include:</p> <ul style="list-style-type: none"> <li>• The site should be fenced off prior to commencement of construction activities;</li> <li>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible;</li> <li>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;</li> <li>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;</li> <li>• The implementation of a rehabilitation programme should be included in the terms of</li> </ul>	

	<p>reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr – section (f) of the EMPr.</p> <ul style="list-style-type: none"> <li>The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> </ul>
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- Loss destruction or fragmentation of habitats – It is noted that the proposed prospecting site is mostly covered in natural vegetation. Faunal species will primarily be affected by the overall loss of habitat; however, this will be low since the prospecting right is without bulk sampling.

<b>Loss or fragmentation of habitats</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
<b>Significance</b>	<b>Negative medium (39)</b>	<b>Negative low (22)</b>
Can impacts be mitigated?	Exotic and invasive plant species should not be allowed to establish, if the development is approved. Where exotic and invasive plant species are found at the site continuous eradication should take place. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for development – section (f) of the EMPr also provides numerous mitigation measures related to fauna and flora.	

- Loss of topsoil –Topsoil may be lost due to poor topsoil management (burial, erosion, etc.). The effect will be the loss of soil fertility on disturbed areas after rehabilitation. This will result in potential grazing and cultivation being lost. However, this application is only for a prospecting right without bulk sampling, only drilling and pitting will take place.

<b>Loss of topsoil</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	No loss of resource (1)
Cumulative impact	Medium cumulative impacts (3)	
<b>Significance</b>	<b>Negative medium (45)</b>	<b>Negative low (16)</b>

<p>Can impacts be mitigated?</p>	<p>The following mitigation or management measures are provided:</p> <ul style="list-style-type: none"> <li>• If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation.</li> <li>• Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.</li> <li>• Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land.</li> <li>• During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</li> <li>• Erosion must be controlled where necessary on top soiled areas.</li> </ul> <p>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>• Record the GPS coordinates of each area.</li> <li>• Record the date of topsoil stripping.</li> <li>• Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>• Record the date of cessation of constructional (or operational) activities at the particular site.</li> <li>• Photograph the area on cessation of constructional activities.</li> <li>• Record date and depth of re-spreading of topsoil.</li> <li>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul> <p>Section (f) of the EMPr also provide mitigation measures related to topsoil management.</p>
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- Soil erosion – Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal and the establishment of roads. Erosion will cause loss and deterioration of soil resources. This will result in grazing and cultivation potential being lost.

<b>Soil erosion</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative

Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Possible (2)
Duration	Long term (2)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Medium cumulative impact (2).	
<b>Significance</b>	<b>Negative Medium (36)</b>	<b>Negative low (20)</b>
Can impacts be mitigated?	<ul style="list-style-type: none"> <li>The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.</li> </ul> <p>Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream – refer to section (f) of the EMPr..</p>	

- Temporary noise disturbance - Preparation activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as back actors and people working on the site. The noise impact is unlikely to be significant; but activities should be limited to normal working days and hours (6:00 – 18:00).

<b>Temporary noise disturbance</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (1)	Medium term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2).	
<b>Significance</b>	<b>Negative low (20)</b>	<b>Negative low (9)</b>
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. The applicant will need to ensure that general waste is appropriately disposed of i.e. taken to the

nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

<b>Generation of waste</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community. If general waste is left on site livestock could mistakenly eat it, which might in turn harm or kill them.	
<b>Significance</b>	<b>Negative low (12)</b>	<b>Negative low (11)</b>
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in section (f) of the EMPr are implemented.	

Impacts on heritage objects –

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

<b>Impacts on heritage objects</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Permanent (4)	Permanent (4)
Magnitude	High (3)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Complete loss of resources (4)	No loss of resource (1)
Cumulative impact	The impact would result in Medium cumulative impact (3). Loss of information regarding early settlement in the region.	
<b>Significance</b>	<b>Negative medium (57)</b>	<b>Negative low (16)</b>
Can impacts be mitigated?	If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Also refer to section (f) of the EMPr.	



**Indirect impacts:** The nuisance aspects generally associated with the installation of infrastructure or ground preparation will also be applicable to this development, which relates primarily to the increase in vehicle traffic associated with prospecting practices, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Increase in vehicle traffic – The movement of heavy vehicles have the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Since the application is for a prospecting right without bulk sampling, only drilling and pitting sampling will take place. Access will be obtained from Hay Besproeiing tar road which changes into a gravel road. The volume of traffic along this road is low and the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users.

<b>Increase in vehicle traffic</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2). If damage to roads is not repaired, then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	
<b>Significance</b>	<b>Negative Low (10)</b>	<b>Negative low (9)</b>
Can impacts be mitigated?	<p>The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• The contractor must ensure that damage caused by construction on the off-gravel roads. The costs associated with the repair must be borne by the contractor;</li> <li>• Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;</li> <li>• All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</li> </ul> <p>Also refer section (f) of the EMPr. For mitigation measures related to traffic.</p>	

- **Risk to safety, livestock and farm infrastructure** - The presence on and movement of workers on and off the site poses a potential safety threat to local farmer's, farm workers and the communities in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

<b>Risk to safety, livestock and farm infrastructure</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative effects (2), provided losses are compensated for.	
<b>Significance</b>	<b>Negative low (22)</b>	<b>Negative low (8)</b>
Can impacts be mitigated?	<p>Key mitigation measures include:</p> <ul style="list-style-type: none"> <li>• <b>Saxon Heavy Minerals (Pty) Ltd</b> should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;</li> <li>• The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;</li> <li>• Contractors appointed by <b>Saxon Heavy Minerals (Pty) Ltd</b> should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;</li> <li>• <b>Saxon Heavy Minerals (Pty) Ltd</b> should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below);</li> </ul>	

	<ul style="list-style-type: none"> <li>• The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;</li> <li>• Contractors appointed <b>Saxon Heavy Minerals (Pty) Ltd</b> must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.</li> <li>• Contractors appointed by <b>Saxon Heavy Minerals (Pty) Ltd</b> must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;</li> <li>• The housing of construction workers on the site should be strictly limited to security personnel (if any).</li> </ul>
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- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife, farmsteads and the communities in the area. In the process, infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of grass fires was heightened by the windy conditions in the area, especially during the dry, windy winter months from May to October. Fire-fighting equipment should be provided on site during the construction phase.

<b>Increased risk of veld fires</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Very high (4)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
<b>Significance</b>	<b>Negative high (64)</b>	<b>Negative low (22)</b>
Can impacts be mitigated?	The mitigation measures include: <ul style="list-style-type: none"> <li>• A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase;</li> <li>• Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months;</li> <li>• Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle;</li> <li>• Contractor to provide fire-fighting training to selected construction staff;</li> <li>• No construction staff, with the exception of security staff, to be accommodated on site over night;</li> <li>• As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.</li> </ul>
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**OPERATIONAL PHASE**

**Direct impacts:** During the operational phase the study area will serve as a prospecting area and the impacts are generally associated with soil erosion, change in land use, impacts associated with the, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities and facilitating a positive economic growth. The abovementioned impacts are discussed in more detail below:

- Soil erosion – There is a low to no risk factor for soil erosion for drilling and pitting. The conditions of the EMP will be adhered to throughout the prospecting operation and commitment to rehabilitation is of paramount importance in order to obtain a closure certificate from DMR.

<b>Soil erosion</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative effects (2), should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	

<b>Significance</b>	<b>Negative Low (24)</b>	<b>Negative Low (8)</b>
Can impacts be mitigated?	<p>Yes, to avoid soil erosion it will be a good practice to not remove all the vegetation at once but to only clear the area as it becomes necessary and to implement concurrent rehabilitation.</p> <ul style="list-style-type: none"> <li>The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly</li> </ul> <p>Also refer to section (f) of the EMPr.</p>	

- Change in land-use – According to the Baseline Ecological Desktop Assessment most of the site is natural, consisting of low shrubland and some scattered bare areas in places. In the north-western corner of the study site, mining activities are taking place. The Buffels River passes the site on the north and east.

<b>Change in land use</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative effects (2)	
<b>Significance</b>	<b>Negative low (11)</b>	<b>Negative low (11)</b>
Can impacts be mitigated?	<p>The proponent should establish a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience in the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.</p> <p>Also refer to section (f) of the EMPr.</p>	

- Generation of alternative land use income – Income generated through the potential prospecting of the minerals applied for will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of farming on site.

<b>Generation of alternative land use income</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Positive	Positive
Geographical extent	Site (1)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact (2).	
<b>Significance</b>	<b>Positive Low (24)</b>	<b>Positive Low (26)</b>
Can impacts be mitigated?	No mitigation required.	

- Increase in storm water runoff – The development will unlikely result in an increase in storm water run-off that needs to be managed to prevent soil erosion, since no vegetation will be cleared.

<b>Increase in storm water runoff</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2) - Should these impacts occur, there will be cumulative impacts on the wider area.	
<b>Significance</b>	<b>Negative low (22)</b>	<b>Negative low (9)</b>
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in section (f) of the EMP. are implemented to ensure that these impacts do not occur	

- Increased consumption of water – Additional water requirements related to the portable water supply for employees and workers. Water will also be used for dust suppression.

<b>Increased consumption of water</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)

Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	Medium cumulative impacts (3) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
<b>Significance</b>	<b>Negative medium (32)</b>	<b>Negative medium (32)</b>
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in section (f) of the EMPr.	

- Generation of waste –Workers will be present on site from 6:00 – 18:00, Monday to Saturday. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of landfill space. If general waste is left on site livestock could mistakenly eat it, which might in turn harm or kill them.	
<b>Significance</b>	<b>Negative low (14)</b>	<b>Negative low (14)</b>
Can impacts be mitigated?	Yes, management actions related to waste management are included in section (f) of the EMPr.	

- Leakage of hazardous materials - The proposed prospecting activity will make use of machinery that use fuel and oil. Leakage of these oils and fuel can contaminate water supplies and must be prevented by constructing oil and diesel permeable bunds to ensure that any spills are suitably attenuated and not released into the environment.

Leakage of hazardous materials	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
<b>Significance</b>	<b>Negative low (22)</b>	<b>Negative low (14)</b>
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the section	

	(f) of EMPr are implemented to ensure that these impacts do not occur.
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- **Noise disturbance** - Prospecting activities will result in the generation of noise over a period of 2-3 years. Sources of noise are likely to include vehicles, the use of machinery such as drills and people working on the site; but prospecting activities should be limited to normal working days and some Saturdays and hours (6:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (1)	Medium term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2).	
<b>Significance</b>	<b>Negative low (20)</b>	<b>Negative low (9)</b>
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

**Indirect impacts:** The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- **Potential impact on tourism** – There are no tourist facilities in close proximity to the proposed area.

Potential impacts on tourism	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Unlikely (1)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	N/A	
<b>Significance</b>	<b>Negative low (6)</b>	<b>Negative low (6)</b>
Can impacts be mitigated?	No mitigation required	

## DECOMMISSIONING PHASE (MINE CLOSURE AND REHABILITATION)

**Direct impacts:** Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live. If



infrastructures are removed after a 3/5 year period, the site will be returned to its natural state. Therefore, the physical environment will benefit from the closure of the prospecting area.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the prospecting area. There is a slight chance to restore the site to its natural state, however rehabilitation will be done concurrently with all activities

<b>Rehabilitation of the physical environment</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	High (3)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
<b>Significance</b>	<b>Positive low (27)</b>	<b>Positive low (27)</b>
Can impacts be mitigated?	No mitigation measures required.	

- Loss of employment - The decommissioning of the facility has the potential to have a negative social impact on the local community.

<b>Loss of employment</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Medium term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
<b>Significance</b>	<b>Negative low (20)</b>	<b>Negative low (18)</b>
Can impacts be mitigated?	<p>The following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>• All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;</li> <li>• <b>Saxon Heavy Minerals (Pty) Ltd</b> should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas.</li> </ul>	

**Indirect impacts:** No indirect impacts are anticipated from the decommissioning phase of the proposed development.

**vi) METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS**

**Method of environmental assessment**

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed development. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

**Impact Rating System**

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction
- Operation
- Decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

**Table:** The rating system

<b>NATURE</b>		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
<b>GEOGRAPHICAL EXTENT</b>		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.

<b>PROBABILITY</b>		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>DURATION</b>		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
<b>INTENSITY/ MAGNITUDE</b>		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently

		ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
<b>REVERSIBILITY</b>		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES</b>		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
<b>CUMULATIVE EFFECT</b>		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
<b>SIGNIFICANCE</b>		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:		
(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

**vii) 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)

- Increased ambient noise levels resulting from geophysics surveys site fly-overs and increased traffic movement during all prospecting phases.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on environmental resources utilized by communities, landowners and other stakeholders.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning.
- Potential decrease in water levels due to abstraction.
- Increased vehicle activity within the area resulting in the possible destruction and disturbance of fauna and flora.
- Poor access control to farms which may impact on livestock movement, breeding and grazing practices.
- Influx of persons (job seekers) to site as a result of increased activity and the possible resultant increase in opportunistic crime.
- Potential visual impacts caused by prospecting activities.
- Prospecting will be undertaken by specialist sub - contractors and it is not anticipated that employment opportunities for local and / or regional communities will result from the prospecting activities.

- Prospecting activities may result in localised visual impacts.

**viii) THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK.**

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

Negative impacts on vegetation, soil and the water resources associated with the prospecting activity have been identified through the BAR & EMPr process. Mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B must be implemented in order to minimise these potential impacts.

Noise

Site activities must take place during the day (06:00 – 18:00) to avoid night time noise disturbances and night time collisions with fauna.

Visual impact

Dust suppression measures must be implemented.

Soil

- Disturbances to soil should be limited as far as possible.
- Erosion control measures should be implemented if necessary.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Waste bins should be provided and waste should be removed and disposed of at a licensed landfill site.
- Rehabilitation should be done concurrently.

Water

- Before any water is abstracted, a geo-hydro study should be conducted in order to determine the specific yield.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Erosion control measures should be implemented if necessary.

**ix) MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED.**

As discussed in the previous section, the possibility to encounter further Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province, were identified.

**x) STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE. (Provide a statement motivating the final site layout that is proposed)**

The site is preferred due to its possibility of having Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) & Leucoxene (Heavy Mineral) the property is also only suitable.

**5) 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.**

**i. A description of all environmental issues and risks that are identified during the environmental impact assessment process**

**Process for the identification of key issues**

The methodology for the identification of key issues aims, as far as possible, to provide a user-friendly analysis of information to allow for easy interpretation.

- Checklist: The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix: The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

**Checklist analysis**

The site visit was conducted to ensure a proper analysis of the site specific characteristics of the study area. The table below provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format.

**Table:** Environmental checklist

Question	YES	NO	Un-sure	Description
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<b>1. Are any of the following located on the site earmarked for the development?</b>				
I. A river, stream, dam or wetland	X			Two Channelled Valley Bottom wetlands are situated to the north of the boundary of the site, in close proximity to the proposed prospecting site. The wetland vegetation type forms part of the Namaqualand Hardeveld and Namaqualand Sandveld. Mara River is found in the area
II. A conservation or open space area		X		
III. An area that is of cultural importance			X	
IV. Site of geological significance			X	
V. Areas of outstanding natural beauty		X		According to the Baseline Ecological Desktop Assessment most of the site is natural, consisting of low shrubland and some scattered bare areas in places. In the north-western corner of the study site, mining activities are taking place. The Buffels River passes the site on the north and east.
VI. Highly productive agricultural land		X		The proposed area falls within land capability Class 7.
VII. Floodplain		X		
VIII. Indigenous forest		X		
IX. Grass land	X			According to the Baseline Ecological Desktop Assessment most of the site is natural, consisting of low shrubland and some scattered bare areas in places. In the north-western corner of the study site, mining activities are taking place.
X. Bird nesting sites			X	According to the Baseline Ecological Desktop Important Bird and Biodiversity Areas (IBAs) are a network of sites that are significant for the long-term viability of naturally occurring bird populations (Birdlife 2019). Many sites are also important for other forms of biodiversity; therefore, the conservation of Important Bird & Biodiversity Areas ensures the survival of a correspondingly large number of other animals and plants. No IBAs were identified within the vicinity of the study site
XI. Red data species			X	
XII. Tourist resort		X		
<b>2. Will the project potentially result in potential?</b>				
I. Removal of people		X		None.
II. Visual Impacts	X			The visual impact will be managed.



III. Noise pollution	✘			Activities are only carried out during the day no activity is done at night due to noise levels which may affect surrounding infrastructure and people.
IV. Construction of an access road		✘		Access will be obtained from R355 towards Kleinzee
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		✘		
VI. Accumulation of large workforce (>50 manual workers) into the site.		✘		Employment opportunities will be created during the different phase of the project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.		✘		Additional water requirements related to the portable water supply for employees, workers, to keep the drill cool and dust suppression.
VIII. Job creation	✘			Employment opportunities will be created during the different phase of the project.
IX. Traffic generation		✘		None.
X. Soil erosion		✘		The application is for a prospecting right without bulk sampling, only drilling and pitting sampling will take place.
XI. Installation of additional bulk telecommunication transmission lines or facilities		✘		None.
<b>3. Is the proposed project located near the following?</b>				
I. A river, stream, dam or wetland	✘			Buffels River, Mara River & Komaggas River found in the area
II. A conservation or open space area			✘	
III. An area that is of cultural importance			✘	
IV. A site of geological significance			✘	
V. An area of outstanding natural beauty			✘	
VI. Highly productive agricultural land		✘		The proposed area falls within land capability Class 7.
VII. A tourist resort			✘	
VIII. A formal or informal settlement		✘		

### Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts, and the mitigation of the potential impacts. The matrix also highlights areas of particular concern, which requires more in depth assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

In order to conceptualise the different impacts the matrix specify the following:

- **Stressor:** Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor:** Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts:** Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation:** Impacts need to be mitigated to minimise the effect on the environment.

**6) AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK**

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS			MITIGATION OF POTENTIAL IMPACTS	SPECIALIST STUDIES / INFORMATION	
		Receptors	Impact description	Minor	Major	Durati on	Possible Mitigation		
<b>CONSTRUCTION PHASE</b>									
<b>Listing Notice GNR 325, Activity 15:</b> "The clearance of an area of 20 hectares or more, of indigenous vegetation"	Site clearing and preparation Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> <li>Loss or fragmentation of indigenous natural vegetation.</li> <li>Loss of sensitive species.</li> <li>Loss or fragmentation of habitats.</li> </ul>	-		M	Yes	-
			Air	<ul style="list-style-type: none"> <li>Air and dust pollution due to the increase of traffic of construction vehicles.</li> </ul>	-		S	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Loss of topsoil.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> </ul>	-		S	Yes	-
			Geology	<ul style="list-style-type: none"> <li>It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.</li> </ul>	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the local sewage plant.</li> </ul>	-		S	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Pollution due to construction vehicles.</li> </ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>Increase in storm water run-off.</li> <li>Pollution of water sources due to soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>		-	S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Job creation.</li> <li>Business opportunities.</li> <li>Skills development.</li> </ul>	+		S	Yes	-
			Visual landscape	<ul style="list-style-type: none"> <li>Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility.</li> </ul>	-		S	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> <li>Increased risk of veld fires.</li> </ul>	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> <li>The generation of noise as a result of construction vehicles, the use of machinery such as drills, excavators and people working on the site.</li> </ul>	-		S	Yes	-

			Tourism industry	<ul style="list-style-type: none"> <li>Since there are no tourism facilities in close proximity to the site, the construction activities might will not an impact on tourism in the area.</li> </ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"> <li>Removal or destruction of archaeological and/or paleontological sites.</li> <li>Removal or destruction of buildings, structures, places and equipment of cultural significance.</li> <li>Removal or destruction of graves, cemeteries and burial grounds.</li> </ul>	-		S	Yes	-
<p><b>Listing Notice GNR 325, Activity 15:</b> "The clearance of an area of 20 hectares or more, of indigenous vegetation</p> <p><b>Listing Notice GNR 327, Activity 20:</b> "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—</p> <p><b>Listing Notice GNR 325, Activity 19:</b> "The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—</p> <p><b>NEM:WA 59 of 2008 Residue stockpiles or residue deposits Category A: (15)</b> The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit, in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p><u>Site clearing and preparation</u> Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately. This will inevitably result in the removal of indigenous vegetation located on the site.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> <li>Loss or fragmentation of indigenous natural vegetation.</li> <li>Loss of sensitive species.</li> <li>Loss or fragmentation of habitats.</li> </ul>	-		M	Yes	-
			Air quality	<ul style="list-style-type: none"> <li>Air and dust pollution due to the increase of traffic.</li> </ul>	-		M	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> <li>Loss of agricultural potential (low significance relative to agricultural potential of the site).</li> </ul>	-		M	Yes	-
			Geology	<ul style="list-style-type: none"> <li>It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.</li> </ul>	-		L	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the local sewage plant.</li> </ul>	-		M	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Pollution due to construction vehicles</li> <li>Pollution due to blasting</li> </ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>Increase in storm water run-off.</li> <li>Pollution of water sources due to soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>	-		M	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Job creation.</li> <li>Skills development.</li> </ul>	+		S	N/A	-
			Visual landscape	<ul style="list-style-type: none"> <li>Potential visual impact on visual receptors in close proximity to proposed facility.</li> </ul>	-		M	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> </ul>	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> <li>The generation of noise as a result of construction vehicles, and people working on the site.</li> </ul>	-		S	Yes	-

		Tourism industry	<ul style="list-style-type: none"> <li>Since there are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area.</li> </ul>	N/A	N/A	N/A	N/A	-	
		Heritage resources	<ul style="list-style-type: none"> <li>Removal or destruction of archaeological and/or paleontological sites.</li> <li>Removal or destruction of buildings, structures, places and equipment of cultural significance.</li> <li>Removal or destruction of graves, cemeteries and burial grounds.</li> </ul>		-	S	Yes	-	
<b>OPERATIONAL PHASE</b>									
<p><b>Listing Notice GNR 325, Activity 15:</b> "The clearance of an area of 20 hectares or more, of indigenous vegetation</p> <p><b>Listing Notice GNR 327, Activity 20:</b> "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—</p> <p><b>Listing Notice GNR 325, Activity 19:</b> "The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—</p> <p><b>NEM:WA 59 of 2008 Residue stockpiles or residue deposits Category A: (15)</b> The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit, in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p>The key components of the proposed project are described below:</p> <ul style="list-style-type: none"> <li><b>Supporting Infrastructure</b> - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 50m<sup>2</sup> or less. Other supporting infrastructure includes a site office and workshop area.</li> <li><b>Roads</b> - Access will be obtained from R355 towards Kleinzee</li> <li><b>Fencing</b> - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.</li> </ul>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> <li>Fragmentation of habitats.</li> <li>Establishment and spread of declared weeds and alien invader plants (operations).</li> </ul>		-	S	Yes	-
			Air quality	<ul style="list-style-type: none"> <li>Air pollution due to the mining activity, crusher plant, transport of the gravel to the designated areas and possible blasting.</li> </ul>	-		M	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> <li>Loss of agricultural potential (low significance relative to agricultural potential of the site).</li> </ul>	-		M	Yes	-
			Geology	<ul style="list-style-type: none"> <li>Collapsible soil.</li> <li>Seepage (shallow water table).</li> <li>Active soil (high soil heave).</li> <li>Erodible soil.</li> <li>The presence of undermined ground.</li> <li>Instability due to soluble rock.</li> <li>Steep slopes or areas of unstable natural slopes.</li> <li>Areas subject to seismic activity.</li> <li>Areas subject to flooding.</li> <li>Blasting</li> </ul>	-		L	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li> <li>Increased consumption of water.</li> </ul>	-		M	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.</li> </ul>	-		L	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>		-	L	Yes	-

				<ul style="list-style-type: none"> <li>Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.</li> </ul>					
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Skills development.</li> </ul>	+		L	Yes	-
			Visual landscape	<ul style="list-style-type: none"> <li>The proposed portions are used for livestock grazing which will still take place simultaneously with the prospecting activity, however this depends on the location of the activity.</li> </ul>	-		L	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in vehicles collecting gravel for distribution.</li> </ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> </ul>	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> <li>The proposed development will result in noise pollution during the operational phase.</li> </ul>	-		M	Yes	-
			Tourism industry	<ul style="list-style-type: none"> <li>Since there are no tourism facilities in close proximity to the site, the operational activities will not have an impact on tourism in the area.</li> </ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"> <li>It is not foreseen that the proposed activity will impact on heritage resources or vice versa.</li> </ul>	-		S	Yes	-
<b>DECOMMISSIONING PHASE</b>									
-	<p><u>Mine closure</u> During the mine closure the Mine and its associated infrastructure will be dismantled.</p> <p><u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> <li>Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.</li> </ul>		+	L	Yes	-
			Air quality	<ul style="list-style-type: none"> <li>Air pollution due to the increase of traffic of construction vehicles.</li> </ul>	-		S	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Backfilling of all voids</li> <li>Placing of topsoil on backfill</li> </ul>	N/A	N/A	N/A	N/A	-
			Geology	<ul style="list-style-type: none"> <li>It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.</li> </ul>	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at the local landfill site.</li> <li>Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li> <li>Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Pollution due to construction vehicles.</li> </ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>Increase in storm water run-off.</li> <li>Pollution of water sources due to soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>	-		S	Yes	-

		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Loss of employment.</li> </ul>	-		L	Yes	-
			Visual landscape	<ul style="list-style-type: none"> <li>Potential visual impact on visual receptors in close proximity to proposed facility.</li> </ul>	-		S	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> <li>Increased crime levels. The presence of mine workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.</li> </ul>	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> <li>The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.</li> </ul>	-		S	Yes	-
			Tourism industry	<ul style="list-style-type: none"> <li>Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.</li> </ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"> <li>It is not foreseen that the decommissioning phase will impact on any heritage resources.</li> </ul>	-		S	Yes	-

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

**7) WHERE APPLICABLE, A SUMMARY OF THE FINDINGS AND IMPACTS MANAGEMENT MEASURES IDENTIFIED IN AN SPECIALIST REPORT COMPLYING WITH APPENDIX 6 OF THESE REGULATIONS AND AN INDICATION AS TO HOW THESE FINDINGS AND RECOMMENDATIONS HAVE BEEN INCLUDED IN THE FINAL REPORT;**

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.
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The following mitigation measures are recommended:

- Ensure that the infrastructure is significantly far away from sensitive wetlands and rivers; the northern boundary of the study site overlaps with the Buffels River;
- According to the Mining and Biodiversity Guidelines (2013), the study site falls within an area which is considered the highest risk for mining and of high biodiversity importance. According to these guidelines, a buffer of 1 km is recommended around any FEPA rivers or wetlands situated in this category. Based on this information, the study site overlaps with the recommended buffer;
- Alien and weed species encountered on the property should be removed in order to comply with existing legislation (National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) [as amended in 2014] Alien and Invasive Species Regulations, 2016);
- No vegetation clearance except for the removal of alien invasive species will be allowed; all remaining indigenous vegetation should be conserved where possible;
- Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and

Baseline ecological desktop assessment



decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens;

- No hunting, trapping or killing of fauna are allowed;
- Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance;
- General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area; and
- Protected trees and plants shall not be removed or damaged without prior approval and permits or licenses from the relevant authority.

## **8) ENVIRONMENTAL IMPACT STATEMENT**

### **i) SUMMARY OF THE KEY FINDINGS**

This section provides a summary of the assessment and conclusions drawn from the proposed prospecting area. In doing so, it draws on the information gathered as part of the environmental impact assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion on the environmental impacts associated with the proposed project. The following conclusions can be drawn for the proposed prospecting activity:

- Potential impacts on biodiversity: According to the Baseline Ecological Desktop Assessment most of the site is natural, consisting of low shrubland and some scattered bare areas in places. In the north-western corner of the study site, mining activities are taking place. The Buffels River passes the site on the north and east.
- Potential impact on heritage resources
- Potential impact on Palaeontological resources: Should fossils be exposed during construction work, it must immediately be reported to a palaeontologist so that an investigation and evaluation of the finds can be made.
- Potential impacts on land use: According to the Baseline Ecological Desktop Most of the site is natural, consisting of low shrubland and some scattered bare areas in places. In the north-western corner of the study site, mining activities are taking place. The Buffels River passes the site on the north and east.
- Potential social impacts: The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.
- Potential negative impacts: (noise, dust, soil degradation, storm water, traffic, health and safety) associated with the operation of the facility are expected to be of low-high impact, of medium terms and site specific. These can be mitigated or negated through the implementation of practical and appropriate mitigation measures.
- Positive impacts: The prospecting of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) without bulk sampling, may result in socio-economic benefit to the area.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the migratory measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

### **ii) FINAL SITE MAP**

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

Refer to Locality Map attached in **Appendix 4**.

### **iii) SUMMARY OF THE POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES**

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.
- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

### **9) 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 conditions of authorisation)**

Management objectives include:

- Ensure that the prospecting activity does not cause pollution to the environment or harm to persons.
- Minimise production of waste.
- All prospecting activities must be conducted in a manner that minimises noise impact, litter, environmental degradation and health hazards i.e. injuries.
- The mine must be kept neat and tidy during waste handling to prevent unsightliness and accidents.

Expected outcomes include:

- Minimum impacts on the environment as a result of prospecting without bulk sampling.
- Compliance with legislative requirements.
- Mine is neat and tidy and well managed.

### **FINAL PROPOSED ALTERNATIVES**

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Due to the expected mineral resources, **Saxon Heavy Minerals (Pty) Ltd** would like to potentially prospect without Bulk Samples, combined

with a Waste Licence Application for the mining of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province, therefore there will be no other alternative (i.e. to facilitate the movement of machinery, equipment, infrastructure).

#### **10) ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.**

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMPr.

#### **11) DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.** (Which relate to the assessment and mitigation measures proposed)

The uncertainties in results are mostly related to the availability of information, time available to gather the relevant information as well as the sometimes-subjective nature of the assessment methodology. If the authority feels that specialists' studies need to be conducted, such will be corresponded to the applicant.

#### **12) REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED**

##### **Reasons why the activity should be authorized or not.**

According to the PWP, the possibility to encounter the mineral applied for were identified.

The option of not approving the activities will result in a significant loss of possible valuable minerals being exploited. And all economic benefits will be lost.

#### **13) CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION**

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMPr.

The EMPr should be binding on all managers and contractors operating/utilizing the site.

#### **Period for which the Environmental Authorisation is required.**

For a minimum of 5 years and maximum of 7 years

**14) 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 Environmental Impact Assessment report and the Environmental Management Programme report.

I, **Percy Schaole (Pr. Sci. Nat)** (EAP) herewith confirms

- A. the correctness of the information provided in the reports
- B. the inclusion of comments and inputs from stakeholders and I&APs ;
- C. the inclusion of inputs and recommendations from the specialist reports where relevant; and
- D. the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

*P. Schaole.*

Signature of the environmental assessment practitioner:

Milnex CC – Environmental Consultants

Name of company:

05 – 08 - 2019

Date:

**15) FINANCIAL PROVISION**

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

CALCULATION OF THE QUANTUM							
Applicant: <b>Saxon Heavy Minerals (Pty) Ltd</b>		Ref No.: <b>NC30/5/1/1/2/12378PR</b>					
Evaluators: <b>Milnex CC</b>		Date: <b>22/08/2019</b>					
No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	0	14,05	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	195,76	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	288,49	1	1	0
3	Rehabilitation of access roads	m2	0	35,03	1	1	0
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	340,01	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	185,46	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	391,53	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	205242,16	0,52	1	0
7	Sealing of shafts adits and inclines	m3	0	105,09	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,12	136828,1	1	1	16419,372
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	170416,93	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	494971,55	1	1	0
9	Rehabilitation of subsided areas	ha	0,12	114572,93	1	1	13748,7516
10	General surface rehabilitation	ha	0,12	108390,94	1	1	13006,9128
11	River diversions	ha	0	108390,94	1	1	0
12	Fencing	m	0	123,64	1	1	0
13	Water management	ha	0	41213,28	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0,36	14424,65	1	1	5192,874
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
						Sub Total 1	48367,9104
1	Preliminary and General		5804,149248	weighting factor 2			5804,149248
				1			
2	Contingencies		4836,79104				4836,79104
						Subtotal 2	59008,85
						VAT (15%)	8851,33
						Grand Total	67860

### **Drilling**

It is estimated that the drilling will take approximately two years after the prospecting right has been executed and the EMP approved.

### Calculation

$7m \times 4 m = 28m^2$  (size of area needed for drill rig and related equipment for drilling one borehole.)

$3m \times 2.5m = 7.5m^2$  (size of area needed for sampling tubes for one borehole.)

$28m^2 + 7.5m^2 = 35.5m^2$  (sum of the above mentioned.)

$35.5m^2 / 10\ 000 = 0.00355ha$

$0.00355ha \times 68boreholes = 0.24 ha$

The area to be disturbed will be approximately 0.24ha in 24 Months & 0.12ha in 12 months

#### **i) Explain how the aforesaid amount was derived.**

The closure cost estimate provided above is aligned with the Guideline Document for the Evaluation of Quantum of Closure related Financial Provision Provided by a Mine, by the DMR (January, 2005). The amount was calculated by Milnex CC.

- ii) **Confirm that this amount can be provided for from operating expenditure.** (Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

### **Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed by **Saxon Heavy Minerals (Pty) Ltd**, will be submitted to the department on request

### **Rehabilitation Fund**

**Saxon Heavy Minerals (Pty) Ltd** will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

- iii) **Motivation for the deviation.**

Not applicable

## **16) OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

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

- i. **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 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 **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6. and 2.12. herein).

The following impacts may be regarded as community impacts:

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.
- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

Indirect socio-economic benefits are expected to be associated with the creation of employment.

- ii. **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 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 that 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).

**17) OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 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**).

From a local perspective, the prospecting of of Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral) near Springbok on the Farm Nuttabooi 199, Registration Division: Namaqualand, Northern Cape Province, is preferred because the geological formation supports the possibility that the minerals applied for could be found on the proposed area. Please see PWP attached as **Appendix 9**.



## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

#### 1) Draft environmental management programme.

##### A) DETAILS OF THE EAP

- i) **The EAP who prepared the report**
- ii) **Expertise of the EAP**

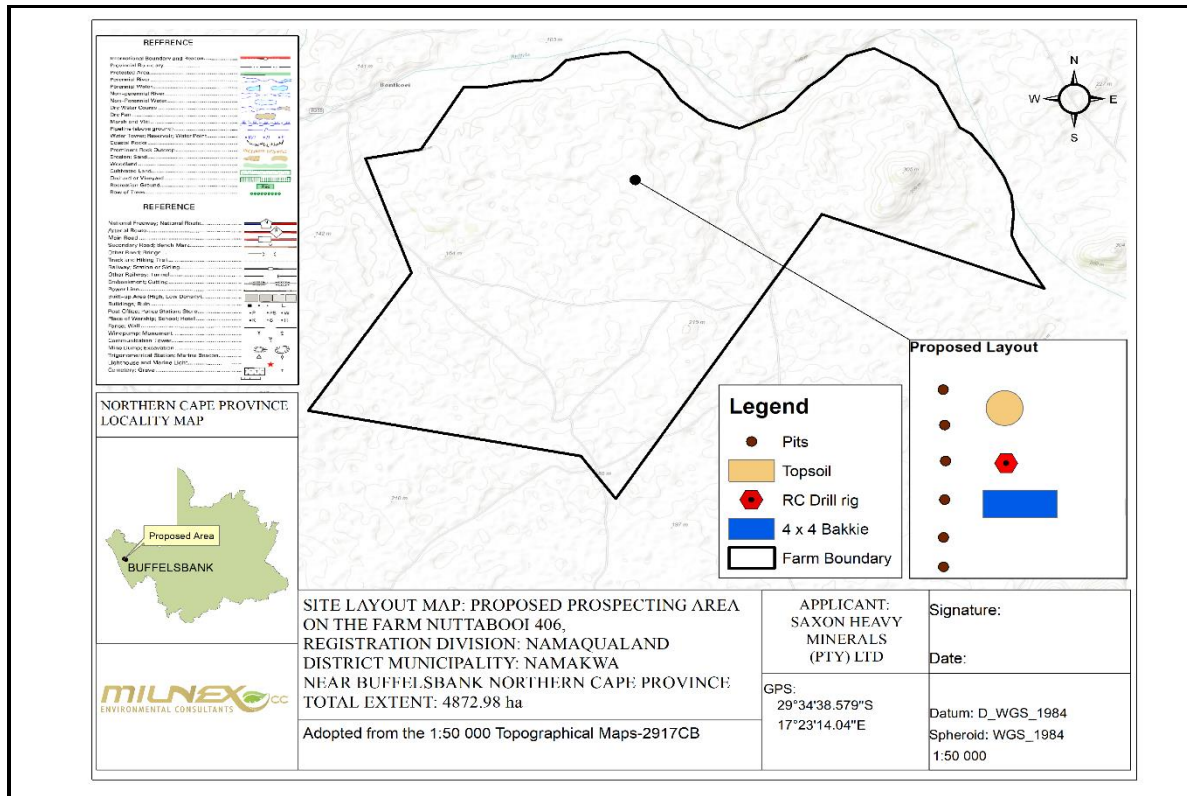
Name of Practitioner	Qualifications	Contact details
Percy Schaole	Master's Degree in Environmental Science (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No: (053) 963 2009 e-mail address: <a href="mailto:percy@milnex-sa.co.za">percy@milnex-sa.co.za</a>
Lizanne Esterhuizen	Honours Degree in Environmental Science (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No: (053) 963 2009 e-mail address: <a href="mailto:lizanne@milnex-sa.co.za">lizanne@milnex-sa.co.za</a>
Danie Labuschagne	Master's Degree in Environmental Management and Geography (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No: (053) 963 2009 e-mail address: <a href="mailto:danie@milnex-sa.co.za">danie@milnex-sa.co.za</a>

- B) DESCRIPTION OF THE ASPECTS OF THE ACTIVITY** (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

It is hereby confirmed that the requirements to describe the aspects of the activity that are required by the EMP is already 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)



Refer to Locality Map, attached as **Appendix 4**.

#### D) DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

- i. **Determination of closure objectives.** (ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

Closure objectives for the prospecting right without bulk sampling will aim to ensure that the residual post-closure impacts be minimized and be acceptable to relevant parties. To achieve these closure objectives, the following will be implemented:

- All prospecting related infrastructure, foundations and concrete areas will be decommissioned, removed from the site and appropriately disposed of. Reclaimable structures such as metal, electrical installations or equipment will be sold for re-use or as scrap.
- All disturbed areas within the site not already vegetated will be re-vegetated with appropriate indigenous, ecologically adapted species appropriate to the area and the final land use as soon as possible after operation ceases. Progress of vegetation growth/establishment, stability and drainage/erosion will be monitored and, in the event of adverse trends being identified, corrective measures will be implemented.
- Vegetation monitoring will consider, inter alia, the establishment of perennial ground cover and infestation by alien invasive plant species. The encroachment of indigenous vegetation into the area will be used as an indication of a stable, self-sustaining vegetation cover with little risk of retrogressing to a situation where are and water pollution may occur.
  - Final landforms must be resilient to perturbation and also be self-sustaining to obviate/limit further/ongoing interventions and maintenance by **Saxon Heavy Minerals**

**(Pty) Ltd.** The remaining impacts be of an acceptable nature with minimal deterioration over time.

- The final outcome of the mine site rehabilitation would be productive systems, where required sustaining either livestock and/or wildlife.
- Environmental and human quality of life, including health and safety requirements in general, would not be compromised; and
- Closure is achieved in an efficient and cost-effective manner as possible and with minimum socioeconomic changes.

The above goal is underpinned by more specific objectives listed below.

### **1. Upfront planning/development**

To provide overall guidance and direction to closure planning and/or the implementation of progressive closure measures over the remaining over the prospecting life.

### **2. Physical stability**

To ensure that surface infrastructure and prospecting residue and/or disturbances that are present at processing plant decommissioning will be removed and/or stabilised in a manner that these will not compromise post-closure land use and be sustainable long-term landforms.

- Closure, removal and disposal of all surface infrastructure that has no beneficial post-closure use.
- Shaping and vegetating the remaining earth embankments, trenches, etc. to stabilise slopes and integrate with surrounding topography.

### **3. Environmental quality**

To ensure that local environmental quality is not adversely affected by possible physical effects arising from prospecting operations and the prospecting site after closure. This will be achieved by:

- Avoiding and/or limiting the following during prospecting operations which could result in adverse effects that could not be readily addressed and/or mitigated at mine closure.
  - Dust fall-out areas surrounding the prospecting site.
  - Wash-off and/or mobilisation of chemically contaminated soils and sediments from the prospecting site that could have long term adverse effects on local aquatic health and/or other water uses.
  - Possible shallow groundwater contamination adversely affecting the quality of the local water resource and its beneficial use.
- Limiting the potential for dust generation on the rehabilitated prospecting site that could cause nuisance and/or health effects to surrounding landowners;
- Limiting the possible adverse water quality and quantity effects arising from the rehabilitated prospecting site to ensure that long term beneficial use of local resources is not compromised;
- Conducting soil clean-up/remediation to ensure that the planned land use could be implemented and maintained;

### **4. Health and safety**

To limit the possible health and safety treats due to terrain hazards to humans and animals utilizing the rehabilitated prospecting site after closure by:

- Demonstrating through upfront soil testing that any resultant inorganic and organic pollution present on the site is acceptable;
- Removal of potential contaminants such as hydrocarbons and chemicals off site;
- Shaping of embankments and trenches to safe slopes and reintegrating of these into surrounding topography.
- Ensuring that the environmental quality as reflected above is achieved.

## **5. Land capability / land use**

To ensure that the required land capability to achieve and support the planned land use can be achieved over the prospecting site by:

- Clean-up and reclamation of contaminated soil areas in order not to compromise the above land use planning earmarked for implementation;
- To ensure that the overall rehabilitated prospecting site is free draining
- Transferring prospecting related surface infrastructure to third parties for beneficial use after closure.

## **6. Aesthetic quality**

To ensure that the rehabilitated prospecting site will display, at a minimum, an acceptable aesthetic appearance that would not compromise the planned land use by leaving behind:

- A prospecting area that is properly cleared-up with no fugitive/scattered waste piles
- Rehabilitated prospecting area that is free draining and disturbed areas that are suitably vegetated.
- Rehabilitated prospecting residues that are suitably landscaped, blending with the surrounding environment as far as possible.
- Shaped and rehabilitated terrace and hard stand areas, roughly emulating the local natural surface topography.

## **7. Landscape viability**

To create a landscape that is self-sustaining and over time will evolve/converge to the desired ecosystem structure, function and composition by:

- Conducting surface profiling, with associated material movement optimisation, to obtain a landscape resembling the natural landscapes to support the succession trajectory towards a climax ecological system.
- Establishing woody patches and create “rough and loose” areas for pioneer species establishment around the respective patches.
- Establishing pioneer species as follows:
  - Collected and prepared seeds for broad casting;
  - Seedlings grown on on-site nursery;
  - Cuttings collected from surrounding veld areas;
- Conducting rehabilitation monitoring and corrective action as required.

## **8. Biodiversity**

To encourage, where appropriate, the re-establishment of native vegetation on the rehabilitated mine site such the terrestrial biodiversity is largely re-instated over time, by:

- Stabilising disturbed areas to prevent erosion in the short- to medium term until a suitable vegetation cover has established; and
- Establishing viable self-sustaining vegetation communities of local fauna, as far as possible.

**E. IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES**

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

<b>ACTIVITIES</b>  <b>(E.g. For prospecting - drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</b>  <b>E.g. For mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</b>	<b>PHASE</b>  (of operation in which activity will take place.  State; Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure).	<b>SIZE AND SCALE of disturbance</b>  (volumes, tonnages and hectares or m <sup>2</sup> )	<b>MITIGATION MEASURES</b>  (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	<b>COMPLIANCE WITH STANDARDS</b>  (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	<b>TIME PERIOD FOR IMPLEMENTATION</b>  Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity Or. Upon the cessation of mining, bulk sampling or Gravel prospecting as the case may be.
Clearance of vegetation	(construction and operation phase)	4872.98 hectares	1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be prospected on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			implemented in areas where these risks are more prevalent.		
Construction of roads	Construction and operation phase)		<ol style="list-style-type: none"> <li>1. Planning of access routes to the site for construction/mining purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for mining vehicles" sign.</li> <li>2. Construction routes and required access roads must be clearly defined.</li> <li>3. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</li> <li>4. Soils compacted by construction/mining activities shall be deep ripped to loosen compacted layers and re-graded to even running levels.</li> <li>5. The contractor must ensure that damage caused by related traffic off buffelsdoorn road is repaired continuously. The costs associated with the repair must be borne by the contractor;</li> <li>6. Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport the gravel are fitted with tarpaulins or covers;</li> <li>7. All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road</li> </ol>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			safety issues and need for strict speed limits.		
Drilling for Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral)	Construction and operation phase)	4872.98 hectares	<ol style="list-style-type: none"> <li>1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil (If topsoil exists), and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</li> <li>2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping.</li> <li>3. The topsoil must be conserved on site in and around the pit/trench area.</li> <li>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms, trenches or low brick walls around their bases.</li> <li>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> </ol>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mine

			<p>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p> <p>8. The impact on the geology will be permanent. There is no mitigation measure.</p>		
Drilling for Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral)	construction and operation phase)	4872.98 hectares	<p>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</p> <p>2. Mine, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</p> <p>3. Truck traffic should be routed away from noise sensitive areas, where possible.</p> <p>4. Noise levels must be kept within acceptable limits.</p> <p>5. Noisy operations should be combined so that they occur where possible at the same time.</p> <p>6. Mine workers to wear necessary ear protection gear.</p>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining area



			<p>7. Noisy activities to take place during allocated hours.</p> <p>8. Noise from labourers must be controlled.</p> <p>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.</p> <p>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</p> <p>11. Implementation of enclosure and cladding of processing plants.</p> <p>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</p>		
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**F. IMPACT MANAGEMENT OUTCOMES**

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

<b>ACTIVITY</b> (whether listed or not listed).	<b>POTENTIAL IMPACT</b>	<b>ASPECTS AFFECTED</b>	<b>PHASE</b> In which impact is anticipated	<b>MITIGATION TYPE</b>	<b>STANDARD TO BE ACHIEVED</b>
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<p><b>(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.).</b></p>	<p><b>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</b></p>		<p><b>(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)</b></p>	<p><b>(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)</b></p> <p><b>E.g.</b></p> <ul style="list-style-type: none"> <li>• <b>Modify through alternative method.</b></li> <li>• <b>Control through noise control</b></li> <li>• <b>Control through management and monitoring</b></li> <li>• <b>Remedy through rehabilitation..</b></li> </ul>	<p><b>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.</b></p>
<p>Clearance of vegetation</p>	<p>Loss or fragmentation of habitats</p>	<p>Fauna &amp; flora</p>		<p><b>Existing vegetation</b></p> <ol style="list-style-type: none"> <li>1. Vegetation removal must be limited to the mining area.</li> <li>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</li> <li>3. No vegetation to be used for firewood.</li> <li>4. Exotic and invasive plant species should not be allowed to establish, if the development is approved.</li> <li>5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance;</li> <li>6. In case Camel Thorn or Shepherd's trees are found permits must be obtained from DAFF to remove these individuals. The contractor must apply</li> </ol>	<p>Minimisation of impacts to acceptable limits</p>

				<p>for these permits in a phased manner as mining proceeds.</p> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>7. All damaged areas shall be rehabilitated upon completion of the contract.</li> <li>8. All natural areas impacted during construction/ mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. However, the quarry area will not be rehabilitated completely as backfilling will not be possible.</li> <li>9. Rehabilitation must take place in a phased approach as soon as possible.</li> <li>10. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.</li> <li>11. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</li> <li>12. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.</li> </ol> <p><b>Demarcation of mining area</b></p> <ol style="list-style-type: none"> <li>13. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan.</li> <li>14. The mining area must be well demarcated and no construction/ mining activities must be allowed outside of this demarcated footprint.</li> <li>15. Vegetation removal must be phased in order to reduce impact of construction/ mining.</li> <li>16. Site office and laydown areas must be clearly demarcated and no</li> </ol>	
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				<p>encroachment must occur beyond demarcated areas.</p> <p>17. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas.</p> <p>18. Soils must be kept free of petrochemical solutions that may be kept on site during construction/ mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p><b>Utilisation of resources</b></p> <p>19. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p><b>Exotic vegetation</b></p> <p>20. Alien vegetation on the site will need to be controlled.</p> <p>21. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>22. The spread of exotic species occurring throughout the site should be controlled.</p> <p>23. Weed control measures must be applied to eradicate any noxious weeds (category 1a &amp; 1b species) on disturbed areas.</p> <p><b>Herbicides</b></p> <p>24. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of</p>	
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				<p>a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>25. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p><b>Fauna</b></p> <p>26. Rehabilitation to be undertaken as soon as possible after the mining activities have been completed.</p> <p>27. No trapping or snaring to fauna on the construction/ mining site should be allowed.</p> <p>28. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p> <p>29. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer.</p> <p>30. All construction vehicles should adhere to a low speed limit (&lt;30km/h) to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>31. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.</p>	
Drilling for Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon	Loss of topsoil	Soil		<p>1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil,</p>	Minimisation of impacts to acceptable limits

<p>(Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral)</p>				<p>and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <ol style="list-style-type: none"> <li>2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping.</li> <li>3. The topsoil must be conserved on site in and around the pit/trench area.</li> <li>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</li> <li>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> <li>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</li> </ol> <p>Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These</p>	
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				<p>records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>• Record the GPS coordinates of each area.</li> <li>• Record the date of topsoil stripping.</li> <li>• Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>• Record the date of cessation mining activities at the particular site.</li> <li>• Photograph the area on cessation of mining activities.</li> <li>• Record date and depth of re-spreading of topsoil.</li> </ul>	
	Erosion	Soil Air Water	(construction and operation phase)	<ol style="list-style-type: none"> <li>1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.</li> <li>3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly</li> </ol>	Minimisation of impacts to acceptable limits

				<ol style="list-style-type: none"> <li>5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site.</li> <li>6. The use of silt fences and Gravel bags must be implemented in areas that are susceptible to erosion.</li> <li>7. Other erosion control measures that can be implemented are as follows:             <ul style="list-style-type: none"> <li>o Brush packing with cleared vegetation</li> <li>o Mulch or chip packing</li> <li>o Planting of vegetation</li> <li>o Hydroseeding/hand sowing</li> </ul> </li> <li>8. Sensitive areas need to be identified prior to construction/mining so that the necessary precautions can be implemented.</li> <li>9. All erosion control mechanisms need to be regularly maintained.</li> <li>10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</li> <li>11. Retention of vegetation where possible to avoid soil erosion.</li> <li>12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</li> <li>13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses.</li> <li>14. No impediment to the natural water flow other than approved erosion control works is permitted.</li> <li>15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/ mining</li> </ol>	
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				<p>activities must be estimated and the drainage system assessed accordingly.</p> <p>16. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion.</p>	
	Air Pollution	Air	(construction and operation phase)	<p><b>Dust control</b></p> <ol style="list-style-type: none"> <li>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.</li> <li>2. Retention of vegetation where possible will reduce dust travel.</li> <li>3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of Gravel and dust into neighbouring areas.</li> <li>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</li> <li>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</li> <li>6. A speed limit of 30km/h must not be exceeded on site.</li> <li>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</li> <li>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</li> </ol> <p><b>Odour control</b></p> <ol style="list-style-type: none"> <li>9. Regular servicing of vehicles in order to limit gaseous emissions.</li> <li>10. Regular servicing of onsite toilets to avoid potential odours.</li> </ol>	Minimisation of impacts to acceptable limits

				<p><b>Rehabilitation</b></p> <p>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</p> <p><b>Fire prevention</b></p> <p>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</p> <p>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</p>	
	Noise		(construction and operation phase)	<p>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</p> <p>2. Mine, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</p> <p>3. Truck traffic should be routed away from noise sensitive areas, where possible.</p> <p>4. Noise levels must be kept within acceptable limits.</p> <p>5. Noisy operations should be combined so that they occur where possible at the same time.</p>	Minimisation of impacts to acceptable limits

				<ol style="list-style-type: none"> <li>6. Mine workers to wear necessary ear protection gear.</li> <li>7. Noisy activities to take place during allocated hours.</li> <li>8. Noise from labourers must be controlled.</li> <li>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.</li> <li>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</li> <li>11. Implementation of enclosure and cladding of processing plants.</li> <li>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</li> </ol>	
	Impact on potential cultural, heritage artefacts and fossils.	Heritage and Paleontology	(construction and operation phase)	<ol style="list-style-type: none"> <li>1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DMR</li> <li>2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any</li> </ol>	Minimisation of impacts to acceptable limits

				<p>artefacts/ fossils are uncovered in the affected area.</p> <ol style="list-style-type: none"> <li>3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds to the ECO so that appropriate action can be taken.</li> <li>4. Known sites should be clearly marked in order that they can be avoided. The workforce should also be informed that fenced-off areas are no-go areas.</li> <li>5. The ECO must also survey for heritage and palaeontological artefacts during ground breaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a palaeontologist should be appointed during the digging and excavation phase of the development.</li> <li>6. All excavating activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to determine proper management, mitigation, excavation and/or collecting measures.</li> <li>7. Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered.</li> <li>8. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site;</li> </ol>	
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				and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).	
Waste management		Pollution	(construction and operation phase)	<p><b>Litter management</b></p> <ol style="list-style-type: none"> <li>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> <li>2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.</li> <li>3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction site.</li> <li>4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.</li> <li>5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</li> <li>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</li> <li>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</li> </ol>	Minimisation of impacts to acceptable limits

				<p>8. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.</p> <p>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</p> <p>10. Under no circumstances may solid waste be burnt on site.</p> <p>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p><b>Hazardous waste</b></p> <p>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.</p> <p>13. Contaminants to be stored safely to avoid spillage.</p> <p>14. Machinery must be properly maintained to keep oil leaks in check.</p> <p>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.</p> <p><b>Sanitation</b></p> <p>16. The Contractor shall install mobile chemical toilets on the site.</p> <p>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.</p> <p>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</p>	
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				<p>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.</p> <p>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</p> <p>21. The construction of “Long Drop” toilets is forbidden, but rather toilets connected to the sewage treatment plant.</p> <p>22. Potable water must be provided for all construction staff.</p> <p><b>Remedial actions</b></p> <p>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>28. Materials used for the remediation of petrochemical spills must be used</p>	
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				<p>according to product specifications and guidance for use.</p> <p>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p> <p>30.</p>	
Water Use and Quality	Water pollution	Water	(construction and operation phase)	<p><b>Water Use</b></p> <ol style="list-style-type: none"> <li>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.</li> <li>2. Water must be reused, recycled or treated where possible.</li> </ol> <p><b>Water Quality</b></p> <ol style="list-style-type: none"> <li>3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.</li> <li>4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.</li> <li>5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans.</li> </ol> <p><b>Stormwater</b></p>	



				<ol style="list-style-type: none"> <li>6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants.</li> <li>7. Silt fences should be used to prevent any soil entering the stormwater drains.</li> <li>8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.</li> <li>9. Promote a water saving mind set with construction/ mining workers in order to Contractor ensure less water wastage.</li> <li>10. Hazardous substances must be stored at least 40m from any water bodies on site to avoid pollution.</li> <li>11. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.</li> <li>12. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.</li> <li>13. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</li> <li>14. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.</li> </ol> <p><b>Groundwater resource protection</b></p>	
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				<p>15. Process solution storage ponds and other impoundments designed to hold non fresh water or non-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.</p> <p><b>Sanitation</b></p> <p>16. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</p> <p>17. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p> <p><b>Public areas</b></p> <p>18. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.</p> <p>19. The Contractor should take steps to ensure that littering by construction/ mining workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>20. No washing or servicing of vehicles on site.</p>	
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**IMPACT MANAGEMENT ACTIONS**

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

<b>ACTIVITY</b> Whether listed or not listed.	<b>POTENTIAL IMPACT</b>	<b>MITIGATION TYPE</b>	<b>TIME PERIOD FOR IMPLEMENTATION</b>	<b>COMPLIANCE WITH STANDARDS</b>
<b>(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.).</b>	<b>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</b>	<b>(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)</b>  <b>E.g.</b> <ul style="list-style-type: none"> <li>• <b>Modify through alternative method.</b></li> <li>• <b>Control through noise control</b></li> <li>• <b>Control through management and monitoring</b></li> </ul> <b>Remedy through rehabilitation..</b>	Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or Gravel mining as the case may be.	(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Clearance of vegetation	Loss or fragmentation of habitats	<b>Existing vegetation</b> 1. Vegetation removal must be limited to the mining site.	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards,

		<p>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</p> <p>3. No vegetation to be used for firewood.</p> <p>4. Exotic and invasive plant species should not be allowed to establish, if the development is approved.</p> <p>5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance;</p> <p>6. In case Camel Thorn or Shepherd’s trees are found permits must be obtained from DAFF to remove these individuals. The contractor must apply for these permits in a phased manner as mining proceeds.</p> <p><b>Rehabilitation</b></p> <p>7. All damaged areas shall be rehabilitated upon completion of the contract.</p> <p>8. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</p> <p>9. All-natural areas impacted during construction/mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.</p> <p>10. Rehabilitation must take place in a phased approach as soon as possible.</p> <p>11. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.</p> <p>12. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</p>		<p>thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.</p>
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		<p>13.Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.</p> <p><b>Demarcation of mining area</b></p> <p>14.All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan.</p> <p>15.The mining area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.</p> <p>16.Vegetation removal must be phased in order to reduce impact of construction/mining.</p> <p>17.Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>18.Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas.</p> <p>19.Soils must be kept free of petrochemical solutions that may be kept on site during construction/mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p><b>Utilisation of resources</b></p> <p>20.Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p><b>Exotic vegetation</b></p> <p>21.Alien vegetation on the site will need to be controlled.</p> <p>22.The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>23.The spread of exotic species occurring throughout the site should be controlled.</p>		
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		<p>24. Weed control measures must be applied to eradicate any noxious weeds (category 1a &amp; 1b species) on disturbed areas.</p> <p><b>Herbicides</b></p> <p>25. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>26. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p><b>Fauna</b></p> <p>27. Rehabilitation to be undertaken as soon as possible after mining has been completed.</p> <p>28. No trapping or snaring to fauna on the construction/ mining site should be allowed.</p> <p>29. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p> <p>30. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer.</p> <p>31. All construction vehicles should adhere to a low speed limit (&lt;30km/h) to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>32. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.</p>		
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<p>Drilling for Heavy Minerals (General), Rutile (Heavy Mineral), Ilmenite (Heavy Mineral), Zircon (Heavy Mineral), Monazite (Heavy Mineral) and Leucoxene (Heavy Mineral)</p>	<p>Loss of topsoil</p>	<ol style="list-style-type: none"> <li>1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction/mining and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</li> <li>2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping.</li> <li>3. The topsoil must be conserved on site in and around the pit/trench area.</li> <li>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</li> <li>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> <li>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</li> </ol> <p>Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>• Record the GPS coordinates of each area.</li> <li>• Record the date of topsoil stripping.</li> </ul>	<p>Duration of operation</p>	<p>The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.</p>
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		<ul style="list-style-type: none"> <li>• Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>• Record the date of cessation mining activities at the particular site.</li> <li>• Photograph the area on cessation of mining activities.</li> <li>• Record date and depth of re-spreading of topsoil.</li> <li>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul>		
	Erosion	<ol style="list-style-type: none"> <li>1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.</li> <li>3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly</li> <li>5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site.</li> <li>6. The use of silt fences and Gravel bags must be implemented in areas that are susceptible to erosion.</li> <li>7. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> <li>○ Brush packing with cleared vegetation</li> <li>○ Mulch or chip packing</li> </ul> </li> </ol>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.



		<ul style="list-style-type: none"> <li>○ Planting of vegetation</li> <li>○ Hydroseeding/hand sowing</li> </ul> <p>8. Sensitive areas need to be identified prior to construction/mining so that the necessary precautions can be implemented.</p> <p>9. All erosion control mechanisms need to be regularly maintained.</p> <p>10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</p> <p>11. Retention of vegetation where possible to avoid soil erosion.</p> <p>12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</p> <p>13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses.</p> <p>14. No impediment to the natural water flow other than approved erosion control works is permitted.</p> <p>15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings.</p> <p>16. Stockpiles not used in three (3) months after stripping must be seeded/backfilled to prevent dust and erosion.</p>		
.	Air Pollution	<p><b>Dust control</b></p> <ol style="list-style-type: none"> <li>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.</li> <li>2. Retention of vegetation where possible will reduce dust travel.</li> <li>3. Clearing activities must only be done during agreed working times and permitting weather</li> </ol>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and

		<p>conditions to avoid drifting of Gravel and dust into neighbouring areas.</p> <ol style="list-style-type: none"> <li>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</li> <li>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</li> <li>6. A speed limit of 30km/h must not be exceeded on site.</li> <li>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</li> <li>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</li> </ol> <p><b>Odour control</b></p> <ol style="list-style-type: none"> <li>9. Regular servicing of vehicles in order to limit gaseous emissions.</li> <li>10. Regular servicing of onsite toilets to avoid potential odours.</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks. However, the quarry area will not be rehabilitated completely as backfilling will not be possible.</li> </ol> <p><b>Fire prevention</b></p> <ol style="list-style-type: none"> <li>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</li> <li>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</li> </ol>		<p>Duty of Care as prescribed by NEMA.</p>
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	Noise	<ol style="list-style-type: none"> <li>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</li> <li>2. Crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</li> <li>3. Truck traffic should be routed away from noise sensitive areas, where possible.</li> <li>4. Noise levels must be kept within acceptable limits.</li> <li>5. Noisy operations should be combined so that they occur where possible at the same time.</li> <li>6. Mine workers to wear necessary ear protection gear.</li> <li>7. Noisy activities to take place during allocated hours.</li> <li>8. Noise from labourers must be controlled.</li> <li>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.</li> <li>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractor's own transport.</li> <li>11. Implementation of enclosure and cladding of processing plants.</li> <li>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a</li> </ol>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.
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		sign of the imminent mechanical failure of a machine.		
	Impact on potential cultural, heritage artefacts and fossils.	<ol style="list-style-type: none"> <li>1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.</li> <li>2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts/ fossils are uncovered in the affected area.</li> <li>3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds to the ECO so that appropriate action can be taken.</li> <li>4. Known sites should be clearly marked in order that they can be avoided. The workforce should also be informed that fenced-off areas are no-go areas.</li> <li>5. The ECO must also survey for heritage and palaeontological artefacts during ground breaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a palaeontologist should be appointed during the digging and excavation phase of the development.</li> <li>6. All excavating activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to determine proper management, mitigation, excavation and/or collecting measures.</li> <li>7. Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered.</li> </ol>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>8. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).</p>		
Waste Management		<p><b>Litter management</b></p> <ol style="list-style-type: none"> <li>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction/mining site.</li> <li>2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.</li> <li>3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction/mining site.</li> <li>4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.</li> <li>5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</li> </ol>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</p> <p>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</p> <p>8. Where a registered waste site is not available close to the construction/mining site, the Contractor shall provide a method statement with regard to waste management.</p> <p>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</p> <p>10. Under no circumstances may solid waste be burnt on site.</p> <p>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p><b>Hazardous waste</b></p> <p>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.</p> <p>13. Contaminants to be stored safely to avoid spillage.</p> <p>14. Machinery must be properly maintained to keep oil leaks in check.</p> <p>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction/mining and any spills shall immediately be cleaned up and all affected areas rehabilitated.</p> <p><b>Sanitation</b></p> <p>16. The Contractor shall install mobile chemical toilets on the site.</p>		
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		<p>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.</p> <p>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</p> <p>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.</p> <p>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</p> <p>21. The construction of “Long Drop” toilets is forbidden, but rather toilets connected to the sewage treatment plant.</p> <p>22. Potable water must be provided for all construction staff.</p> <p><b>Remedial actions</b></p> <p>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p>		
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		<p>28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>		
<p>Water Use and Quality</p>	<p>Water pollution</p>	<p><b>Water Use</b></p> <ol style="list-style-type: none"> <li>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.</li> <li>2. Water must be reused, recycled or treated where possible.</li> </ol> <p><b>Water Quality</b></p> <ol style="list-style-type: none"> <li>3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.</li> <li>4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.</li> <li>5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans.</li> </ol> <p><b>Stormwater</b></p> <ol style="list-style-type: none"> <li>6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants.</li> <li>7. Silt fences should be used to prevent any soil entering the stormwater drains.</li> </ol>		



		<p>8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.</p> <p>9. Promote a water saving mind set with construction/mining workers in order to Contractor ensure less water wastage.</p> <p>10. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency.</p> <p>11. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution.</p> <p>12. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.</p> <p>13. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.</p> <p>14. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p> <p>15. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.</p> <p><b>Groundwater resource protection</b></p> <p>16. Process solution storage ponds and other impoundments designed to hold non fresh water or un-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.</p> <p><b>Sanitation</b></p>		
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		<p>17. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</p> <p>18. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p> <p><b>Public areas</b></p> <p>19. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.</p> <p>20. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>21. No washing or servicing of vehicles on site.</p>		
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**Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

The Rehabilitation & Closure Plan is attached as **Appendix 8**.

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

CALCULATION OF THE QUANTUM							
Applicant: <b>Saxon Heavy Minerals (Pty) Ltd</b>		Ref No.:		NC30/5/1/1/2/12378PR			
Evaluators: <b>Milnex CC</b>		Date:		22/08/2019			
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	0	14,05	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	195,76	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	288,49	1	1	0
3	Rehabilitation of access roads	m2	0	35,03	1	1	0
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	340,01	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	185,46	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	391,53	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	205242,16	0,52	1	0
7	Sealing of shafts adits and inclines	m3	0	105,09	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,12	136828,1	1	1	16419,372
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	170416,93	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	494971,55	1	1	0
9	Rehabilitation of subsided areas	ha	0,12	114572,93	1	1	13748,7516
10	General surface rehabilitation	ha	0,12	108390,94	1	1	13006,9128
11	River diversions	ha	0	108390,94	1	1	0
12	Fencing	m	0	123,64	1	1	0
13	Water management	ha	0	41213,28	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0,36	14424,65	1	1	5192,874
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
Sub Total 1							48367,9104
1	Preliminary and General		5804,149248		weighting factor 2 1		5804,149248
2	Contingencies				4836,79104		4836,79104
Subtotal 2							59008,85
VAT (15%)							8851,33
<b>Grand Total</b>							<b>67860</b>

### Drilling

It is estimated that the drilling will take approximately two years after the prospecting right has been executed and the EMP approved.

### Calculation

$7m \times 4 m = 28m^2$  (size of area needed for drill rig and related equipment for drilling one borehole.)

$3m \times 2.5m = 7.5m^2$  (size of area needed for sampling tubes for one borehole.)

$28m^2 + 7.5m^2 = 35.5m^2$  (sum of the above mentioned.)

$35.5m^2 / 10\ 000 = 0.00355ha$

$0.00355ha \times 68boreholes = 0.24 ha$

The area to be disturbed will be approximately 0.24ha in 24 Months & 0.12ha in 12 months

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

**Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed **Saxon Heavy Minerals (Pty) Ltd** will be submitted

**Rehabilitation Fund**

**Saxon Heavy Minerals (Pty) Ltd** will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

**G. Monitoring of Impact Management Actions**

**H. Monitoring and reporting frequency**

**I. Responsible persons**

**J. Time period for implementing impact management actions**

**K. Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Clearance of vegetation	Loss or fragmentation of habitats	<ul style="list-style-type: none"> <li>• Conduct regular internal audits</li> <li>• Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Manager</li> <li>• Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Mining of Gravel –	Loss of topsoil Erosion Air Pollution Noise Impact on potential cultural-, heritage artefacts and fossils	<ul style="list-style-type: none"> <li>• Conduct regular internal audits</li> <li>• Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Manager</li> <li>• Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Waste management	Pollution	<ul style="list-style-type: none"> <li>• Conduct regular internal audits</li> <li>• Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Manager</li> <li>• Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External

				audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Water Use and Quality	Water pollution	<ul style="list-style-type: none"> <li>• Conduct regular internal audits</li> <li>• Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Manager</li> <li>• Suitable qualified environmental auditor</li> </ul>	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.

**L. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT.**

External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.

**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.**

**Saxon Heavy Minerals (Pty) Ltd** will implement an Environmental Awareness Plan which will include various mechanisms for informing employees of environmental risks resulting from their work, including:

- Induction training for full –time staff and contractors;
- In-house training sessions to be held with relevant employees;
- On the job training regarding environmental issues
- Training and skills development

The above measures will be implemented through an Environmental Communication Strategy to be implemented.

See the attached **Appendix 11** for the Awareness plan

**i. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.**

**Saxon Heavy Minerals (Pty) Ltd** will implement an incident reporting and reporting procedure in order to identify risks timeously and implement actions to avoid or minimise environmental impacts.

**N. Specific information required by the Competent Authority  
(Among others, Confirm that the financial provision will be reviewed annually).**

No specific information requirements have been detailed by the Competent Authority.

\*\*\*\*\***END OF REPORT**\*\*\*\*\*