



**ECC**  
ENVIRONMENTAL  
COMPLIANCE CONSULTANCY



ECC-128-361-REP-10-D

**ENVIRONMENTAL COMPLIANCE REPORT FOR ONGOING EXPLORATION /  
PROSPECTING UNDER THE EXCLUSIVE PROSPECTING LICENSE (EPL) NO. 4655  
GOBABIS/MARIENTAL DISTRICTS, OMAHEKE/HARDAP REGIONS NAMIBIA**

**RENEWAL  
ENVIRONMENTAL CLEARANCE CERTIFICATE**

*PREPARED FOR*  
**HEADSPRING INVESTMENTS (PTY) LTD**

JULY 2021

## TITLE AND APPROVAL PAGE

<b>Project Name:</b>	Environmental Compliance Report for Ongoing Exploration / Prospecting under the Exclusive Prospecting License (EPL) No. 4655 Gobabis/Mariental Districts, Omaheke/Hardap Regions
<b>Project Number</b>	ECC-128-361-REP-10-D
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### Environmental Compliance Consultancy Contact Details:

We welcome any enquiries regarding this document and its content please contact:

#### Stephan Bezuidenhout

Director & Principal Environmental Practitioner  
Tel: +264 81 6697608  
Email: [stephan@eccenvironmental.com](mailto:stephan@eccenvironmental.com)  
[www.eccenvironmental.com](http://www.eccenvironmental.com)

#### Jessica (Bezuidenhout) Mooney

Director & Principal Environmental Practitioner  
Tel: +264 81 6697608  
Email: [jessica@eccenvironmental.com](mailto:jessica@eccenvironmental.com)  
[www.eccenvironmental.com](http://www.eccenvironmental.com)

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## Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>5</b>
1.1	PROJECT INTRODUCTION .....	5
1.2	THE PROPONENT OF THE PROJECT .....	7
1.3	ENVIRONMENTAL CONSULTANCY.....	7
1.4	PURPOSE OF REPORT.....	7
<b>2</b>	<b>BACKGROUND OF THE PROJECT .....</b>	<b>8</b>
<b>3</b>	<b>ENVIRONMENTAL COMPLIANCE AUDIT .....</b>	<b>9</b>
3.1	SITE INSPECTION .....	9
3.2	ANNUAL COMPLIANCE AUDIT .....	9
3.3	COMPLIANCE AUDIT FINDINGS.....	9
<b>4</b>	<b>CONCLUSION AND RECOMMENDATIONS.....</b>	<b>22</b>
	<b>APPENDIX A: ENVIRONMENTAL CLEARANCE CERTIFICATE .....</b>	<b>23</b>

**TABLES**

**TABLE 1 - PROPONENTS DETAILS** ..... 7

TABLE 2 - EXPLORATION ACTIVITIES COMPLIANCE TABLE..... 11

TABLE 3 - DECOMMISSIONING AND CLOSURE AUDIT ..... 20

**DEFINITIONS AND ABBREVIATIONS**

ECC	Environmental Compliance Consultancy
ECO	Environmental Control Officer
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPL	Exclusive Prospecting Licence
MEFT	Ministry of Environment, Forestry and Tourism

## 1 INTRODUCTION

### 1.1 PROJECT INTRODUCTION

Headspring Investments (Pty) Ltd (herein referred to as the proponent or Headspring) is an exploratory mining prospector for base and rare metals and nuclear fuel minerals. Their current area of interest is located within a 40km radius of the town of Leonardville, in the Windhoek/Gobabis/Mariental Districts, Khomas, Omaheke and Hardap Regions of eastern Namibia. Headspring plans to expand its operations for this project and would like to continue to explore the availability of base and rare metals and nuclear fuel minerals at the Exclusive Prospecting Licence (EPL) 4655 located west of Leonardville.

The proponent proposes to carry out exploration activities on EPL 4655 for nuclear fuel minerals, specifically but not limited to, uranium deposits. EPL 4655 occurs across the Hardap and Omaheke Regions of Namibia. The prospect area is located approximately 10km north-west of Leonardville and 80 km south of Gobabis (Figure 1.)

A revised Environmental Management Plan (EMP) report was compiled by Risk-Based Solutions (RBS) CC in August 2018 to support the renewal application for an environmental clearance certificate for the exploration activities on EPL 4655. The environmental clearance certificate for the exploration activities on EPL 4655 was valid for a period of three (3) years as was issued by the Environmental Commissioner on 3rd of September 2018 (Appendix A).

In terms of the Environmental Management Act. No. 7 of 2007 a renewal application for the project's environmental compliance certificate is required. As part of this application an environmental compliance review of the works undertaken on site and compliance with the Environmental Management Plan (EMP) is to be submitted to the Ministry of Environment, Forestry and Tourism (MEFT).

#### **DISCLAIMER**

*This report has been compiled by means of a desktop study, including the revision of relevant reports and all records made available by the proponent. ECC did not conduct any field verification and therefore rely on the proponent's integrity to uphold conditions specified in the EMP.*

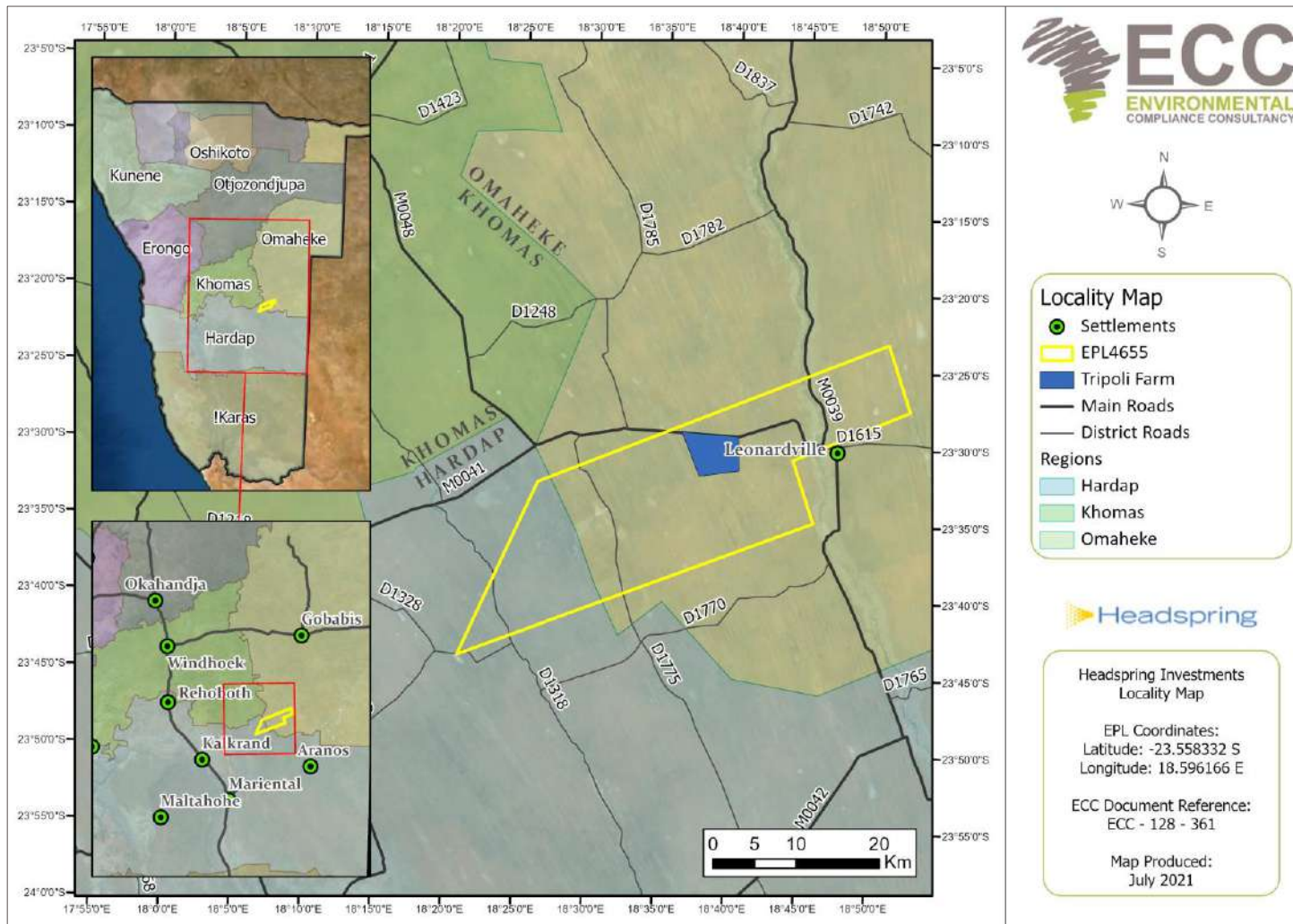


FIGURE 1 – LOCALITY MAP OF EPL 4655

## 1.2 THE PROPONENT OF THE PROJECT

The details of the proponent are set out in Table 1.

**TABLE 1 - PROPONENTS DETAILS**

CONTACT	POSTAL ADDRESS	EMAIL ADDRESS	TELEPHONE
HEADSPRING INVESTMENTS (PTY) LTD Mrs. Svetlana Bauer	P.O Box 318 Windhoek Namibia	Svetlana.Bauer@uranium1.com	061-304588

## 1.3 ENVIRONMENTAL CONSULTANCY

ECC, a Namibian consultancy registration number CC/2013/11401, has prepared this document on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients across Southern Africa in the public and private sector. The curriculum vitae's of the authors of this report are contained in Appendix B. ECC is independent of the proponent and has no vested or financial interest in the proposed project except for fair remuneration for professional services rendered.

All compliance and regulatory requirements regarding this document should be forwarded by email or posted to the following address:

**Environmental Compliance Consultancy**

PO BOX 91193

Klein Windhoek, Namibia

Tel: +264 81 669 7608

Email: [info@eccenvironmental.com](mailto:info@eccenvironmental.com)

## 1.4 PURPOSE OF REPORT

Environmental Compliance Consultancy (ECC) has been appointed by the proponent to apply for their renewal of an environmental clearance certificate for the exploration activities on EPL 4655 situated in the Omaheke, Hardap and Khomas Regions of Namibia. The purpose of this environmental compliance report is to document the findings of an environmental compliance audit covering the period since the approval of the renewal environmental clearance licence from the 3rd September 2018 to 3rd September 2021, which will be, submitted as part of the new renewal application.

## 2 BACKGROUND OF THE PROJECT

Headspring Investments is a licenced mining prospector operating in within a 40km radius of Leonardville town, in Eastern Namibia. It currently holds (pending renewal) EPLs for eight zones in the Hardap region, three of which are co-located in both the Hardap and Omaheke regions and one in the Hardap, Omaheke and Khomas regions. The license area covers both privately owned commercial farmland and communal land (Government land). Exploration activities have been undertaken as follows:

- (i) Initial desktop exploration activities (no field-work undertaken);
- (ii) (ii) Regional reconnaissance field-based mapping and sampling activities (Subject to the positive results of (i));
- (iii) (iii) Interpretation of existing aerial data, initial local field-based mapping and sampling activities followed by possible acquisition of new aerial data (radiometrics, magnetics and gravity) (Subject to the positive results of (i) and (ii) above),
- (iv) (iv) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling (Subject to the positive results of (i) - (iii) above)

There are currently no ongoing mining activities in the specified area.

This document is subjected to periodical auditing as the project activities transition from the earliest exploration stage to the operation stage. The EMP is audited in order to monitor the progress of the project and ensure that all measures stipulated in the document are met and effectively adhered to as required by the Department of Environmental Affairs and Forestry (DEAF). In an event where the project activities alter, the EMP is required to be amended accordingly.

EPL 4655 does not fall within any ecologically sensitive areas of Namibia. It is however imperative that through studies are carried out to ascertain the biophysical condition of the area prior to the exploration or mining activities.

As per the EIA Regulations and Environmental Management Act No. 7 of 2007, exploration activities on EPL 4655 cannot be undertaken without an environmental clearance certificate. The exploration activities at EPL 4655 proposes to assess the amount of Uranium rich substrate and other minerals resources that can be found in the EPL 4655 area. The proposed method for exploration would have minimal impact as it will be done on small scale and rehabilitation of the natural vegetation will be done as per the Environmental Management Plan (EMP).



### 3 ENVIRONMENTAL COMPLIANCE AUDIT

#### 3.1 SITE INSPECTION

Environmental Compliance Consultancy (ECC) has not undertaken a site inspection for this project. This report was conducted through a series of desktop assessments, revision of relevant reports, and verification of owner documentation, and all records made available to ECC. The findings of this inspection are included in Table 2.

#### 3.2 ANNUAL COMPLIANCE AUDIT

During the licence period (2018-2021) there were significant exploration activities carried out on the EPL. The EMP compiled by Risk-Based Solutions (RBS) CC in August 2018 set of feasible and cost-effective mitigation, monitoring and institutional measures to avoid adverse environmental and social impacts, reduce them to acceptable levels or to compensate for them. Furthermore, the EMP covers all adverse environmental impacts, including any that may result from the exploration activities at EPL 4655. The EMP will provide the technical details for each mitigation, monitoring and institutional measure, including the impact(s) to which it relates and the conditions when it is required, together with designs, equipment descriptions and operating procedures in compliance with the approved EMP granted in terms of the Environmental Management Act, No. 7 of 2007.

In addition to the compliance audit, the EMP will be revised to identify gaps in order to recommend additional best practice measures that were not captured in the previous EMP.

#### 3.3 COMPLIANCE AUDIT FINDINGS

The section outlines the findings of the environmental audit completed for the project. It addresses obligations in terms of the key acts that govern the activities on the site, the commitments made in the EMP, and presents the findings and recommended corrective actions where applicable (Table 2 - 3).

The EMP:

- identifies all mineral exploration activities that could cause environmental damage (risks) and provides a summary of actions required;
- identifies institutions responsible for ensuring compliance with the EMP and provides their contact information;
- provides standard procedures to avoid, minimise and mitigate the identified negative environmental impacts and to enhance the positive impact of the proposed activities on the environment;
- provides for site and exploration rules and actions required;
- forms a written record of procedures, responsibilities, requirements and rules for contractor/s, their staff and any other person who must comply with the EMP;

- provides a monitoring and auditing programme to track and record compliance and identify and respond to any potential or actual negative environmental impacts, and
- Provides a monitoring programme to record any mitigation measures that are implemented.

**TABLE 2 - EXPLORATION ACTIVITIES COMPLIANCE TABLE**

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Biotic Environment</b>	<ul style="list-style-type: none"> <li>– Impact to ecological resources would be minimal and localized during exploration because of the limited nature of activities.</li> <li>– Introduction of fauna and flora through the introduction of seeds and fauna through the movement of people and vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>– The proponent shall take adequate steps to educate all members of his workforce as well as his supervisory staff on the relevant environmental laws and protection requirements.</li> <li>– The proponent shall appoint a suitably qualified independent Environmental Control Officer (ECO).</li> <li>– The proponent shall construct and/or implement all the necessary environmental protection measures in each area before exploration work may proceed.</li> </ul>	– Compliant	– All activities were undertaken in accordance with the EMP.
– <b>Environmental awareness</b>	<ul style="list-style-type: none"> <li>– To ensure that all employees and Sub-Contractors are informed of their environmental obligations.</li> </ul>	<ul style="list-style-type: none"> <li>– The Environmental, Health, and Safety Induction Course should be conducted by the ECO and appointed Health and Safety officer.</li> <li>– The site manager responsible will provide feedback to his staff on their day-to-day environmental performance and address issues requiring attention and specific actions required.</li> </ul>	– Compliant	<ul style="list-style-type: none"> <li>– Transfer of skills by induction course.</li> <li>– Communication with the staff and sub-contractors to be conducted in accordance with the EMP.</li> </ul>
– <b>Safety to the public</b>	<ul style="list-style-type: none"> <li>– To reduce the risks posed by the project to the public.</li> </ul>	<ul style="list-style-type: none"> <li>– Where the public could be exposed to danger by any of the exploration or site activities, the project manager shall provide flagmen, barriers, and/or warning signs in English.</li> </ul>	– Compliant	– No evidence of non – compliance.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
		<ul style="list-style-type: none"> <li>No firearms shall be permitted on site without the prior approval of the Project Manager.</li> <li>The project manager shall implement appropriate measures to limit any adverse social impacts associated with the establishment of a exploration camp and/or the accommodation of contractors workforce on the local communities.</li> </ul>		
<ul style="list-style-type: none"> <li><b>Human resource and opportunities management</b></li> </ul>	<ul style="list-style-type: none"> <li>Preliminary assessment indicated activities conducted during exploration phase are temporary and limited in scope, they would not result in significant socioeconomic impacts on employment, local services or property values. Exploration activities shall be restricted to specified hours in order to limit disturbance to the public.</li> </ul>	<ul style="list-style-type: none"> <li>In order to enhance the benefits of employment creation for these communities, it is recommended that the Project manager shall establish a formal and organized recruitment process in line with this EMP. Ensure that local people are employed for semi-skilled labour where possible during exploration and after the mining activities commerce.</li> <li>The project manager shall restrict activities to the hours of 6h30 - 17h00 during summer and 07h00 - 17h00 during winter on Mondays to Saturdays and no work will be permitted on Sundays or public holidays.</li> </ul>	<ul style="list-style-type: none"> <li>Compliant</li> </ul>	<ul style="list-style-type: none"> <li>Activities were undertaken in accordance with the EMP.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Dust</b>	– Impacts on air quality during exploration activities such as emissions and dust from earth moving equipment, vehicles, geophysical surveys, bore hole completion and testing and drill rig exhaust.	<ul style="list-style-type: none"> <li>– Dust suppression method should be done to minimise any dust emission from exploration activities.</li> <li>– Exploration vehicles to only use designated roads;</li> <li>– During high wind conditions the site manager must make the decision to cease activities until the wind has calmed down; and</li> <li>– Cover any stockpiles with a suitable material, such as plastic or shade-cloth, to minimize windblown dust.</li> </ul>	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.
– <b>Noise</b>	– Acoustics or noise associated with exploration from earth-moving equipment, vehicle traffic, geophysical surveys and drill rig operations	<ul style="list-style-type: none"> <li>– Install and maintain silencers on machinery</li> <li>– Appropriate directional and intensity settings are to be maintained on all hooters and sirens</li> <li>– No amplified sound shall be allowed on site other than in emergency situations</li> <li>– Noise pollution during exploration would be minimal. However, if deemed necessary, employees working on the exploration should exercise maximum care to avoid disruption</li> </ul>	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Visual Impacts</b>	– Visual impacts could be adverse if the landscape were substantially degraded or modified. However, exploration activities would have only temporary and minor visual effects, resulting from the presence of drills rigs, workers, vehicles and other equipment	– Ensure effective and formal communication between the Project Management Team and the project manager on exploration issues throughout all stages of the project	– <b>Compliant</b>	– No evidence of non – compliance.
– <b>Impacts on soil and vegetation</b>	– Uncontrolled off-road driving may have an impacts on the grasses and succulents that are found on the soils in the project area that stabilizes the surface and protect the underlying soil from erosion. Disturbance of organic and inorganic protective layers can lead to increased wind and water erosion, reduced infiltration rates, reduced soil moisture content and inhabitation of plant germination.	– The exploration team should guide the vehicles for exploration on which route should be used. – Off-road driving should be limited to specific areas and rehabilitation where possible should be done after the exploration activities.	– <b>Compliant</b>	– No evidence of non – compliance.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
<ul style="list-style-type: none"> <li>– <b>Health and Safety</b></li> </ul>	<ul style="list-style-type: none"> <li>– Potential impacts on human health and safety resulting from exploration activities such as occupational accidents and injuries, vehicle accidents, exposure to weather extremes, wildlife encounters, trips and falls on uneven terrain, adverse health effects from dust generation and emissions and contact hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>– All employees working on exploration should be inducted on human health and safety and should be provided with PPE</li> <li>– Health and safety training and procedures should be provided by the health and safety team</li> </ul>	<ul style="list-style-type: none"> <li>– <b>Compliant</b></li> </ul>	<ul style="list-style-type: none"> <li>– Activities were undertaken in accordance with the EMP.</li> </ul>
<ul style="list-style-type: none"> <li>– <b>Site demarcation</b></li> </ul>	<ul style="list-style-type: none"> <li>– The site manager shall restrict all his activities, materials, equipment and personnel to the designated Site.</li> <li>– Loss of biological crusts can substantially increase water and wind erosion. However, the amount of surface disturbance and use of geologic materials during exploration would be minimal.</li> </ul>	<ul style="list-style-type: none"> <li>– The site manager shall ensure that the clearance of vegetation is restricted only to that required to facilitate the execution of the works.</li> <li>– Exploration activity needs to be conducted in such way that disturbance to surface materials is minimized.</li> </ul>	<ul style="list-style-type: none"> <li>– <b>Compliant</b></li> </ul>	<ul style="list-style-type: none"> <li>– Activities were undertaken in accordance with the EMP.</li> </ul>

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Access, traffic and haul roads</b>	– Access traffic shall be controlled to ensure minimal disruption to normal road users.	– The contractor shall be held responsible for the control of all project related traffic, including that of his suppliers, in ensuring that vehicles associated with the project remain on designated routes and within the designated working times.	– <b>Compliant</b>	– No evidence of non – compliance.
– <b>Solid waste management</b>	– Geophysical and exploratory drill crews may generate waste i.e. drilling fluid and muds, used oil and filters, spilled fuel, drill cuttings, spent and unused solvents, scrap metal, solid waste and garbage – Ensure that there is no illegal disposal of waste.	– Ensure that waste generated during the exploration on site is disposed of at an appropriate site. – The contractor shall provide sufficient number of rubbish bins with secured lids. – No waste materials, including domestic, organic or exploration wastes shall be burnt, dumped or buried on the site.	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.
– <b>Fuel and oil</b>	– To ensure that all liquid fuels are stored appropriately, and adequate firefighting equipment is stored on site.	– The project manager shall ensure that all liquid fuels are stored in tanks or mobile bowsers with lids that are kept firmly shut. – All tanks and/or mobile bowsers shall be situated in a bunded area. – The project manager shall ensure that there is adequate fire-fighting equipment at the fuel storage areas.	– <b>Compliant</b>	– All management actions have been adhered to as practically possible.



ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Equipment maintenance and storage</b>	– All vehicles and equipment are kept in good working order.	<ul style="list-style-type: none"> <li>– Leaking or damaged equipment shall be repaired immediately or removed from the site.</li> <li>– Drip trays shall be provided at designated areas.</li> </ul>	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.
– <b>Materials handling, use and storage</b>	– All delivery drivers are informed of the on-site procedures and restrictions.	<ul style="list-style-type: none"> <li>– The site manager shall ensure that any delivery drivers are informed of all procedures and restrictions, including “no-go” areas and designated haul routes.</li> <li>– All material shall be stored within the designated Site boundaries.</li> </ul>	– <b>Compliant</b>	– All management actions and have been adhered to as practically possible.
– <b>Hazardous substances</b>	– Any hazardous substances are stored appropriately.	<ul style="list-style-type: none"> <li>– Hazardous chemical substances used during exploration activities shall be stored in secondary containers.</li> <li>– The relevant Material Safety Data Sheets (MSDS) shall be available on site.</li> </ul>	– <b>Compliant</b>	– All management actions have been adhered to as practically possible in accordance with the EMP.
– <b>Trenching</b>	– Trenches are appropriately demarcated and secured.	– Trenches shall be demarcated appropriately and securely and regularly monitored to ensure that pedestrian (and vehicular) access to these areas is strictly prohibited.	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
– <b>Fire control</b>	– To reduce the risk of fires	<ul style="list-style-type: none"> <li>– Fires are only permitted in designated area and shall not be left unattended.</li> <li>– Fire extinguishers shall be readily available.</li> </ul>	– <b>Compliant</b>	– All actions and mitigation measures have been adhered to as practically possible in accordance with the EMP.
– <b>Emergency procedures</b>	– All employees are aware of emergency procedures.	<ul style="list-style-type: none"> <li>– The site manager shall ensure that his employees are aware of the procedure to be followed for dealing with leaks and spills.</li> <li>– The site manager shall ensure that the necessary materials and equipment for mitigating leaks and spill incidents are available on site at all times.</li> </ul>	– <b>Compliant</b>	– Activities were undertaken in accordance with the EMP.
– <b>Erosion, water quality, and Surface water management</b>	<ul style="list-style-type: none"> <li>– Minimal impact to water resources (water quality, water flows and surface/groundwater interactions) would be anticipated from the exploration activities.</li> <li>– Pollution of the soil and groundwater through accidental spillage is unlikely given the presence of calcretes below the top soil</li> </ul>	<ul style="list-style-type: none"> <li>– The project manager shall take all reasonable steps to prevent or remediate damage to the environment resulting from the exploration activities in the form of erosion and sedimentation.</li> <li>– The project manager shall immediately remedy any situation that is or has the potential to result in soil erosion, water pollution and sedimentation.</li> <li>– Surface water should be managed appropriately and all water released</li> </ul>	– <b>Compliant</b>	– All management actions have been adhered to as practically possible in accordance with the EMP.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
	horizons. This provide good buffering capacity and any acidic pollution will soon be neutralized.	<p>into the environment should adhere to environmental specification.</p> <ul style="list-style-type: none"> <li>– Where excessive spillage occurred, it should be cleaned up and dumped at an appropriate waste area.</li> <li>– The Environmental Team should guide the exploration team on where hazardous waste should be disposed of.</li> </ul>		
– <b>Wildlife</b>	<ul style="list-style-type: none"> <li>– Temporary and localized impact to land use would result from exploration activities such as disturbance to wildlife</li> <li>– Illegal entry to the Sperrgebiet and hunting, poaching and illegal reptile collection were cited as the major concern of the public and authorities.</li> <li>– Bees and their possible effect on health and safety were raised as one of the concerns.</li> </ul>	<ul style="list-style-type: none"> <li>– Exploration activity needs to be conducted in such way that disturbance to wildlife is minimized</li> <li>– The exploration team should be inducted on Parks rules and that no one is allowed to hunt, poach or collect any illegal reptiles etc.</li> <li>– Where beehives are found, appropriate personnel (i.e. MET) should be notified as soon as possible.</li> <li>– The Environmental Team should provide guidelines / Park Rules to the Exploration team involved</li> </ul>	– <b>Compliant</b>	– No evidence of non – compliance.

ASPECT	MANAGEMENT OBJECTIVES	MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
<ul style="list-style-type: none"> <li>Protection of natural systems, archaeological sites and Paleontological resources.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to natural systems are kept to a minimum.</li> <li>Paleontological resources could be disturbed by vehicular traffic, ground clearing and pedestrian vehicle activities</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance of vegetation and faunal communities and their habitats is kept to a minimum.</li> <li>Heavy vehicles should be kept out of the seasonal and ephemeral stream channels and the movement of exploration vehicles should be limited where possible to the existing roads.</li> <li>All earthworks equipment operators shall be informed to cease operating immediately if any artefact is unearthed and to report the finding immediately to Project manager, who in turn shall notify the National Heritage Council.</li> <li>Exploration activity needs to be conducted in such way that disturbance to paleontology is minimized</li> </ul>	<ul style="list-style-type: none"> <li>Compliant</li> </ul>	<ul style="list-style-type: none"> <li>All management actions have been adhered to as practically possible in accordance with the EMP.</li> </ul>

**TABLE 3 - DECOMMISSIONING AND CLOSURE AUDIT**

ACTIVITY/PROCESSES	ASPECT	IMPACT	– MANAGEMENT ACTIONS	COMPLIANCE	COMMENTS OR RECOMMENDATIONS
<b>1) Decommissioning and Closure</b>	<ul style="list-style-type: none"> <li>– Decommissioning</li> <li>– This impact can be successfully mitigated through rehabilitation and control of movement on site.</li> </ul>	<ul style="list-style-type: none"> <li>– Social and Environmental Performance &amp; Visual</li> </ul>	<ul style="list-style-type: none"> <li>– Conduct a validation survey to ensure that all contaminated material at the substation has been removed; remove any contaminated material and dispose of at an appropriate disposal facility.</li> <li>– Rehabilitate access tracks not required for ongoing land use activities.</li> <li>– Remove all other equipment, waste, etc. from the area.</li> <li>– Reshape all disturbed areas to their original contours.</li> <li>– Cover disturbed areas with previously collected topsoil and spread evenly.</li> <li>– Manually rip disturbed areas, where compaction has taken place, and cover the areas with previously collected topsoil.</li> <li>– Replant any previously removed native plant species in disturbed areas.</li> </ul>	<ul style="list-style-type: none"> <li>– N/A</li> </ul>	<ul style="list-style-type: none"> <li>– No decommission occurred.</li> <li>– This phase will be implemented as a joint collaboration between the proponent, the local authorities, and other key stakeholders.</li> <li>– Specific activities will be contained in a detailed decommissioning and closure plan</li> </ul>
<b>2) Closure</b>	<ul style="list-style-type: none"> <li>– Loss of jobs and income</li> </ul>	<ul style="list-style-type: none"> <li>– Socio-economic</li> </ul>	<ul style="list-style-type: none"> <li>– Implement a skills development programme during the operations.</li> </ul>	<ul style="list-style-type: none"> <li>– N/A</li> </ul>	<ul style="list-style-type: none"> <li>– No decommission occurred.</li> </ul>

## 4 CONCLUSION AND RECOMMENDATIONS

Headspring Investments has focused all its exploration activities on the area and adjacent sites to EPL 4655. As such substantial physical prospecting has been conducted for the exploration activities on EPL 4655 for nuclear fuel minerals since the environmental clearance was issued in 2018. A number of regional reconnaissance field-based mapping and sampling activities as well as initial local field-based mapping and sampling activities have already been undertaken within the EPL area and will be extended to other parts of the EPL area where potential nuclear fuels could occur. All proposed activities shall be carried out in compliance with the relevant requirements of the granted licence in accordance with the approved EMP.

- (i) The proponent had Access Agreements with the land owner/s as was required;
- (ii) The Proponent adhered to all the provisions of the EMP and conditions of the Access Agreement entered between the proponent and the land owner/s in line with all applicable national regulations;
- (iii) Before entering any private property such as a private farm, the proponent gave advanced notices and obtained access permission from the land owners at all times;
- (iv) The proponent implemented the precautionary measures / approach to environmental management at all times;
- (v) The proponent provided all the necessary support including human and financial resources, for the implementation of the proposed / ongoing mitigations and effective environmental management, and;
- (vi) The proponent implemented internal and external (contracted Risk-Based Solutions) monitoring of the actions and management strategies developed during the mineral exploration process.

The ongoing exploration activities are being undertaken following the highest Health, Safety and Environment (HSE) commitments. It is recommended that the proponent continue to adhere to all environmental legislation and company standards to ensure that best practical environmental protection continues as the project activities progress.

Headspring plans to develop a pilot plant on selected target areas within EPL 4655 to assess the potential success of extracting uranium through the in-situ leach process. For this purpose a separate environmental clearance certificate application will be submitted to the Competent Authorities, an environmental impact assessment is currently in progress for these activities. No proposed activities shall be undertaken without an approved environmental clearance certificate.

## APPENDIX A: ENVIRONMENTAL CLEARANCE CERTIFICATE



REPUBLIC OF NAMIBIA

### MINISTRY OF ENVIRONMENT AND TOURISM

Tel: +264 61 284 2111  
Fax: +264 61 232 057

Cor Robert Mugabe St  
Dr Mannam Kanda Street  
Private Bag 3335  
Windhoek  
Namibia

Enquiries: Mr. Josafat K Hiwana  
E-mail: [josafat.hiwana@met.gov.na](mailto:josafat.hiwana@met.gov.na)

3 September 2018

#### OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Managing Director  
Headspring Investments (Pty) Ltd  
P.O. Box 318  
Windhoek  
Namibia

Dear Sir/Madam

**SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR EXPLORATION ON EXCLUSIVE PROSPECTING LICENCE 4655, HARDAP REGION**

The Environmental Management Plan submitted is sufficient as it made provisions of the environmental management concerning the proposed activities. From this perspective, regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout this process.

This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project. From this perspective, I issue the environmental clearance certificate with the following condition; that the key recommendations in the Environmental Management Plan shall be followed.

On the basis of the above, this letter serves as an environmental clearance certificate for the project to continue. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for any misleading information, nor any adverse effects that may arise from this project's activities. Instead, full accountability rests with Headspring Investments (Pty) Ltd.

This environmental clearance is valid for a period of 3 (three) years, from the date of issue unless withdrawn by this office.

Yours sincerely,

  
Teofilus Nghitila  
ENVIRONMENTAL COMMISSIONER



**"Stop the poaching of our rhinos"**

All official correspondence must be addressed to the Permanent Secretary.

# Headspring Investments (Pty) Ltd (the Proponent) EPL No. 4655

Final Updated Environmental Scoping and  
Environmental Management Plan (EMP)  
Report to Support the Application for  
Renewal of Environmental Clearance  
Certificate (ECC) for Ongoing Exploration /  
Prospecting in the Exclusive Prospecting  
License (EPL) No. 4655 Gobabis/Mariental  
Districts, Omaheke /Hardap Regions  
**SOUTH EASTERN NAMIBIA**

April 2018

Headspring Investments Pty Ltd  
P.O. Box 318  
**WINDHOEK, NAMIBIA**  
Tel: +264 61 304 588  
Mobile: +264 81 143 4070



# Prepared By



## *Risk-Based Solutions (RBS) CC*

**The Consulting Arm of Foresight Group Namibia (PTY) LTD**  
**Our Investments and Consultancy Portfolio / Specialisation:**

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- 

Maerua Mall, Unit 0149A, 4<sup>th</sup> Floor Maerua Park  
Cnr Jan Jonker Road & Centaurus Street  
**WINDHOEK NAMIBIA**

P.O. Box 1839  
**WINDHOEK**  
**NAMIBIA**

**Cell:** +264 - (0) 811413229 /81277-2546

**Tel:** +264-61- 306058

**Fax:** +264-61-306059 / 61-256830

**Email:** [frontdesk@rbs.com.na](mailto:frontdesk@rbs.com.na) or [smwiya@rbs.com.na](mailto:smwiya@rbs.com.na)

Global Office [URL:http://www.rbs.com.na](http://www.rbs.com.na)

**Foresight Group Namibia (FGN) (PTY) LTD – *Perfecting the Future***  
**Risk-Based Solutions (RBS) – *Delivering the Solutions***

# Summary Profile and Qualification of the Environmental Assessment Practitioner (EAP) – Dr. Sindila Mwiya

Dr. Sindila Mwiya has more than sixteen (16) years of direct field-based technical knowledge and experience in **Onshore and Offshore Resources (Minerals , Oil and Gas exploration and production support, Health, Safety and Environment (HSE) permitting for Geophysical Surveys such as 2D and 3D Seismic and Gravity Surveys support, through to engineering planning, layout, designing, logistical support, utilisation, production / operations, compliance monitoring, rehabilitation, closure and aftercare stages), Energy (Renewable and Non-renewable Energy sources), Environmental Assessment (SEA, EIA, EMP, EMS) and Exclusive high-end Smart Automated Property Development** portfolios. Through his companies, Risk-Based Solutions (RBS) and Foresight Group Namibia (FGN) (PTY) LTD, which he founded, he has undertaken more than 200 projects for local, regional (SADC) and international client. He continue to work for global reputable resources (petroleum and mining / minerals) and energy companies such as Shell Namibia B. V. (Namibia/ the Netherlands), Tullow Oil (UK), Desert Lion (Canada/ Australia), Petrobras Oil and Gas (Brazil) / BP (UK), REPSOL (Spain), ACREP (Namibia/Angola), Preview Energy Resources (UK), HRT Africa (Brazil / USA), Chariot Oil and Gas Exploration (UK), Serica Energy (UK), Eco (Atlantic) Oil and Gas (Canada / USA), ION GeoVentures (USA), PGS UK Exploration (UK), TGS-NOPEC (UK), Maurel & Prom (France), GeoPartners (UK), PetroSA Equatorial Guinea (South Africa / Equatorial Guinea), Preview Energy Resources (Namibia / UK), Sintezneftegaz Namibia LTD (Russia), INA Namibia (INA INDUSTRIJA NAFTE d.d) (Croatia), Debmarine (Namibia), Namibia Underwater Technologies (NUTAM) (Namibia), InnoSun Holding (PTY) LTD (Namibia / France) and OLC Northern Sun Energy (Pty) Ltd (Namibia).

Dr. Sindila Mwiya is highly qualified with extensive technical knowledge and experience in petroleum, mining, renewable energy (Solar, Wind, Biomass, Geothermal and Hydropower), Non-Renewable energy (Coal, Oil, Gas, Wood, Charcoal), applied environmental assessment, management and monitoring (Scoping, EIA, EMP, EMP, EMS), Exclusive Smart Automated Property Development and overall industry specific HSE, cleaner production programmes, geoenvironmental, geological and geotechnical engineering specialist fields. Dr. Sindila Mwiya has undertaken and continue to undertake and manage high value projects on behalf of our global and local clients. Currently, (2017-2019), Dr. Sindila Mwiya is responsible for permitting, technical operational support through to projects completion and closure compliance monitoring for four (4) major upstream petroleum, several minerals exploration and mining operations for more than ten (10) of our global clients operating in Namibia and other parts of the World. Within the Exclusive Smart Automated Property Development portfolio, Dr. Mwiya, through his company FGN is developing the exclusive mixed use 16 Ha private waterfront named Mwale Mwiya Park, situated in Katima Mulilo Central Business District (CBD), Zambezi Region Namibia. He continue to worked as an Environmental Assessment Practitioner (EAP), Technical Consultant (RBS / FGN), Project Manager and has worked as a Lecturer (University of Namibia- UNAM), External Examiner/ Moderator (Namibia University of Science and Technology-NUST), National (Namibia) Technical Advisor (Department of Environmental Affairs, Ministry of Environment and Tourism / DANIDA – Cleaner Production Component) and Chief Geologist for Engineering and Environment Division and a Field-Based Geotechnician (Magnetics, Seismic, Gravity and Electromagnetics Exploration and Survey Methods) for Geophysics Division, Geological Survey of Namibia, Ministry of Mines and Energy.

He has supervised and continue to support a number of MScs and PhDs research programmes and has been a reviewer on international, national and regional researches, plans, programmes and projects with the objective to ensure substantial local skills development pivotal to the national socioeconomic development through the promotion of sustainable natural resources coexistence developmental approaches, utilisation, management and for development policies, plans, programmes and projects financed by governments, private investors and donor organisations. Since 2006, he has provided extensive technical support to the Department of Environmental Affairs (DEA), Ministry of Environment and Tourism (MET) through GIZ and continue to play a significant role in the amendments of the Namibian Environmental Management Act, 2007, (Act No. 7 of 2007), preparation of new Strategic Environmental Assessment (SEA) Regulations, preparation of the updated Environmental Impact Assessment (EIA) Regulations as well as the preparation of the new SEA and EIA Guidelines and Procedures all aimed at promoting effective environmental management practices. Among his academic achievements, Dr Sindila Mwiya is a holder of a PhD (Geoenvironmental Engineering and Artificial Intelligence) – Research Thesis: Development of a Knowledge-Based System Methodology (KBSM) for the Design of Solid Waste Disposal Sites in Arid and Semiarid Environments (Namibia)), MPhil/PG Cert and BEng (Hons) (Engineering Geology and Geotechnics), qualifications from the University of Portsmouth, School of Earth and Environmental Sciences, United Kingdom. During the 2004 Namibia National Science Awards, organised by the Namibian Ministry of Education, and held in Windhoek, Dr. Sindila Mwiya was awarded the Geologist of the Year for 2004, in the professional category. Furthermore, as part of his professional career recognition, Dr. Sindila Mwiya is a life member of the Geological Society of Namibia, Consulting member of the Hydrogeological Society of Namibia and a Professional Engineer registered with the Engineering Council of Namibia.

**WINDHOEK, MAY 2018**

# CONTENT LIST

<b>NON TECHNICAL SUMMARY</b> .....	<b>VIII</b>
<b>1. BACKGROUND</b> .....	<b>- 1 -</b>
1.1 INTRODUCTION.....	- 1 -
1.2 REGULATORY REQUIREMENTS.....	- 1 -
1.3 LOCATION, SITE DESCRIPTION, LAND USE AND INFRASTRUCTURE .....	- 3 -
1.3.1 <i>Location and Site Description</i> .....	- 3 -
1.3.2 <i>Current Land Uses</i> .....	- 3 -
1.3.3 <i>Supporting Infrastructure and Services</i> .....	- 3 -
1.4 PROJECT MOTIVATION .....	- 7 -
1.5 ASSUMPTIONS AND LIMITATIONS .....	- 7 -
1.6 STRUCTURE OF THE REPORT.....	- 7 -
<b>2. DESCRIPTION OF THE EXPLORATION</b> .....	<b>- 9 -</b>
2.1 GENERAL OVERVIEW.....	- 9 -
2.2 DETAILED EXPLORATION ACTIVITIES .....	- 9 -
2.3 PREFEASIBILITY AND FEASIBILITY STUDY.....	- 10 -
2.4 SUMMARY TERMS OF REFERENCE POSSIBLE MINING ECC .....	- 10 -
<b>3. REGULATORY FRAMEWORK</b> .....	<b>- 12 -</b>
3.1 MINERALS EXPLORATION LEGISLATION AND REGULATIONS .....	- 12 -
3.2 ENVIRONMENTAL REGULATIONS .....	- 12 -
3.2.1 <i>Environmental Assessment Requirements and Procedures</i> .....	- 12 -
3.2.2 <i>Competent Authorities</i> .....	- 12 -
3.2.3 <i>Other Regulatory Permits</i> .....	- 13 -
3.3 RECOMMENDATIONS ON PERMITTING REQUIREMENTS .....	- 13 -
<b>4. SUMMARY OF NATURAL ENVIRONMENT</b> .....	<b>- 14 -</b>
4.1 PHYSICAL GEOGRAPHY AND VISUAL IMPACTS.....	- 14 -
4.2 CLIMATE COMPONENTS.....	- 14 -
4.2.1 <i>Local Precipitation</i> .....	- 14 -
4.2.2 <i>Temperature</i> .....	- 14 -
4.2.3 <i>Wind Patterns</i> .....	- 14 -
4.3 FAUNA AND FLORA DIVERSITY .....	- 18 -
4.3.1 <i>Overview</i> .....	- 18 -
4.3.2 <i>Summary of the Fauna Diversity</i> .....	- 18 -
4.3.2.1 Reptiles.....	- 18 -
4.3.2.2 Amphibians.....	- 18 -
4.3.2.3 Mammals .....	- 19 -
4.3.2.4 Birds .....	- 19 -
4.3.3 <i>Summary of the Flora Diversity</i> .....	- 19 -
4.3.3.1 Trees/shrubs and Grasses .....	- 19 -
4.3.3.2 Aloes.....	- 19 -
4.3.3.3 Commiphora .....	- 19 -
4.3.3.4 Lithops.....	- 20 -
4.3.3.5 Ferns .....	- 20 -
4.3.3.6 Lichens .....	- 20 -
4.3.3.7 Other species .....	- 20 -
4.3.4 <i>Ecosystems and Important Areas</i> .....	- 20 -
4.3.4.1 Ephemeral River Channels and Pans.....	- 20 -
4.3.4.2 Ephemeral Drainage lines .....	- 21 -
4.3.5 <i>Fauna and Flora Conclusions</i> .....	- 21 -
4.4 SUMMARY OF THE SOCIOECONOMIC SETTINGS .....	- 22 -
4.4.1 <i>Overview</i> .....	- 22 -
4.4.2 <i>Socioeconomic Summary</i> .....	- 22 -
4.5 GROUND COMPONENTS .....	- 24 -
4.5.1 <i>Regional and Local Geology</i> .....	- 24 -
4.5.2 <i>Groundwater Resources</i> .....	- 26 -
4.5.3 <i>Evaluation of Water Vulnerability</i> .....	- 32 -
4.5.4 <i>Recommendations on Water Resources Protection</i> .....	- 34 -

<b>5. IMPACT ASSESSMENT AND RESULTS</b> .....	<b>35 -</b>
5.1 IMPACT ASSESSMENT PROCEDURE .....	- 35 -
5.2 APPROACH, ALTERNATIVES, KEY ISSUES AND METHODOLOGY .....	- 35 -
5.2.1 <i>Terms of Reference (ToR) and Approach</i> .....	- 35 -
5.2.2 <i>Alternatives and Ecosystem Assessments</i> .....	- 36 -
5.3 KEY ISSUES CONSIDERED IN THE ASSESSMENT PROCESS.....	- 38 -
5.3.1 <i>Sources of Impacts (Proposed / Ongoing Project Activities)</i> .....	- 38 -
5.3.2 <i>Likely Environmental Impacts</i> .....	- 39 -
5.4 IMPACT ASSESSMENT METHODOLOGY .....	- 39 -
5.4.1 <i>Impact Definition</i> .....	- 39 -
5.4.2 <i>Sensitivity of Receptors</i> .....	- 41 -
5.4.3 <i>Likelihood (Probability) of Occurrence</i> .....	- 43 -
5.4.4 <i>Project Activities Summary of Impacts Results</i> .....	- 43 -
5.5 EVALUATION OF SIGNIFICANT IMPACTS.....	- 60 -
5.5.1 <i>Overview</i> .....	- 60 -
5.5.2 <i>Significance Criteria</i> .....	- 60 -
5.5.3 <i>Assessment Likely Significant Impacts</i> .....	- 60 -
5.6 ASSESSMENT OF OVERALL IMPACTS .....	- 66 -
5.6.1 <i>Summary of the Results of the Impact Assessment</i> .....	- 66 -
<b>6. THE EMP</b> .....	<b>67 -</b>
6.1 SUMMARY OF THE EMP OBJECTIVES .....	- 67 -
6.2 IMPLEMENTATION OF THE EMP .....	- 67 -
6.2.1 <i>Roles and Responsibilities</i> .....	- 67 -
6.2.2 <i>Proponent’s Representative (PR) / Project Manager (PM)</i> .....	- 67 -
6.2.3 <i>Project Health, Safety and Environment (Project HSE)</i> .....	- 68 -
6.2.4 <i>Contractors and Subcontractors</i> .....	- 68 -
6.3 SPECIFIC MITIGATION MEASURES .....	- 69 -
6.3.1 <i>Hierarchy of Mitigation Measures Implementation</i> .....	- 69 -
6.3.2 <i>Mitigation Measures Implementation</i> .....	- 69 -
6.4 MONITORING OF THE ENVIRONMENTAL PERFORMANCE .....	- 86 -
6.4.1 <i>Overview</i> .....	- 86 -
<b>7. CONCLUSION AND RECOMMENDATION</b> .....	<b>87 -</b>
7.1 CONCLUSIONS .....	- 87 -
7.2 RECOMMENDATIONS .....	- 87 -
7.3 SUMMARY TOR FOR TEST MINING AND MINING STAGES .....	- 89 -
<b>8. BIBLIOGRAPHY / REFERENCES</b> .....	<b>90 -</b>
<b>9. ANNEXES</b> .....	<b>95 -</b>

# LIST OF FIGURES

Figure 1.1:	Copy of the expired Environmental Clearance Certificate (ECC) issued on 9 <sup>th</sup> October 2012.....	2 -
Figure 1.2:	Regional location of the EPL 4655 .....	4 -
Figure 1.3:	Detailed regional location of the EPL 4655.....	5 -
Figure 1.4:	Location of the EPL 4655, roads and farms names.....	6 -
Figure 4.1:	Landscape of the EPL 4655 area .....	15 -
Figure 4.2:	Comparative climatic data - mean monthly and annual rainfall and evaporation for Mariental.....	16 -
Figure 4.3:	Comparative climatic data sets - mean monthly and annual rainfall and evaporation for Keetmanshoop .....	16 -
Figure 4.4:	Comparative climatic data sets - mean monthly and annual rainfall and evaporation for Gobabis .....	17 -
Figure 4.5:	Comparative climatic data sets - Average wind speed at Mariental, Keetmanshoop and Gobabis. ....	17 -
Figure 4.6	Comparative climatic data sets - Wind direction and speed for Mariental, Keetmanshoop and Gobabis weather stations .....	18 -
Figure 4.7:	A general representation of the stratigraphic column .....	25 -
Figure 4.8	EPL 4655 with respect to the key river catchments (Auob, Olifants and Nossob) forming part of the Stampriet Artesian Basin (SAB) groundwater protection zone (Source: JICA, 2002) and insert showing the extent of the SAB into Botswana and South Africa.....	27 -
Figure 4.9	Regional Hydrogeology of the EPL 4655 .....	28 -
Figure 4.10:	Geology and hydrogeological setting of the Stampriet Artesian Basin (SAB).....	30 -
Figure 4.11:	Water quality, geology and hydrogeological setting of the Stampriet Artesian Basin (SAB).....	31 -
Figure 4.12:	Regional groundwater vulnerability around the EPL 4655.....	34 -

# LIST OF TABLES

Table 3.1:	Government agencies regulating environmental protection in Namibia.....	12 -
Table 3.2:	R553 Regional Standards for Industrial Effluent, in Government Gazette No 217 dated 5 April 1962. ....	13 -
Table 4.1:	Summary of the geology and hydrogeological setting of the Stampriet Artesian Basin (SAB) (Source: International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation. ....	29 -
Table 4.2:	Regional groundwater vulnerability within the Stampriet Artesian Basin (SAB) (Source: International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation.....	33 -
Table 5.1:	Summary of the proposed / ongoing activities, alternatives and key issues considered during the Environmental monitoring and assessment (EA) process.....	36 -
Table 5.2:	Definition of impact categories used in this report. ....	40 -
Table 5.3:	Definitions used for determining the sensitivity of receptors.....	42 -
Table 5.4:	Scored on a scale from 0 to 5 for impact magnitude.....	42 -
Table 5.5:	Scored time period (duration) over which the impact is expected to last ....	42 -
Table 5.6:	Scored geographical extent of the induced change.....	42 -

Table 5.7:	Summary of the qualitative scale of probability categories (in increasing order of likelihood).....	- 43 -
Table 5.8:	Results of the scored on a scale from 0 to 5 for negative impact magnitude.....	- 44 -
Table 5.9:	Results of the scored time period over which the impact is expected to last.....	- 48 -
Table 5.10:	Results of the scored geographical extent of the induced change. ....	- 52 -
Table 5.11:	Results of the qualitative scale of probability occurrence. ....	- 56 -
Table 5.12:	Scored impact significance criteria.....	- 60 -
Table 5.13:	Significant impact assessment matrix for the proposed / ongoing exploration activities. ....	- 62 -
Table 6.1:	Project planning and implementation. ....	- 71 -
Table 6.2:	Implementation of the EMP. ....	- 71 -
Table 6.3:	Public and stakeholders relations.....	- 72 -
Table 6.4:	Measures to enhance positive socioeconomic impacts. ....	- 72 -
Table 6.5:	Environmental awareness briefing and training.....	- 73 -
Table 6.6:	Erection of supporting exploration infrastructure. ....	- 73 -
Table 6.7:	Use of existing access roads, tracks and general vehicle movements. ....	- 74 -
Table 6.8:	Mitigation measures for preventing flora and ecosystem destruction and promotion of conservation. ....	- 75 -
Table 6.9:	Mitigation measures for preventing faunal and ecosystem destruction and promotion of conservation. ....	- 76 -
Table 6.10:	Mitigation measures to be implemented with respect to the exploration camps and exploration sites. ....	- 77 -
Table 6.11:	Mitigation measures for surface and groundwater protection as well as general water usage.....	- 78 -
Table 6.12:	Mitigation measures to minimise negative socioeconomic impacts.....	- 79 -
Table 6.13:	Mitigation measures to minimise health and safety impacts.....	- 80 -
Table 6.14:	Mitigation measures to minimise visual impacts.....	- 81 -
Table 6.15:	Mitigation measures to minimise vibration, noise and air quality. ....	- 82 -
Table 6.16:	Mitigation measures for waste (solid and liquid) management. ....	- 83 -
Table 6.17:	Rehabilitation plan.....	- 84 -
Table 6.18:	Environmental data collection.....	- 85 -

# NON TECHNICAL SUMMARY

Headspring Investments (Pty) Ltd (the Proponent) holds mineral rights under the Exclusive Prospecting Licence (EPL) No. 4655 covering a total area of 99902.5709 Ha. The license area is situated in Gobabis / Mariental Districts in Omaheke / Hardap Regions, south Eastern Namibia. The EPL No. 4655 was granted on the 15/08/2011 and will expire on the 14/08/2018. The proponent intends to continue with prospecting for base and rare metals and nuclear fuels with special focus on using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling.

This updated Scoping and EMP report has been prepared based on the previous Scoping and EMP Report that was completed in 2012 as well as the Environmental Monitoring activities that have been undertaken since 2012 in order to support the application for the renewal of the ECC that was issued on the 9<sup>th</sup> October 2012.

The license area falls within the well-established private commercial farmland and communal community of Leonardville settlement. The overall landscape is dominated by topographically low laying areas of the Kalahari Desert longitudinal landforms incised by a number of major and minor Ephemeral Rivers linked to the Nossob and Olifants Ephemeral River Systems. The land uses in these areas are mainly dominated by agriculture (cattle, small stock and slowly growing wildlife farming) and tourism operations including lodges and campsites.

The EPL area is dominated by sedimentary rocks of the Karoo and post-Karoo rocks and dykes which have been deposited on a mostly Damaran-age Precambrian basement rocks consisting mainly of metasediments like mica schist, phyllite, carbonate (marble, dolomite, or limestone). Surficial geology comprises Kalahari Sands, calcretes, sand, gravel as well as silty, salty clay soils within the targeted pan areas. The EPL area falls within the Stampriet Artesian Basin (SAB), a groundwater protection zone under the management of the Department of Water Affairs in the Ministry of Agriculture, Water and Forestry (MAWF). Good quality groundwater resources in the area is associated with the primary (sandstones) and secondary hydraulic properties of the local country rocks with localised poor groundwater quality horizons zones in some places. The drilling operations could result in mixing of the poor and good quality water horizons. Due to the location of the EPL area within the SAB, the proponent is required to apply for a drilling permit from the Department of Water Affairs (DWA). It's highly likely that the DWA may request that all boreholes drilled within the EPL area shall have casing installed in order to minimise the risk of mixing the good and poor quality groundwater horizons.

The general area of the EPL 4655 does not fall within a pristine area, but rather an area with numerous anthropomorphic influences – e.g. long term farming activities and associated infrastructures, power lines, roads and tracks, etc.

It is estimated that at least 63 species of reptile, 9 amphibian, 62 mammal, 141 bird species (breeding residents), at least 52 species of larger trees and shrubs (>1m) and at least 64 species of grasses occur in the general/immediate area of which a moderate proportion are endemics (e.g. 41.3% of reptiles). Although many endemic species are known to occur from the general area, it is currently not clear if any of these are associated with the existing EPL area or how exactly they will be affected by such activities.

The area is viewed as important for its reptile diversity, especially tortoises (*Stigmochelys pardalis*, *Psammobates oculiferus*, *Psammobates tentorius verroxii*). The giant bullfrog (*Pyxicephalus adspersus*) with population trends decreasing is viewed as the most important amphibian potentially associated with the ephemeral pans in the area.

Mammals classified as rare (*Cistugo seabrae*, *Zeltomys woosnami*, *Felis nigripes*) under Namibian legislation and vulnerable (*Smutsia temminckii* *Acinonyx jubatus*, *Panthera pardus*, *Felis nigripes*) and near threatened (*Eidolon helvum*, *Hyaena brunnea*) by the IUCN (2017) are viewed as the most important although they do not necessarily occur in the area throughout the year, but rather pass through occasionally dependent on environmental conditions, etc.

The ground nesting Ludwig's and kori bustards, vultures and eagles, which are known to breed in the general area, are viewed as the most important species potentially affected by exploration activities, although to what extent they occur in the general area is currently unknown. Species most likely to be adversely affected by exploration would be the variety of reptiles and ground nesting birds specifically associated with this area. However, none of the important species are expected to be exclusively associated with the area.

It is estimated that at least 52 species of larger trees and shrubs (>1m) and at least 64 grasses occur in the general area. If herbs and "lower" plants (e.g. algae, lichens, etc.) were to be included, this would undoubtedly increase the floral composition of the area tremendously. The most important species is the endemic – *Tetragonia schenckii*. Although, the focus of the desktop study was limited to the bigger and thus more obvious species of trees, shrubs and grasses, the importance other species such as *Aloe* spp., lichens, ferns, *Lithops*, etc. is also acknowledged.

All human induced activities including the proposed exploration activities, agriculture and tourism operations all have potential negative environmental consequences, but identifying the most important fauna and flora species including high risk habitats beforehand, coupled with environmentally acceptable recommendations (mitigating factors), lessens the overall impact of such activities. Once specific targets have been identified from the initial drilling activities and it's decided that more detailed work leading to prefeasibility and feasibility studies are needed, a site-specific fieldwork to determine the actual fauna and flora species likely to be affected on the targeted site/s is highly recommended.

The proposed exploration activities within the EPL 4655 area will not adversely affect any unique vertebrate fauna and flora, especially if the proposed recommendations (mitigation measures) presented in the EMP section of this report are incorporated.

**Based on the environmental monitoring undertaken for the period under review (2012 - 2018) and the overall findings of this updated Environmental Scoping and Environmental Management Assessment (EMP) report, it's hereby recommended that the proposed / ongoing exploration activities be issued with new Environmental Clearance Certificate (ECC).** Following the granting of the renewed ECC, the proponent shall take into consideration the following key recommendations:

- (i) The Proponent shall adhere to all the provisions of the EMP and conditions of the Access Agreement between the proponent and the land owner/s in line with all applicable national regulations;
- (ii) Before entering any private property such as a private farm, the proponent must give advance notices and obtain permission to access the EPL area at all times;
- (iii) The EPL area falls within the Stampriet Artesian Basin (SAB), a groundwater protection zone. The proponent shall contact the Department of Water Affairs (DWA) in the Ministry of Agriculture, Water and Forestry (MAWF) with respect to the application for drilling permit and ascertain the drilling requirements including the need for casing installations during the drilling process, and;



- (iv) Where possible, and if water is found during the drilling process, the proponent shall support other land uses in the area in terms of access to freshwater supply for both human consumption, wildlife and agricultural support as may be requested by the local community / land owner/s. The abstraction of the groundwater resources shall include water levels monitoring, sampling and quality testing on a bi-annual basis, and that the affected landowners shall have access to the results of the water monitoring analyses as part of the ongoing stakeholder disclosure requirements on shared water resources as maybe applicable.

Once a viable project has been defined (economic minerals deposits are discovered), a separate field-based and site-specific Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports shall be prepared as part of the prefeasibility and feasibility studies. The site-specific EIA and EMP shall cover the area identified to have potential economic minerals resources and all the supporting infrastructures.

In addition to the Terms of Reference (ToR) to be developed during the Environmental Scoping study phase for field-based EIA and EMP, the following field-based and site-specific specialist studies shall be undertaken:

- (i) Groundwater studies including modelling as maybe applicable;
- (ii) Field-based flora and fauna diversity;
- (iii) Dusty, noise and sound modelling linked to engineering studies;
- (iv) Socioeconomic assessment, and;
- (v) Others as may be identified / recommended by the stakeholders/ land owners/ Environmental Commissioner or specialists.

# 1. BACKGROUND

## 1.1 Introduction

Headspring Investments (Pty) Ltd (**the Proponent**) holds mineral rights under the Exclusive Prospecting Licence (EPL) No. 4655 covering a total area of 99902.5709 Ha.

The EPL No. 4655 was granted on the 15/08/2011 and will expire on the 14/08/2018 (Annex 1).

The Proponent intends to continue with prospecting for base and rare metals and nuclear fuels with special focus on using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling.

## 1.2 Regulatory Requirements

The proposed prospecting activities are listed in the Environmental Impact Assessment (EIA) Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007) and cannot be undertaken without an Environmental Clearance Certificate (ECC). The Proponent is required to have a valid ECC for the ongoing exploration activities.

In fulfilment of the environmental requirements, the Proponent appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant and led by Dr. Sindila Mwiya as the Environmental Assessment Practitioner (EAP) (Annex 2).

This updated Scoping and EMP report has been prepared based on the previous Scoping and EMP Report that was completed in 2012 as well as the Environmental Monitoring activities that have been undertaken since 2012 in order to support the application for the renewal of the ECC that was issued on the 9<sup>th</sup> October 2012 (Fig. 1.1 and Annex 3).



## REPUBLIC OF NAMIBIA

### MINISTRY OF ENVIRONMENT AND TOURISM

Tel: +264 61 2842701  
Fax: +264 61 240339  
Enquiry: Ms. Saima Angula

Capital Centre, 6<sup>th</sup> Floor  
Private Bag 13306  
Windhoek

#### OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Director  
Headspring Investments (Pty) Ltd  
P.O. Box 318  
Windhoek

Dear Sir or Madam

**SUBJECT: ENVIRONMENTAL CLEARANCE FOR THE ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED EXPLORATION AND POSSIBLE TEST MINING, EXCLUSIVE PROSPECTING LICENCE 4655, HARDAP REGION, SOUTHERN NAMIBIA**

The Environmental Impact Assessment (EIA) submitted is sufficient as it made an adequate provision of the environmental management during your exploration activities. From this perspective regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout this process.

In view of the fact that your project is located in an environmentally sensitive area, this Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project. From this perspective, we issue this clearance with the following condition: all key stakeholders must be properly consulted and written consent obtained prior to the implementation of the exploration activities.

On the basis of the above, this letter serves as an environmental clearance for the project to proceed. However, this clearance letter does not in anyway hold the Ministry of Environment and Tourism accountable of any wrong doing, for insufficient information, nor any adverse effects that may arise from this project activity. Instead, full accountability rests with the proponent and his/ her consultants.

Yours sincerely,

  
Teofilus Nghitila  
ENVIRONMENTAL COMMISSIONER



All official correspondence must be addressed to the Permanent Secretary

Figure 1.1: Copy of the expired Environmental Clearance Certificate (ECC) issued on 9<sup>th</sup> October 2012.

## **1.3 Location, Site Description, Land Use and Infrastructure**

### **1.3.1 Location and Site Description**

The license area is situated in Gobabis / Mariental Districts in Omaheke / Hardap Regions, south Eastern Namibia (Figs. 1.2 and 1.3). The license area falls within privately owned commercial farmland, as shown in Fig. 1.4.

### **1.3.2 Current Land Uses**

The general land use of the area is dominated by agriculture (cattle and small stock farming) and privately owned tourism supporting establishments. Situated within the scenic Kalahari landscapes, a number of farms in the area operates accommodation facilities that support tourism in the local area and the Omaheke and Hardap Regions.

Game farms and tourism related operated farms are important conservation areas for endemic and protected flora and fauna and act as sanctuaries for endangered species. These farms offer visitors the opportunity to be close to nature with a variety of tailor made tourism products such as landscape viewing, game viewing, trails and hunting activities.

### **1.3.3 Supporting Infrastructure and Services**

The main access roads to the EPL area is accessible through the C23 or C20 with a number of minor roads such as the D1318 and D1775 cutting across the EPL area (Figs. 1.2 and 1.4). Within the EPL area, a number of private farm roads and minor tracks are available for internal access. The nearest settlements is Leonardville situated within the EPL area (Figs. 1.2 and 1.4).

A number of lodges and campsites existing within the general area. Establishment of any form of exploration based camp shall be done with permission of the land owners.

The proposed / ongoing exploration programme will not require major water and energy resources. Water requirements for exploration will be provided from the available local water resources supplied by private boreholes and NamWater local / regional water supply schemes. Electricity needs will be supplied by generators and solar installations while diesel and petrol will be the main sources of fuels and readily available in the surrounding towns and settlements.

In an event of a discovery of economic minerals resources, and the subsequent development of a mining project within the EPL Area, there will be a need to have reliable energy and water supply sources. Sources of the water supply will be provided by NamWater from possible local and regional groundwater resources still to be determined.

Electricity supply will be provided by NamPower from already existing infrastructure in the region also still to be determined. The assessment of the energy and water resources requirements for any possible mining operations will be evaluated in detail in the environmental assessment that will be undertaken as part of the feasibility study if economic resources are discovered within the EPL 4655 Area.

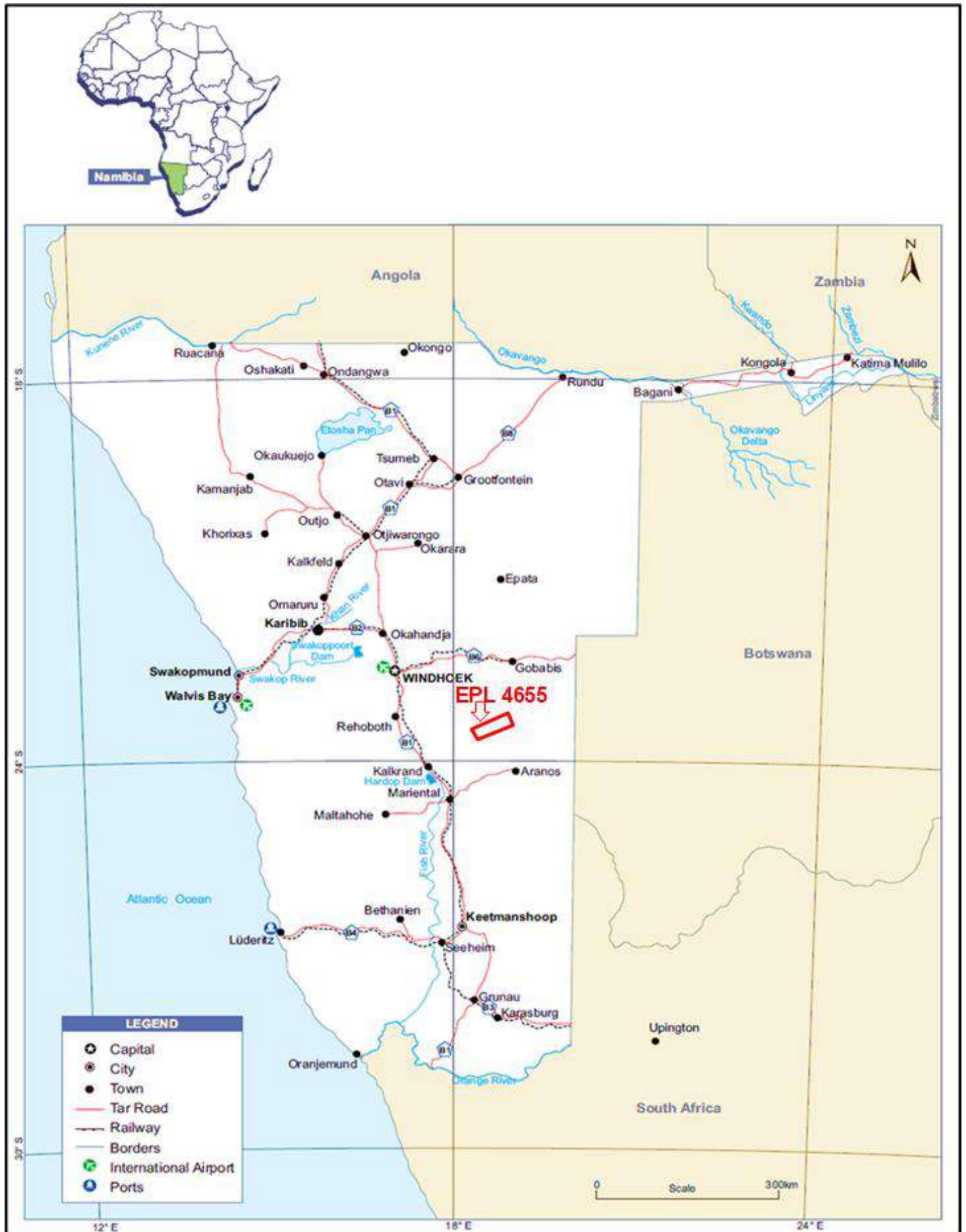


Figure 1.2: Regional location of the EPL 4655 (Source: Risk-Based Solutions, 2015).

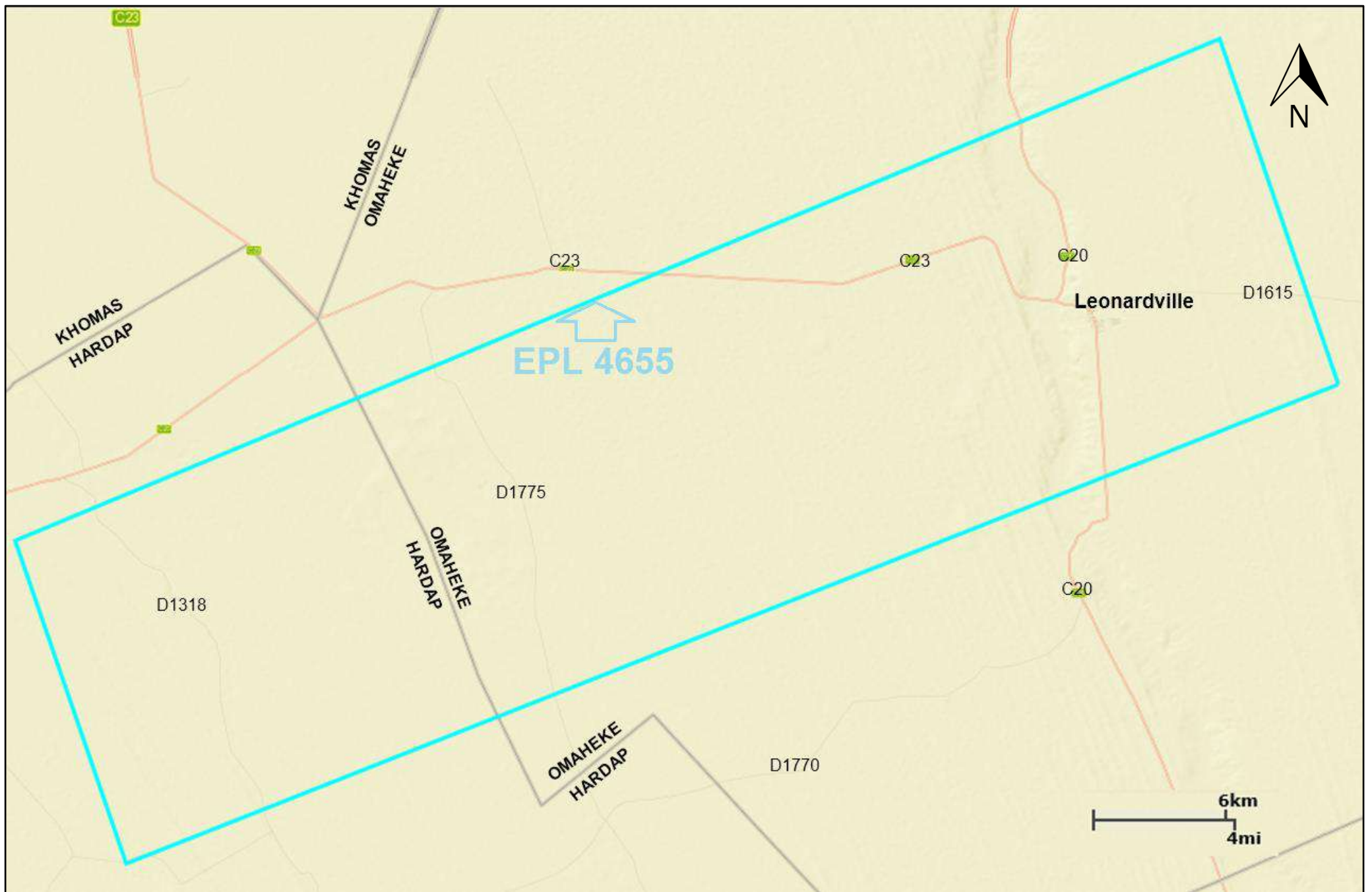


Figure 1.3: Detailed regional location of the EPL 4655 (Source: <http://portals.flexicadastre.com/Namibia>).

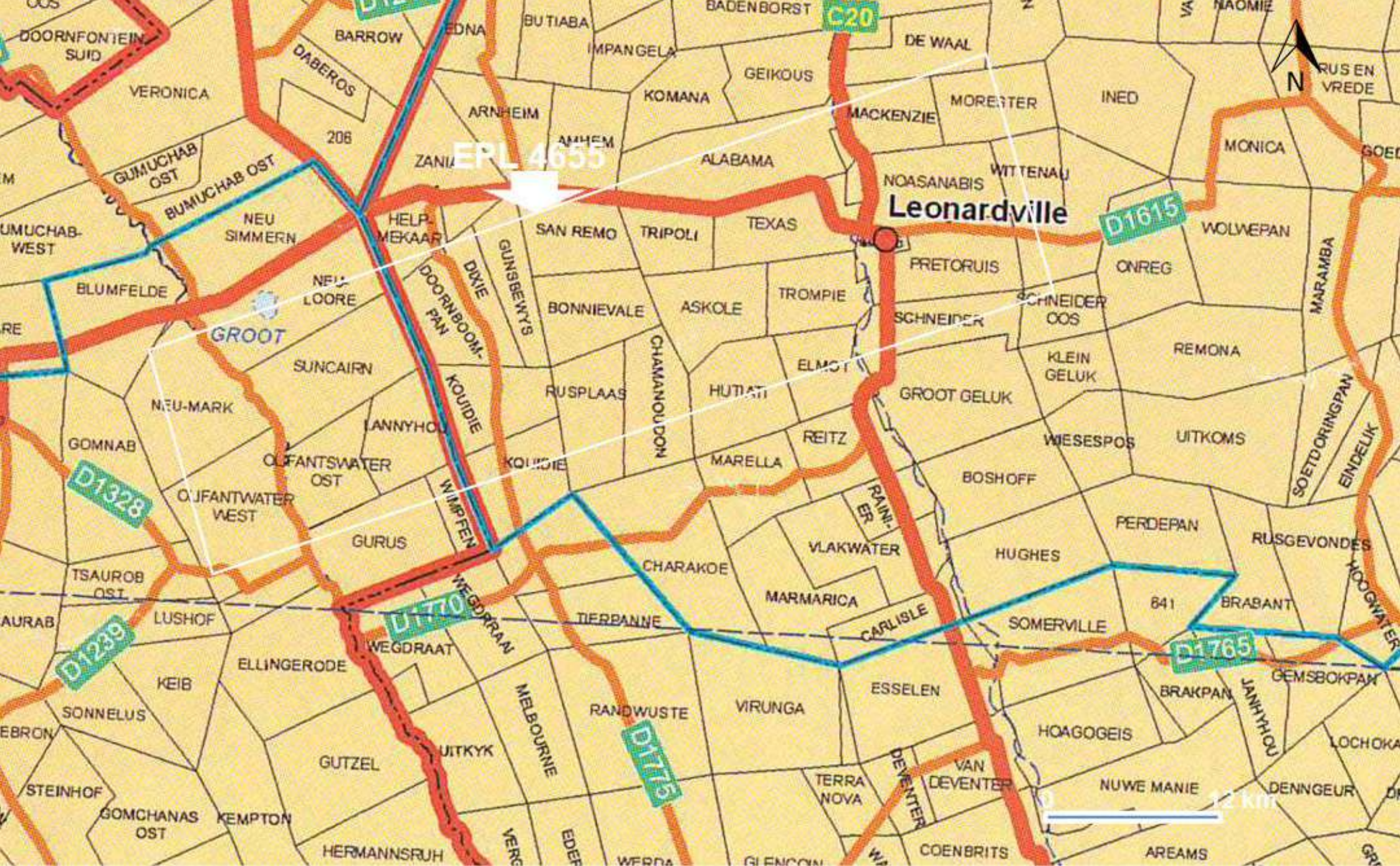


Figure 1.4: Location of the EPL 4655, roads and farms names (Extract 1:1000000 Namibia Division Registration, Surveyor General).

## 1.4 Project Motivation

The EPL 4655 falls within a prospective area for base and rare metals and nuclear fuels linked to the regional and local rocks. Base and rare metals are known to be associated with some of the post Karoo rocks and pegmatites found within the EPL area.

Nuclear fuels minerals derived from the erosion of the local rocks could have resulted in the potential secondary economic mineralisation.

The proposed / ongoing exploration activities has limited socioeconomic benefits which are mainly centred around the payment of the annual license rental fees to the Central Government through the Ministry of Mines and Energy (MME) and value addition to the potential underground minerals resources in the area which otherwise would not have been known if the exploration in the EPL 4655 did not take place.

The potential discovery of economic minerals resources in the area will have much greater and positive socioeconomic benefits to the local and region inhabitants as well as Namibia as a whole.

Additional socioeconomic benefits will also be realised at regional and national levels in terms of capital investments, value addition opportunities, license rental fees, royalty taxes payable to Government, direct and indirect contracts and employment opportunities, export earnings, foreign direct investments and various taxes payable to the Government.

## 1.5 Assumptions and Limitations

The following assumptions and limitations underpin the approach adopted, overall outcomes and recommendations for this Scoping and EMP study:

- ❖ The proposed exploration activities as well as all the plans, maps, EPL Boundary / coordinates and appropriate data sets received from the proponent, project partners, regulators, Competent Authorities and specialist assessments are assumed to be current and valid at the time of conducting the studies and compilation of this environmental report;
- ❖ The impact assessment outcomes, mitigation measures and recommendations provided in this report are valid for the entire duration of the proposed exploration / prospecting activities;
- ❖ A precautionary approach has been adopted in instances where baseline information was insufficient or unavailable or site-specific locations of the proposed project activities is not yet available, and;
- ❖ Mandatory timeframes as provided for in the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) have been observed and will apply to the review and decision of this report by the Competent Authority and the Environmental Commissioner.

## 1.6 Structure of the Report

The following is the summary structure outline of this scoping and EMP report.



1. **Section 1: Background** covering the proposed / ongoing project location with available infrastructure and services;
2. **Section 2: Project Description** covering the summary of the proposed / ongoing project exploration activities;
3. **Section 3: Regulatory Framework** covering the proposed / ongoing exploration with respect to relevant legislation, regulations and permitting requirements;
4. **Section 4: Receiving Environment** covering physical, biological and socioeconomic environments of the proposed / ongoing project area;
5. **Section 5: Impact Assessment** covering the likely positive and negative impacts the proposed / ongoing project activities are likely to have on the receiving environment;
6. **Section 6: Environmental Management Plan (EMP)** describing the detailed mitigation measures with respect to the identified likely impacts;
7. **Section 7: Conclusions and Recommendations-** Summary of the findings and way forward.
8. **Section 8: Annexes**
  1. **Copy of the EPL**
  2. **CV of the EAP (Dr. Sindila Mwiya)**
  3. **Copy of the Expired ECC**

## **2. DESCRIPTION OF THE EXPLORATION**

### **2.1 General Overview**

The overall aim of the proposed / ongoing project activities (exploration / prospecting programme) is to search for potential economic minerals resources within the EPL area. The proponent will be prospecting for base and rare metals and nuclear fuels. The exploration activities to be undertaken as assessed in this environmental assessment (Scoping and Environmental Management Plan (EMP) are as follows:

- (i) Initial desktop exploration activities (no field-work undertaken);
- (ii) Regional reconnaissance field-based mapping and sampling activities (Subject to the positive results of (i));
- (iii) Interpretation of existing aerial data, initial local field-based mapping and sampling activities followed by possible acquisition of new aerial data (radiometrics, magnetics, and gravity (Subject to the positive results of (i) and (ii) above),
- (iv) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling (Subject to the positive results of (i) - (iii) above), and;
- (v) Prefeasibility and feasibility studies (Subject to the positive results of (i) - (iv) above).

The implementation of the above activities (i-v) can take years and 99% of all the exploration projects often fails to produce a viable mining project. The scope of the required field-based support and logistical activities will depend on the scale of proposed exploration activities to be undertaken. The proposed exploration activities will be supported by existing tracks and campsites / farmstead as well as existing accommodation in the area. In the absence of existing tracks, the field team will create such new tracks with the permission of the land owner/s and depending on the scale of exploration. In the absence of existing suitable campsite / farmstead, temporary camp will be set up at suitable locations within the EPL area in line with the strict provisions of the EMP provisions and with the permission of the land owner. The size of the exploration camp will be of very limited footprints during the exploration phase but may be expanded for the test mining and mine development phases in an event of a discovery of economic minerals resources.

### **2.2 Detailed Exploration Activities**

A number of regional reconnaissance field-based mapping and sampling activities as well as initial local field-based mapping and sampling activities have already been undertaken within the EPL area but will still be extended to other parts of the EPL area where potential base and rare metals and nuclear fuels could occur. Other activities to be undertaken as part of the detailed local field-based activities include the following:

- (i) Interpretation of existing aerial data, initial local field-based mapping and sampling activities followed by possible acquisition of new aerial data (radiometrics, magnetics, and gravity);
- (ii) Surface and subsurface geological mapping including boreholes drilling and logging, sampling and laboratory analyses / assessments;

- (iii) Trenching, logging, sampling and laboratory analyses of shallow targets;
- (iv) Baseline studies such as fauna and flora diversity spanning across the seasons in twelve (12) months and hydrogeological assessments including boreholes drilling and possible groundwater modelling, and;
- (v) Logistical support such as access preparation, exploration and camp sites management.

## 2.3 Prefeasibility and Feasibility Study

Prefeasibility and feasibility studies will be implemented on site-specific area (small local area where there will be proof that economic minerals may occur there) and is subject to the positive outcomes of the detailed local field-based exploration activities. The activities to be undertaken as part of the prefeasibility and feasibility will include the following:

- (i) Detailed site-specific surveys (radiometrics, magnetics, and gravity);
- (ii) Detailed geological mapping;
- (iii) Drilling, sampling and laboratory analyses;
- (iv) Bulk sampling and testing;
- (v) Ore reserve calculations;
- (vi) Geotechnical studies for mine design;
- (vii) Detailing technical viability studies including forecasts of estimated expenditure and financial;
- (viii) Mine planning and designs including all supporting infrastructures (water, energy and access);
- (ix) Site-specific field-based Environmental Impact Assessment (EIA) with specialist studies as maybe applicable;
- (x) Site-specific field-based Environmental Management Plan (EMP);
- (xi) Test mining activities, and;
- (xii) Preparation of feasibility report and application for Mining License;

Field-based support and logistical activities will be very extensive because the local field-based activities will be undertaken on a specific area for a very long time (up to one year or more in some instances). The activities will be supported by existing tracks and campsites / lodging facilities available in the area.

## 2.4 Summary Terms of Reference Possible Mining ECC

In an event that economic minerals resources are discovered within the EPL area and could lead to the development of mining project, a new Environmental Clearance Certificate (ECC) for mining will be required. The ECC being supported by the current Scoping and EMP report only covers the exploration phase.

A separate field-based and site-specific Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports supported by specialist studies as maybe applicable must be prepared in order to support the application for a new ECC for mining operations.

The EIA and EMP studies shall form part of the prefeasibility and feasibility study and undertaken during the exploration phase. The site-specific EIA and EMP shall cover the area identified to have potential economic minerals resources as well as all areas to be used for infrastructural support areas such as pit / shaft area/s, waste rock, tailings dump, access, office blocks, water and energy infrastructure support areas (water, energy and road / access). In addition to the Terms of Reference (ToR) to be developed during the Environmental Scoping study phase for the test mining / mining stages, the following field-based and site-specific specialist studies shall be undertaken as part of the EIA and EMP for possible test mining or mining operations in an event of a discovery of economic minerals resources and possible development of a mining project:

- (i) Groundwater studies including modelling as maybe applicable;
- (ii) Field-based flora and fauna diversity;
- (iii) Noise and Sound modelling linked to engineering studies;
- (iv) Socioeconomic assessment, and;
- (v) Others as may be identified / recommended by the stakeholders/ land owners/ Environmental Commissioner or specialists.

The aims and objectives of the mining Environmental Assessment (EA) covering EIA and EMP to be implemented as part of the feasibility study if a variable resources are discovered are:

- (i) To assess all the likely positive and negative short- and long-term impacts on the receiving environment (physical, biological and socioeconomic environments) at local (EPL Area), regional, national (Namibia) and Global levels using appropriate assessment guidelines, methods and techniques covering the complete project lifecycle. The EIA and EMP to be undertaken shall be performed with reasonable skill, care and diligence in accordance with professional standards and practices existing at the date of performance of the assessment and that the guidelines, methods and techniques shall conform to the national regulatory requirements, process and specifications in Namibia and in particular as required by the Ministry of Mines and Energy, Ministry of Environment and Tourism and Ministry of Agriculture, Water Affairs and Forestry, and;
- (ii) The development of appropriate mitigation measures that will enhance the positive impacts and reduce the likely negative influences of the negative impacts identified or anticipated. Such mitigation measures shall be contained in a detailed EMP report covering the entire project lifecycle.

### 3. REGULATORY FRAMEWORK

#### 3.1 Minerals Exploration Legislation and Regulations

The Ministry of Mines and Energy (MME) is the competent authority with respect to minerals prospecting and mining activities in Namibia. The Minerals (Prospecting and Mining) Act (No 33 of 1992) is the most important legal instrument governing minerals prospecting / exploration and mining activities. Several explicit references to the environment and its protection are contained in the Minerals Act, which provides for environmental impact assessments, rehabilitation of prospecting and mining areas and minimising or preventing pollution.

#### 3.2 Environmental Regulations

##### 3.2.1 Environmental Assessment Requirements and Procedures

Environmental Assessment (EA) process in Namibia is governed by the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007). The proposed / ongoing field –based exploration activities falls within the categories of listed activities that cannot be undertaken without an Environmental Clearance.

##### 3.2.2 Competent Authorities

The environmental regulatory authorities responsible for environmental protection and management in relation to the proposed / ongoing project including their role in regulating environmental protection are listed in Table 3.1.

Table 3.1: Government agencies regulating environmental protection in Namibia.

AGENCY	RESPONSIBILITY
Ministry of Environment and Tourism (MET)	Issue of Environmental Clearance Certificate (ECC) based on the review and approval of the Environmental Assessments (EA) reports comprising Environmental Scoping, Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) prepared in accordance with the Environmental Management Act (2007) and the Environmental Impact Assessment Regulations, 2012
Ministry of Mines and Energy (MME)	The competent authority for minerals prospecting and mining activities in Namibia. Issues Exclusive prospecting License (EPL), Mining Licenses (ML) and Mining Claims (license) as well as all other minerals related permits for processing, trading and export of minerals resources
Ministry of Agriculture, Water and Forestry (MAWF)	<p>The Directorate of Resource Management within the Department of Water Affairs (DWA) at the MAWF is currently the lead agency responsible for management of surface and groundwater utilisation through the issuing of abstraction permits and waste water disposal permits. DWA is also the Government agency responsible for water quality monitoring and reporting.</p> <p>The National Botanical Research Institute's (NBRI) mandate is to study the flora and vegetation of Namibia, in order to promote the understanding, conservation and sustainable use of Namibia's plants for the benefit of all. The Directorate of Forestry (DOF) is responsible for issuing of forestry permits with respect to harvest, transport, and export or market forest resources.</p>

### 3.2.3 Other Regulatory Permits

Industrial effluent likely to be generated by the proposed / ongoing minerals exploration activities must comply with provisions of the Government Gazette No 217 dated 5 April 1962 (Table 3.2).

Table 3.2: R553 Regional Standards for Industrial Effluent, in Government Gazette No 217 dated 5 April 1962.

Colour, odour and taste	The effluent shall contain no substance in concentrations capable of producing colour, odour or taste	
pH	Between 5.5 and 9.5	
Dissolved oxygen	At least 75% saturation	
Typical faecal coli	No typical faecal coli per 100 ml	
Temperature	Not to exceed 35 °C	
Chemical demand oxygen	Not to exceed 75 mg/l after applying a correction for chloride in the method	
Oxygen absorbed	Not to exceed 10 mg/l	
Total dissolved solids (TDS)	The TDS shall not have been increased by more than 500 mg/l above that of the intake water	
Suspended solids	Not to exceed 25 mg/l	
Sodium (Na)	The Na level shall not have been increased by more than 50 mg/l above that of the intake water	
Soap, oil and grease	Not to exceed 2.5 mg/l	
Other constituents	Residual chlorine	0,1 mg/l as Cl
	Free & saline ammonia	10 mg/l as N
	Arsenic	0,5 mg/l as As
	Boron	1,0 mg/l as B
	Hexavalent Cr	0,05 mg/l as Cr
	Total chromium	0,5 mg/l as Cr
	Copper	1,0 mg/l as Cu
	Phenolic compounds	0,1 mg/l as phenol
	Lead	1,0 mg/l as Pb
	Cyanide and related compounds	0,5 mg/l as CN
	Sulphides	1,0 mg/l as S
	Fluorine	1,0 mg/l as F
	Zinc	5,0 mg/l as Zn

### 3.3 Recommendations on Permitting Requirements

It is hereby recommended that the developer must follow the provisions of all relevant national regulatory throughout the proposed / ongoing project lifecycle and must obtain the following permits/ authorisations as maybe applicable / required as the proposed project develops:

- (i) Valid Exclusive Prospecting License (EPL) as maybe applicable from Department of Mines in the Ministry of Mines and Energy;
- (ii) Valid Environmental Clearance Certificate (ECC) from the Department of Environmental Affairs in the Ministry of Environment and Tourism (MET);
- (iii) Permission to drill a borehole in protected groundwater zone, fresh water abstraction permits and waste water discharge permits from the Department of Water Affairs in the Ministry of Agriculture, Water and Forestry, and;
- (iv) All other permits as maybe become applicable during the proposed exploration operations.

## **4. SUMMARY OF NATURAL ENVIRONMENT**

### **4.1 Physical Geography and Visual Impacts**

The license area falls within the well-established private commercial farmland. The overall landscape is dominated by topographically low laying areas of the Kalahari Desert longitudinal landforms incised by a number of major and minor Ephemeral River Systems (Fig. 4.1).

### **4.2 Climate Components**

#### **4.2.1 Local Precipitation**

The mean annual rainfall is highly variable and may range between 200 mm - 400 mm in various parts of the PEL Area. The distribution of rainfall within the Nama Basin is extremely seasonal with almost all the rain falling in summer - from November to April with occasional winter rainfall (Figs. 4.2 -4.4). Mean annual gross evaporation is between 3000 mm and 3, 400 mm.

#### **4.2.2 Temperature**

Ambient air temperature is an important parameter in determining pollution plume behaviour, the depth of mixing height, and position of the inversion layer. The mixing layer is the average thickness of the layer within which pollutants are expected to mix with air over a geographical area. The inversion layer is characterised by an increase in temperature with height.

The greater the difference between the emitted pollutant and the ambient air temperature, the resulting plume will have a buoyancy rise. Daytime temperatures range between 35° to 45°C from October to March, the hottest months, and can drop below freezing between June and August. The annual mean temperature is around 32°C with the mean monthly temperatures ranging between 35°C to 23°C throughout the year.

#### **4.2.3 Wind Patterns**

The medium-term (days) and short-term (seconds) wind characteristics are of fundamental importance in determining the area of the ground that can be exposed to emissions of Hazardous Air Pollutants (HAPs) from a source. Based on the regional wind patterns, the dominant wind direction is from the north eastern and southwest quadrants (Figs. 4.5 and 4.6). Locally, the situation may be different due to various influences including topographic effects.



Figure 4.1: Landscape of the EPL 4655 area (Source: [http:// portals. flexicadastre. com / Namibia](http://portals.flexicadastre.com/Namibia)).



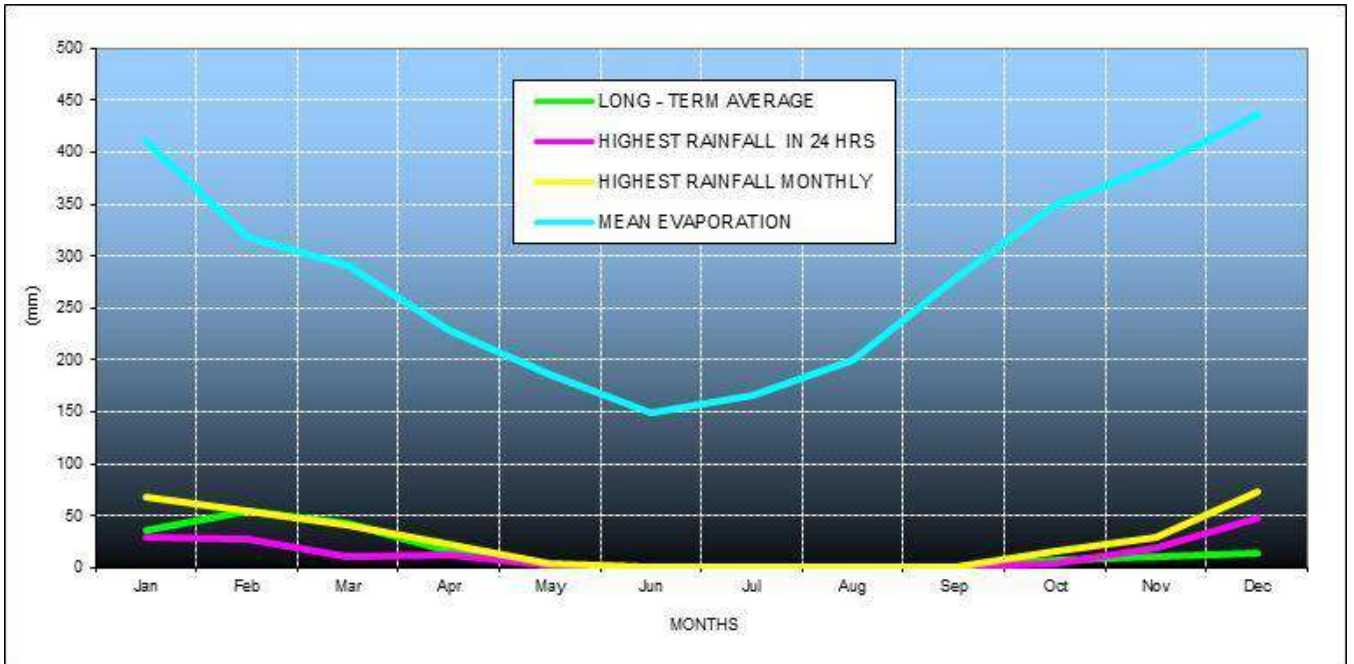


Figure 4.2: Comparative climatic data - mean monthly and annual rainfall and evaporation for Mariental (Data source Metrological Services of Namibia).

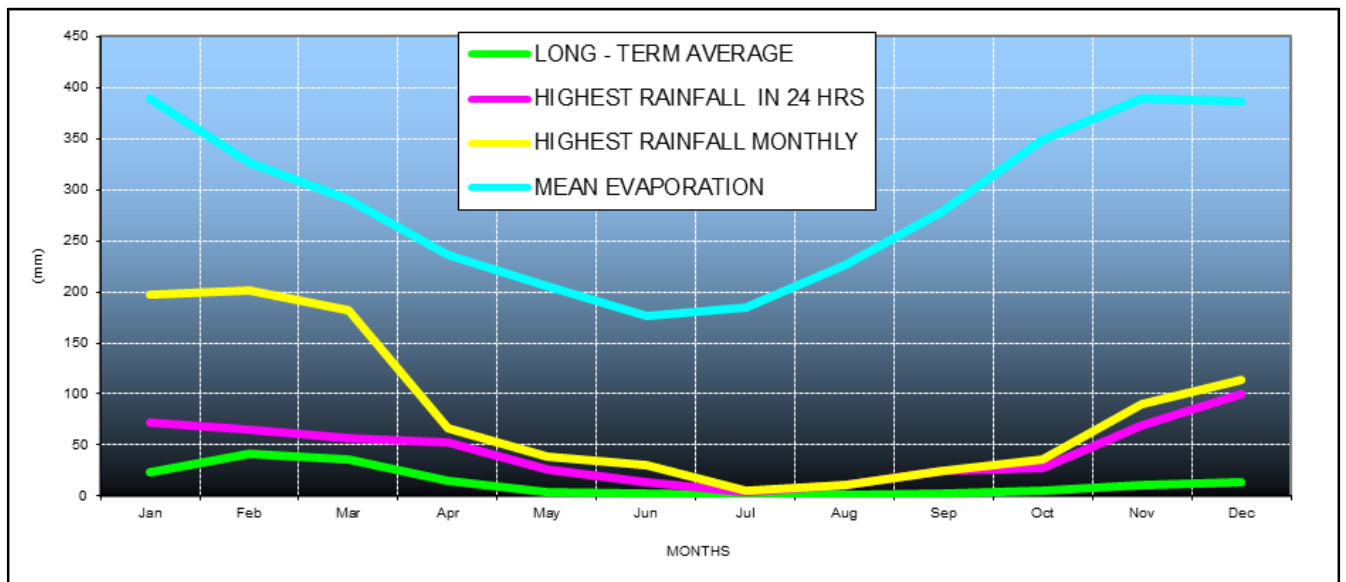


Figure 4.3: Comparative climatic data sets - mean monthly and annual rainfall and evaporation for Keetmanshoop (Data source Metrological Services of Namibia).

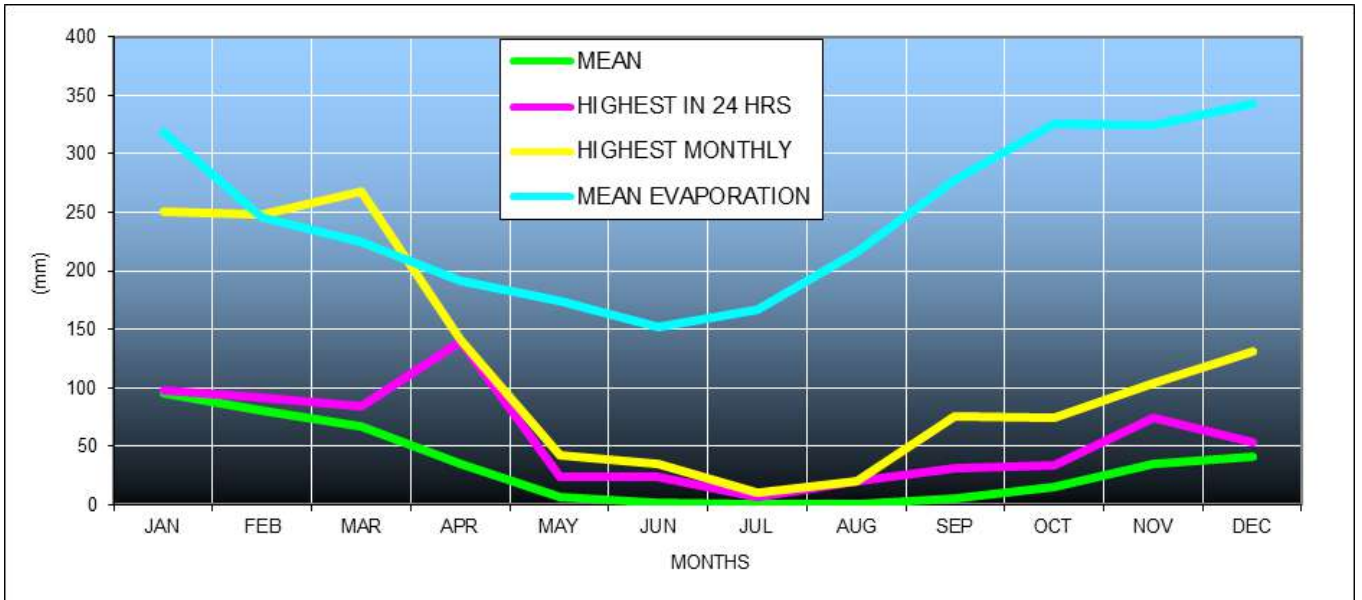


Figure 4.4: Comparative climatic data sets - mean monthly and annual rainfall and evaporation for Gobabis (Data source Metrological Services of Namibia).

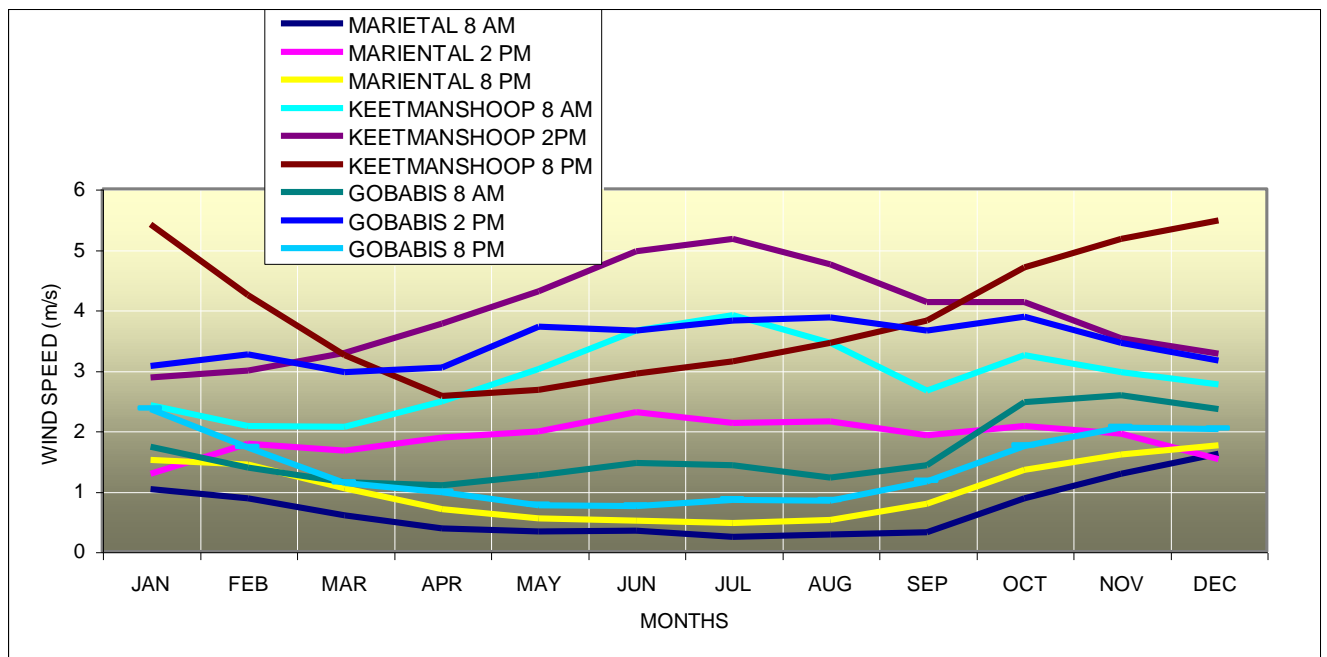


Figure 4.5: Comparative climatic data sets - Average wind speed at Mariental, Keetmanshoop and Gobabis.

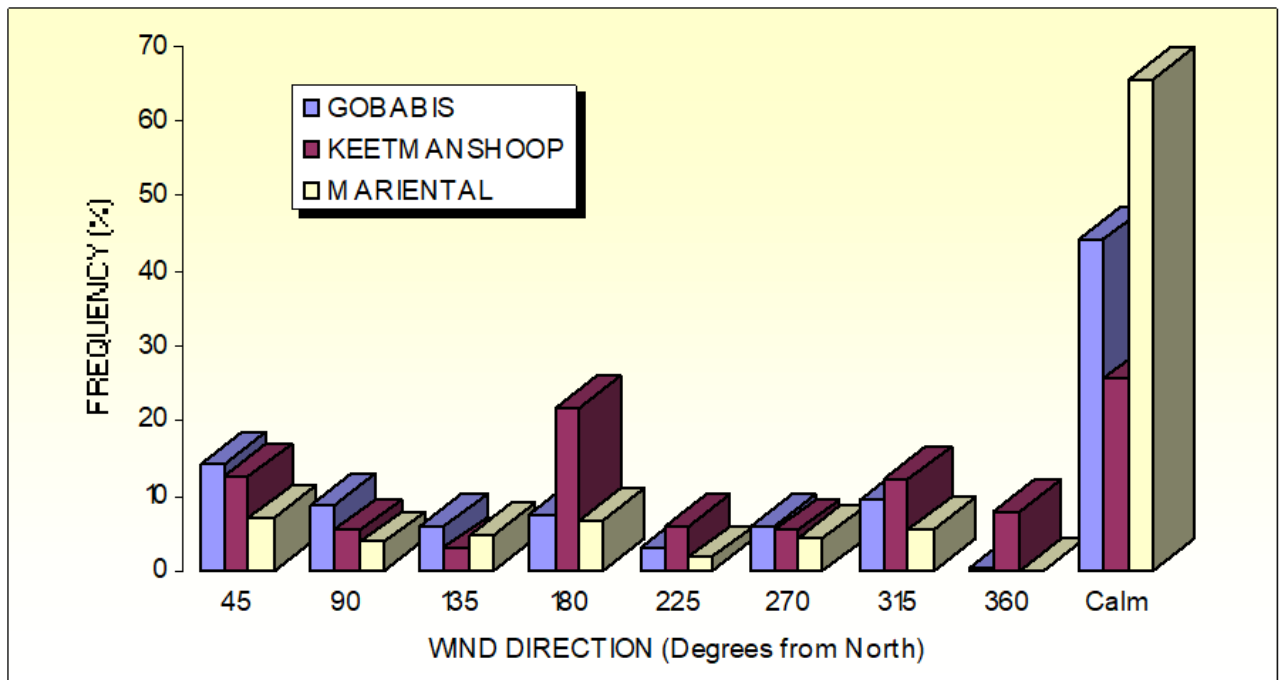


Figure 4.6 Comparative climatic data sets - Wind direction and speed for Mariental, Keetmanshoop and Gobabis weather stations (Data source Metrological Services of Namibia).

## 4.3 Fauna and Flora Diversity

### 4.3.1 Overview

A flora and fauna desktop specialist study was undertaken as part of the process of preparing this Scoping and EMP report. The aim was to determine the actual as well as potential vertebrate fauna and flora associated with the general area commonly referred to as the Dwarf Shrub Savannah (Giess 1971) or on the boundary of the Dwarf Shrub Savannah and the Southern Kalahari (Mendelsohn et al. 2002).

### 4.3.2 Summary of the Fauna Diversity

#### 4.3.2.1 Reptiles

The high percentage of endemic reptile species (41.3%) associated with the general area underscores the importance of this area without formal state protection. The most important reptiles in the area are viewed as those classified as vulnerable and protected game under Namibian legislation – i.e. *Stigmochelys pardalis*, *Psammobates oculiferus*, *Psammobates tentorius verroxii* and *Varanus albigularis*. Tortoises – e.g. *Stigmochelys pardalis*, *Psammobates oculiferus*, *Psammobates tentorius verroxii* – are viewed as the group of reptiles most under threat in Namibia. Tortoises, snakes and monitor lizards are routinely killed for food or as perceived threats.

#### 4.3.2.2 Amphibians

The most important amphibian from the general area is viewed as *Pyxicephalus adspersus* with population trends decreasing (IUCN 2017). With the exception of the ephemeral pans in the immediate area, temporary pools after showers and farm dams and reservoirs, no

permanent surface water exists in the development area. Large numbers of *Pyxicephalus adspersus* are associated with the ephemeral pans throughout the general area after the influx of water. The Nossob and Olifants Ephemeral Rivers often with permanent pools and the Hardap Dam, to the southwest, are the closest suitable all year round amphibian habitat. However, the overall lack of suitable habitat is expected to negatively affect the presence of most amphibians.

#### 4.3.2.3 Mammals

The most important species from the general area are probably all those classified as rare (*Cistugo seabrae*, *Zeltomys woosnami*, *Felis nigripes*) under Namibian legislation and vulnerable (*Smutsia temminckii*, *Acinonyx jubatus*, *Panthera pardus*, *Felis nigripes*) and near threatened (*Eidolon helvum*, *Hyaena brunnea*) by the IUCN (2017). Some species such as cheetah, leopard and brown hyena do not necessarily occur in the area permanently but rather pass through from occasionally dependent on environmental conditions, etc.

#### 4.3.2.4 Birds

Species viewed as the most important potentially occurring in the general area are those listed as endangered (white-backed vulture, tawny eagle, martial eagle, bateleur, black harrier, black stork, Ludwig's bustard), vulnerable (secretarybird, lappet-faced vulture, white-headed vulture, African fish-eagle) and near threatened (marabou stork, Verreaux's eagle, peregrine falcon, kori bustard) by Simmons *et al.* (2015) in Namibia as well as those species classified as critically endangered (white-backed vulture, white-headed vulture), endangered (lapped-faced vulture, black harrier, Ludwig's bustard), vulnerable (secretarybird, martial eagle) and near threatened (bateleur, kori bustard) by the IUCN (2017). Other important aquatic species, etc. – are maccoa duck (Near Threatened-NT), Cape vulture (Critically Endangered-CE), black-necked grebe (Near Threatened-NT), greater flamingo (Vulnerable-V), lesser flamingo (Vulnerable - V), great white pelican (Vulnerable-V) and saddle-billed stork (Endemic-E) (Simmons *et al.* 2015).

### 4.3.3 Summary of the Flora Diversity

#### 4.3.3.1 Trees/shrubs and Grasses

The most important species are the endemic – *Tetragonia schenckii* – and near endemic species as well as those with some form of formal protection – i.e. Forestry, Nature Conservation and CITES species. The endemic/near endemic grasses (*Antheophora argentea*, *Eragrostis lehmanniana*, *Eragrostis truncata*, *Panicum kalaharensis* and *Stipagrostis amabilis*) are viewed as the most important species potentially occurring in the general area (Van Rooyen 2001).

#### 4.3.3.2 Aloes

Aloes potentially occur in the general area, and also viewed as important are *Aloe hereroensis* and *A. zebrina* (Rothmann 2004).

#### 4.3.3.3 Commiphora

Many endemic *Commiphora* species are found throughout Namibia with Steyn (2003) indicating that *Commiphora africana*, *C. glaucescens*, *C. tenuipetiolata* and *C. crenato-serrata* potentially also occurring in the general area.

#### 4.3.3.4 Lithops

Lithops species – all protected (See Nature Conservation Ordinance No. 4 of 1975) – are also known to occur in the general area and often difficult to observe, especially during the dry season when their aboveground structures wither. The closest species are currently only known to occur to the northwest and southeast of Kalkrand – i.e. *Lithops pseudotruncatella* subsp. *groendrayensis* and *Lithops vallis-mariae*, respectively (Cole and Cole 2005).

#### 4.3.3.5 Ferns

At least 64 species of ferns, of which 13 species being endemic, occur throughout Namibia. Ferns in the general area include at least 1 endemic species (*Marsilea burchellii*) and 12 indigenous species (*Actiniopteris radiata*, *Adiantum capillus-veneris*, *Cheilanthes marlothii*, *Marselia coromandelina*, *M. aegyptiaca*, *M. ephippiocarpa*, *M. farinosa*, *M. macrocarpa*, *M. unicornis*, *M. vera*, *Ophioglossum polyphyllum* and *Pellaea calomelanos*) (Crouch *et al.* 2011). The general area is under collected with more species probably occurring in the general area.

#### 4.3.3.6 Lichens

The overall diversity of lichens is poorly known from Namibia, especially the coastal areas and statistics on endemism is even sparser (Craven 1998). More than 100 species are expected to occur in the Namib Desert with the majority being uniquely related to the coastal fog belt (Wirth 2010). Lichen diversity is related to air humidity and generally decreases inland from the Namibian coast (Schults and Rambold 2007). Off road driving is the biggest threat to these lichens which are often rare and unique to Namibia.

To indicate how poorly known lichens are from Namibia, the recent publication by Schultz *et al.* (2009) indicating that 37 of the 39 lichen species collected during BIOTA surveys in the early/mid 2000's were new to science (i.e. new species), is a case in point.

#### 4.3.3.7 Other species

Other species with commercial potential that could occur in the general area include *Harpagophytum procumbens* (Devil's claw) – harvested for medicinal purposes and often over-exploited – and *Citrullus lanatus* (Tsamma melon) which potentially has a huge economic benefit (Mendelsohn *et al.* 2002).

### 4.3.4 Ecosystems and Important Areas

#### 4.3.4.1 Ephemeral River Channels and Pans

Although there are numerous pans within the EPL area, they only get inundated after above average rainfall events (Fig. 4.1). When filled with water these pans serve as habitat to various amphibians and aquatic bird species, albeit temporary of nature.

However, these pans are not listed as sites of special ecological importance in Namibia by Curtis and Barnard (1998) although all water related features are important in a dry, drought prone country such as Namibia and should be treated accordingly.

#### 4.3.4.2 Ephemeral Drainage lines

The EPL area is cut across by major ephemeral drainage lines with numerous smaller tributaries probably somehow associated with the extensive pan systems. The Nossob and Olifants Ephemeral River channels both cut across the EPL area (Fig. 4.1).

#### 4.3.5 Fauna and Flora Conclusions

According to the findings of the desktop flora and fauna specialist assessment undertaken for the area, the general area of the EPL 4655 does not fall within a pristine area, but rather an area with numerous anthropomorphic influences – e.g. long term farming activities and associated infrastructures, power lines, roads and tracks, etc. affecting the general area.

It is estimated that at least 63 species of reptile, 9 amphibian, 62 mammal, 141 bird species (breeding residents), at least 52 species of larger trees and shrubs (>1m) and at least 64 species of grasses occur in the general/immediate area of which a moderate proportion are endemics (e.g. 41.3% of reptiles). Although many endemic species are known to occur from the general area, it is currently not clear if any of these are associated with the existing EPL area or how exactly they will be affected by such activities.

The area is viewed as important for its reptile diversity, especially tortoises (*Stigmochelys pardalis*, *Psammobates oculiferus*, *Psammobates tentorius verroxii*). The giant bullfrog (*Pyxicephalus adspersus*) with population trends decreasing is viewed as the most important amphibian potentially associated with the ephemeral pans and river channels in the area.

Mammals classified as rare (*Cistugo seabrae*, *Zeltomys woosnami*, *Felis nigripes*) under Namibian legislation and vulnerable (*Smutsia temminckii*, *Acinonyx jubatus*, *Panthera pardus*, *Felis nigripes*) and near threatened (*Eidolon helvum*, *Hyaena brunnea*) by the IUCN (2017) are viewed as the most important although they do not necessarily occur in the area throughout the year, but rather pass through occasionally dependent on environmental conditions, etc.

The ground nesting Ludwig's and kori bustards, vultures and eagles, which are known to breed in the general area, are viewed as the most important species potentially affected by exploration activities, although to what extent they occur in the general area is currently unknown. Species most likely to be adversely affected by exploration would be the variety of reptiles and ground nesting birds specifically associated with this area. However, none of the important species are expected to be exclusively associated with the area.

It is estimated that at least 52 species of larger trees and shrubs (>1m) and at least 64 grasses occur in the general area. If herbs and "lower" plants (e.g. algae, lichens, etc.) were to be included, this would undoubtedly increase the floral composition of the area tremendously. The most important species is the endemic – *Tetragonia schenckii*. Although, the focus of the desktop study was limited to the bigger and thus more obvious species of trees, shrubs and grasses, the importance other species such as *Aloe* spp., lichens, ferns, *Lithops*, etc. is also acknowledged.

All human induced activities including the proposed exploration activities, agriculture and tourism operations all have potential negative environmental consequences, but identifying the most important fauna and flora species including high risk habitats beforehand, coupled with environmentally acceptable recommendations (mitigating factors), lessens the overall impact of such activities. Once specific targets have been identified aerial and files based exploration activities and it's decided that more detailed work leading to prefeasibility and feasibility studies are needed, a site-specific fieldwork to determine the actual fauna and flora species likely to be affected on the targeted site/s is highly recommended.

## 4.4 Summary of the Socioeconomic Settings

### 4.4.1 Overview

The socioeconomic settings around the EPL area is dependent on agriculture, tourism and hospitality industries. Sheep farming is the dominant farming activity in the general area with between 90-100% of stock farmed with being sheep and 0-10% being goats (van der Merwe 1983). The stock density is estimated at >20 sheep and goats/km<sup>2</sup> in the area with 27.9% of the total percentage sheep in Namibia found in the Mariental District (van der Merwe 1983). The risk of farming is generally viewed as “average to high” with the carrying capacity viewed as 30-40kg/ha (Mendelsohn et al. 2002) or 12-15LAU/ha (van der Merwe 1983). The tourism potential of this area is viewed as relatively low (Mendelsohn et al. 2002, van der Merwe 1983).

### 4.4.2 Socioeconomic Summary

The following is summary of the selected regional and local socioeconomic setting of the Hardap Region, the location of the EPL area (National Statistics Agency (NSA) (2016 and 2013):

- ❖ The population of the Hardap Regions is 87186 (2016) with population growth of 1.8 compared to 2011 census data;
- ❖ The exploration area is located in the sparsely populated privately owned commercial farmland;
- ❖ Unemployment rates in Hardap Region is below the national average of 36.9%. Unemployment in Hardap Region stands at 35.2%;
- ❖ The leading main source of income in Hardap Region is wages and salaries (64.2%);
- ❖ The health-care facilities in Hardap Region experience lack of qualified registered nurses and medical doctors;
- ❖ The infrastructure and service provision in the area of proposed project is limited;
- ❖ 17.4% of households in Hardap Region are more than 40km away;
- ❖ About 13% in Hardap Region are more than 50km away to nearest primary school. In comparison to the average in Namibia, there are only 3.6% such households;
- ❖ The crime rates in Hardap are relatively high. Most committed crimes in Hardap Region in 2012/13 were assault, theft, crimen injuria, malicious damage to property;
- ❖ The physical features, characterised by semi-arid adapted biomes, make the land largely unsuitable for agriculture activities and human settlement. People in this area mainly practice small-stock farming with sheep, goats and cattle;
- ❖ The area boasts a well-developed infrastructure base for tourism and has great potential based on the high landscape value linked on the Kalahari Dune Belt;
- ❖ The greatest limiting factors for economic activities are the arid climate and an overall shortage of water, poor soils and rangeland productivity; poor skills base, and;

- ❖ Overall economic growth and development in the project area is slow and thus a capital investment could spin-off the economic development of the surrounding settlements area in the area.

The following is summary of the selected regional and local socioeconomic setting of the Omaheke Region, the location of the EPL area (National Statistics Agency (NSA) (2016 and 2013) :

- ❖ The EPL area falls within the Aminuis Constituency of the Omaheke Region is known for cattle farming and the Trans- Kalahari highway;
- ❖ The total population of Omaheke increased from 52,735 in 1991 to 68,039 in 2001, and further to 71,233 people in 2011;
- ❖ The Omaheke Region's population has a median age of 21 years;
- ❖ Omaheke region had a high share of working age population of about 52.2 percent, while the elderly made up 7.3 percent of the total population;
- ❖ The population in Omaheke Region is growing at an annual rate of 0.5 percent;
- ❖ Omaheke Region's Grade 12 pass rate is ranked 12<sup>th</sup> in Namibia;
- ❖ Aminuis Constituency has a population density of 0.9 persons per square kilometres (sq km);
- ❖ Namibia has a literacy rate of 88.7 percent. The Omaheke Regional literacy rate was 73.3 percent, which is lower than the literacy rate in Namibia;
- ❖ In Aminuis constituency, 27.6 percent of people aged 6 years and above attended school, the school attendance is higher than the average regional attendance;
- ❖ The Aminuis Constituency consisted of 8.1 percent of the population aged between 0-4 years attending Early Childhood Development (ECD) Programmes;
- ❖ Elementary occupations made up the largest occupation group in Omaheke Region (37.8%), followed by skilled agricultural and fisheries workers (22.9%), Service Workers (10.6%) and Craft and Related trade workers (9.3%);
- ❖ Elementary occupations, as well as skilled agricultural and fisheries occupations were dominated by males, compared to females, but more females worked as service workers compared to males;
- ❖ The main industries in Omaheke Region are Agriculture, Forestry and Fishing, followed by Administrative and Support service, then Construction industry;
- ❖ Omaheke Region has a higher unemployment rate (39.5%) than the national average (26.8%);
- ❖ Aminuis constituency has unemployment rates standing at 35.6;
- ❖ The labour force participation for Omaheke Region is 65.2 percent. In Aminuis constituency it is 63.2%;



- ❖ There are 16 174 households in Omaheke Region, with 85.1 percent of the households having access to safe water;
- ❖ 85.1 percent of households in Omaheke region had access to safe water;
- ❖ Detached houses were the most common types of dwelling units, accounting for 53.7 percent of households;
- ❖ The most common source of energy for lighting in Aminuis is Paraffin/Kerocene (49.4%), Candles (43.6%) made up the most common source of energy;
- ❖ The most common means of disposing garbage in Omaheke region was burning (38.2%), and;
- ❖ Aminuis constituency has one major access point, the Trans-Kalahari Highway linking Namibia and Gobabis.

## 4.5 Ground Components

### 4.5.1 Regional and Local Geology

The EPL 4655 falls within the greater Karoo Basin covering much of southern Namibia and extend to western Botswana and northern South Africa. Generally, the thickness of the stratigraphic units increases from the margin of the basin towards the centre, especially from the Ghanzi Ridge in the north, which formed a high during sedimentation of the Karoo Sequence. Karoo sediments have been deposited on a mostly Damaran-age Precambrian basement consisting mainly of metasediments like mica schist, phyllite, carbonate (marble, dolomite, or limestone). These metasediments have been intruded by granites in many places. In most Karoo Sequence basins sedimentation started with the Permo- Carboniferous Dwyka Formation which was deposited under glacial and periglacial conditions and consists of tillite, mixtite, pebbly mudstone and dark shale.

The material is derived from glaciated highs and was transported into depressions, where it either forms a several-hundred-metres-thick blanket, typical of the marine embayment. With the retreat of the ice mostly fine-clastic material was deposited in marine, lacustrine and distal fluvial environments of the Ecca Group of lower Permian age (Fig. 4.7). The surface is covered by recent deposits of the Kalahari Group consisting of sands and calcrete. The stratigraphic subdivision adopted by the South African Committee for Stratigraphy for the Karoo rocks is outlined in Fig. 4.7.

The EPL area is extensively covered by the Kalahari Group, a stratigraphic group consists of a fairly monotonous sequence of red sandstone which ranges in thickness from less than 50 metres to greater than 275 metres. The thickest development occurs within a broad NE – SW trending pre-Kalahari valley. The base of the Kalahari Group is locally marked by a conglomeratic zone consisting of angular blocks sandstone, siltstone or dolerite in a red sandstone matrix. The Kalahari-Karoo contact is usually well defined except where the underlying Karoo rock is weathered sandstone. Loose Kalahari Desert Sands forming longitudinal dune belt which are vegetated in some place dominate the landscape of the EPL area. Calcretes and gravel with silty-clays sands can be found in topographically low laying areas.

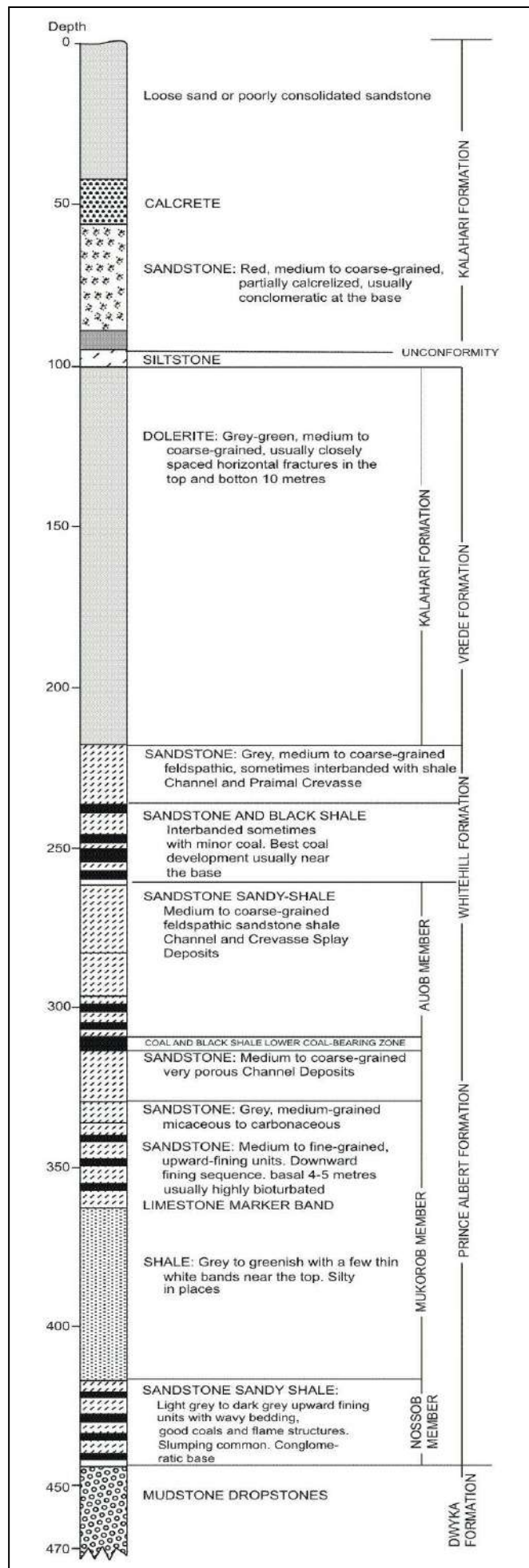


Figure 4.7: A general representation of the stratigraphic column (Hegenberger, W. 1992).

## 4.5.2 Groundwater Resources

The EPL 4655 falls within the Stampriet Artesian Basin (SAB), a groundwater protection zone managed by the Department of Water Affairs (DWA) in the Ministry of Agriculture, Water and Forestry (Figs. 4.8 and 4.9). Stampriet Artesian Basin (SAB) falls within the greater Kalahari Basin covers Namibia, Botswana, South Africa, Angola and Zambia (Fig. 4.8 (insert map) and International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), 2016). The Stampriet Artesian Basin (SAB) is a transboundary groundwater resources which Namibia shares by Botswana and South Africa. Groundwater recharge in the Stampriet Artesian Basin very limited. Potential sources of water supply for the proposed exploration activities could be obtained from local groundwater resources. The Stampriet Artesian Basin is recharge by several ephemeral river channels such as the Nossob, Seeis, Auob and Olifants Ephemeral Rivers (Figs. 4.8 and 4.9).

The groundwater occurrence within the Stampriet Artesian Basin (SAB) inclusive of the EPL area is associated with the upper Kalahari Group and in the underlying Karoo Sequences (Figs. 4.8 - 4.11 and Table 4.1). The three main aquifers in the SAB in Namibia are in the Kalahari Beds, the Auob Sandstone and the Nossob Sandstone (Figs. 4.8 and 4.9 and Table 4.1). The average thickness of the Kalahari Aquifer is 100 m, that of the Auob 80 m, and that of the Nossob 25 m (JICA 2002). In the southeastern part of the Namibian SAB, the Kalahari sediments are considerably thicker, reaching about 250 m in the 'Pre-Kalahari Valley'. The Auob Sandstone Aquifer and the Nossob Sandstone Aquifer lie in the Ecca Group of the lower Karoo Sequence and are separated by shale layers of the Mukorob Member, which is overlaid by Rietmond Shale and Sandstone. The Auob and Nossob Aquifers are confined and free flowing in the Auob Valley from Stampriet and further downstream, as well as in the Nossob Valley around Leonardville. Water levels elsewhere in boreholes in the artesian aquifers are subartesian. Several springs are located in the eastern outcrop of the Kalkrand Basalt in the northwest. Groundwater also occurs in the Kalahari layers across the basin and in the Prince Albert Formation of the Karoo Sequence.

According to the Department of Water Affairs and Forestry, (2001) and the International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), (2016), water in the area is used for human consumption, stock watering and increasingly for irrigation and tourism / hospitality establishment purposes. Although agriculture and tourism / hospitality both have economic advantages of creating more rural jobs job opportunities, these economic activities if managed poorly can be great source of groundwater pollution from the use of fertilisers and poor selection of kraals locations with respect to the exiting boreholes in the agricultural sector to the poor management of wastewater and disposal of solid waste in the tourism / hospitality sectors.

The Stampriet Artesian Basin (SAB) show a rise in the rest water level with good pressure head to which the Nossob Aquifer is subjected within the basin. This observation is very important from an environmental point of view, since borehole penetration of the Nossob Aquifer is most likely to cause relatively poor quality groundwater from the aquifer to infiltrate upwards into the overlying Auob Aquifer (with better quality groundwater), and even into and past the Kalahari aquifer.

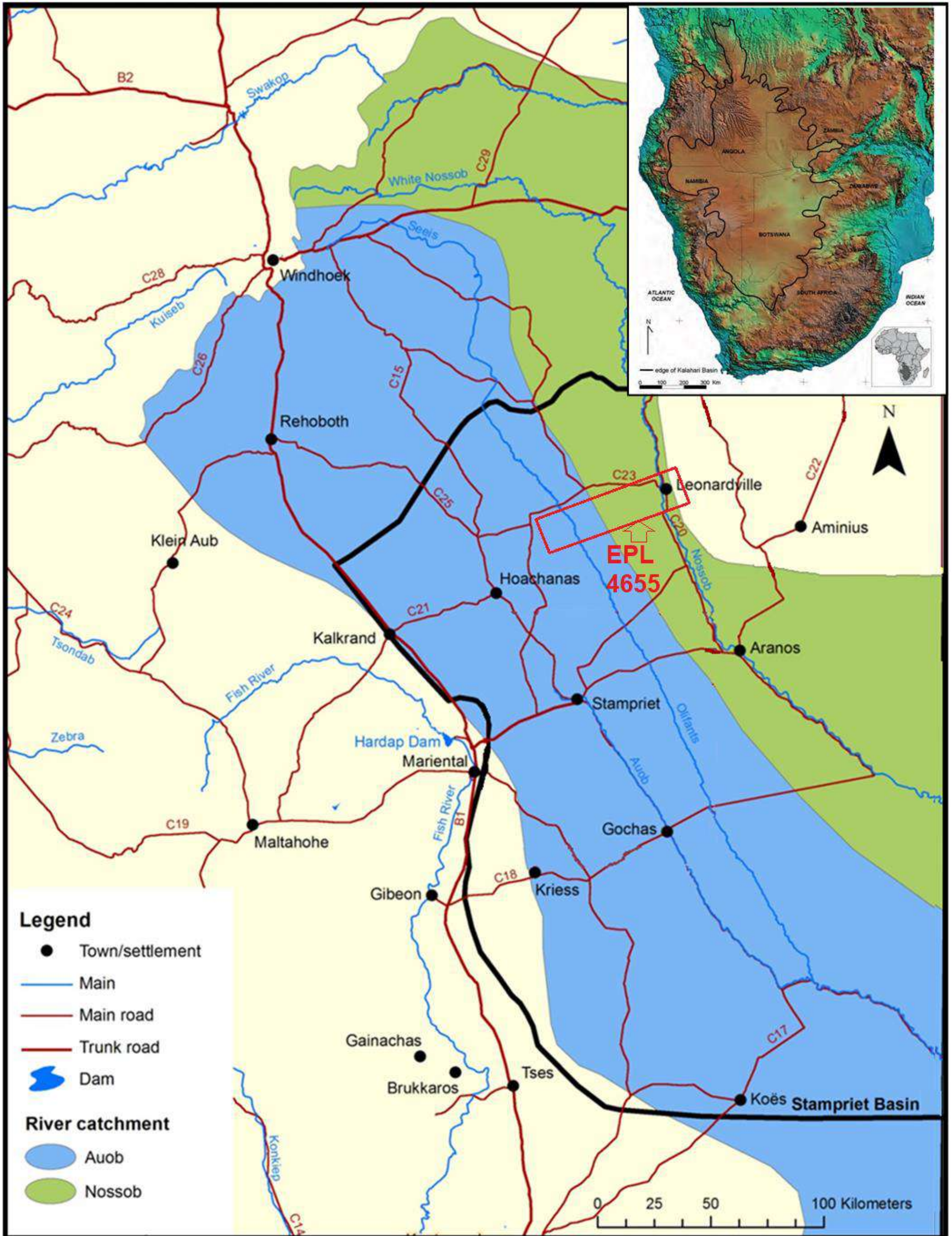
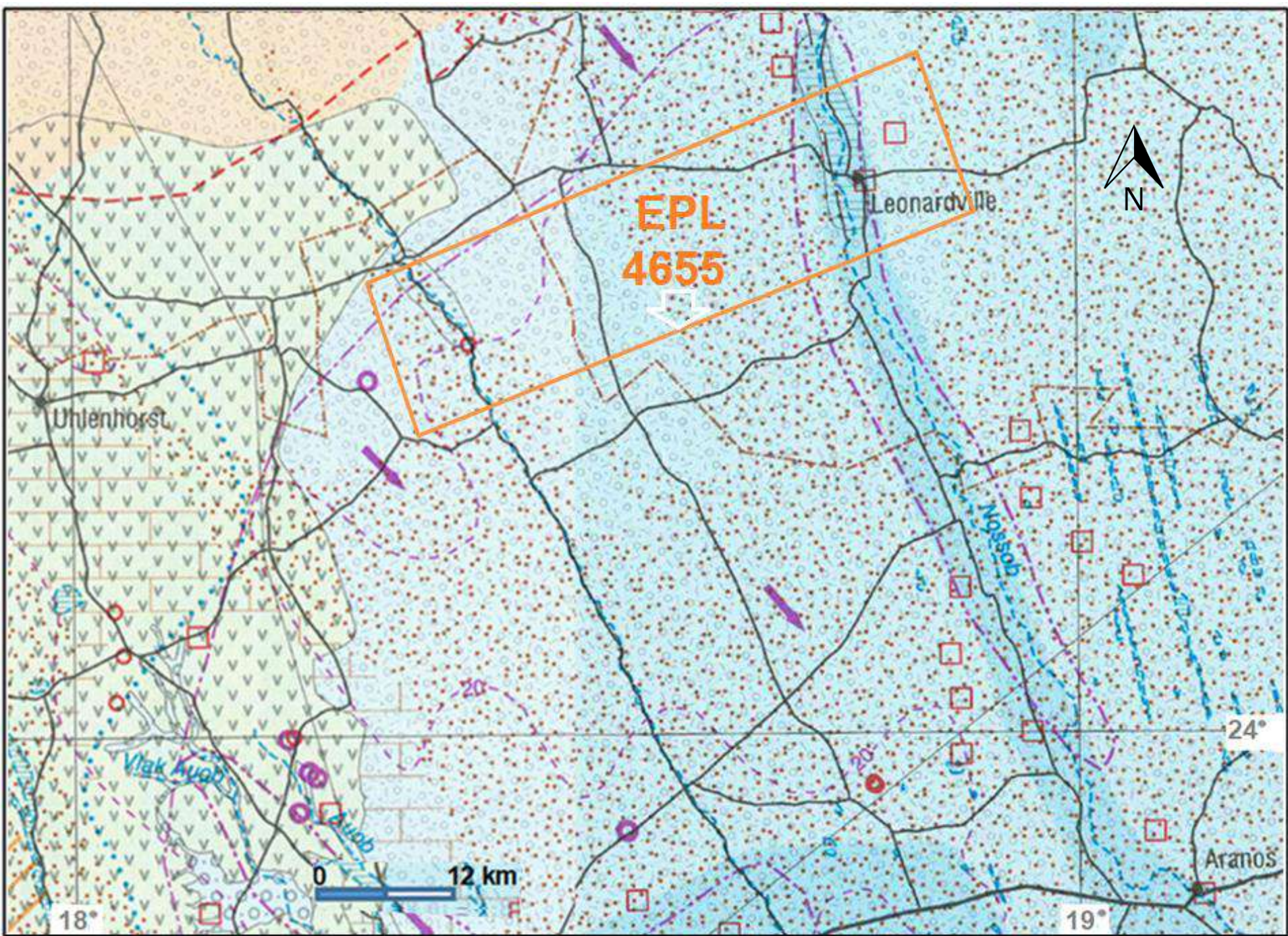


Figure 4.8 EPL 4655 with respect to the key river catchments (Auob, Olifants and Nossob) forming part of the Stampriet Artesian Basin (SAB) groundwater protection zone (Source: JICA, 2002) and insert showing the extent of the SAB into Botswana and South Africa (Source: International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), 2016).



### Hydrogeology and groundwater potential of rock bodies

#### Porous aquifers

High potential

Moderate potential

#### Fractured, fissured or karstified aquifers

High potential

Moderate potential

#### Rock bodies with little groundwater potential

Generally low potential; locally moderate potential

Very low and limited potential

### Main rock types

#### Main rock type of hydrogeological units

Sand and gravel, valley deposits (alluvium)

Non-porous sandstone, conglomerate, quartzite

Unconsolidated to semi-consolidated sand and gravel, locally calcrete

Volcanic rocks (Karoo and younger)

Calcrete

Metamorphic rocks, including quartzite and marble bands

Limestone, dolomite, marble

Granite, gneiss, old volcanic rocks

#### Groundwater features

- Spring
- Thermal spring
- 20 --- Depth to groundwater (in m below ground)
- Groundwater flow direction
- Groundwater divide

- Limit of area of artesian flow
- Limit of area of sub-artesian groundwater
- /// Area of saline groundwater
- /// Area of poor quality groundwater at depth
- A—B Line of hydrogeological cross-section

#### Water use and water management features

- Well or borehole (selected)
- Borehole (only in cross-sections)
- Groundwater supply scheme
- ◇ Irrigation scheme using groundwater

- Canal
- Water pipeline
- Dam with capacity of reservoir in Mm<sup>3</sup>
- Boundary of groundwater control area

Figure 4.9 Regional Hydrogeology of the EPL 4655 (Source: Department of Water Affairs and Forestry, 2001).

Table 4.1: Summary of the geology and hydrogeological setting of the Stampriet Artesian Basin (SAB) (Source: International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), 2016).

		GEOLOGY					HYDRO-GEOLOGY		
Age	Super group	Group	Formation/Member				Lithology		
			Botswana (Smith, 1984)	Namibia (Miller, 2008)	S. Africa (SACS, 1980)	This report	(simplified)	STAS	
Tertiary to Quaternary	Kalahari	Kalahari				Kalahari beds	Sand, silcrete, calcrete (duricrust), gravel, sandstone, marls, clayey gravels	Unsaturated zone	
Jurassic		Stormberg-lava (B) Kalkrand (N) Drakensberg (SA)		Neu Loore		Kalkrand	Basalt and dolerite	Kalahari aquifers	
Triassic		Lebung (B) Etjo (N) Clarens (SA)	Ntane Mosolotsane			Ntane	Sandstone		
Permian	Karoo	Ecca <sup>16</sup>	Kule	Whitehill	Whitehill	Whitehill	Shale and limestone	Stampriet Artesian Basin	
			Rietmond	Rietmond		Rietmond	Shale and sandstone		Aquitard/ aquiclude
			Otshe	Auob	Prince Albert	Auob	Sandstone, interbedded with shale and coal horizons		Auob aquifer
			Kobe	Mukorob		Mukorob	Shale, mudstone, siltstone		Aquitard/ aquiclude
			Ncojane	Nossob		Nossob	Sandstone		Nossob aquifer
Carboniferous		Dwyka				Glacial sediments	Aquitard/ aquiclude		
Cambrian	Pre-Karoo	Nama							

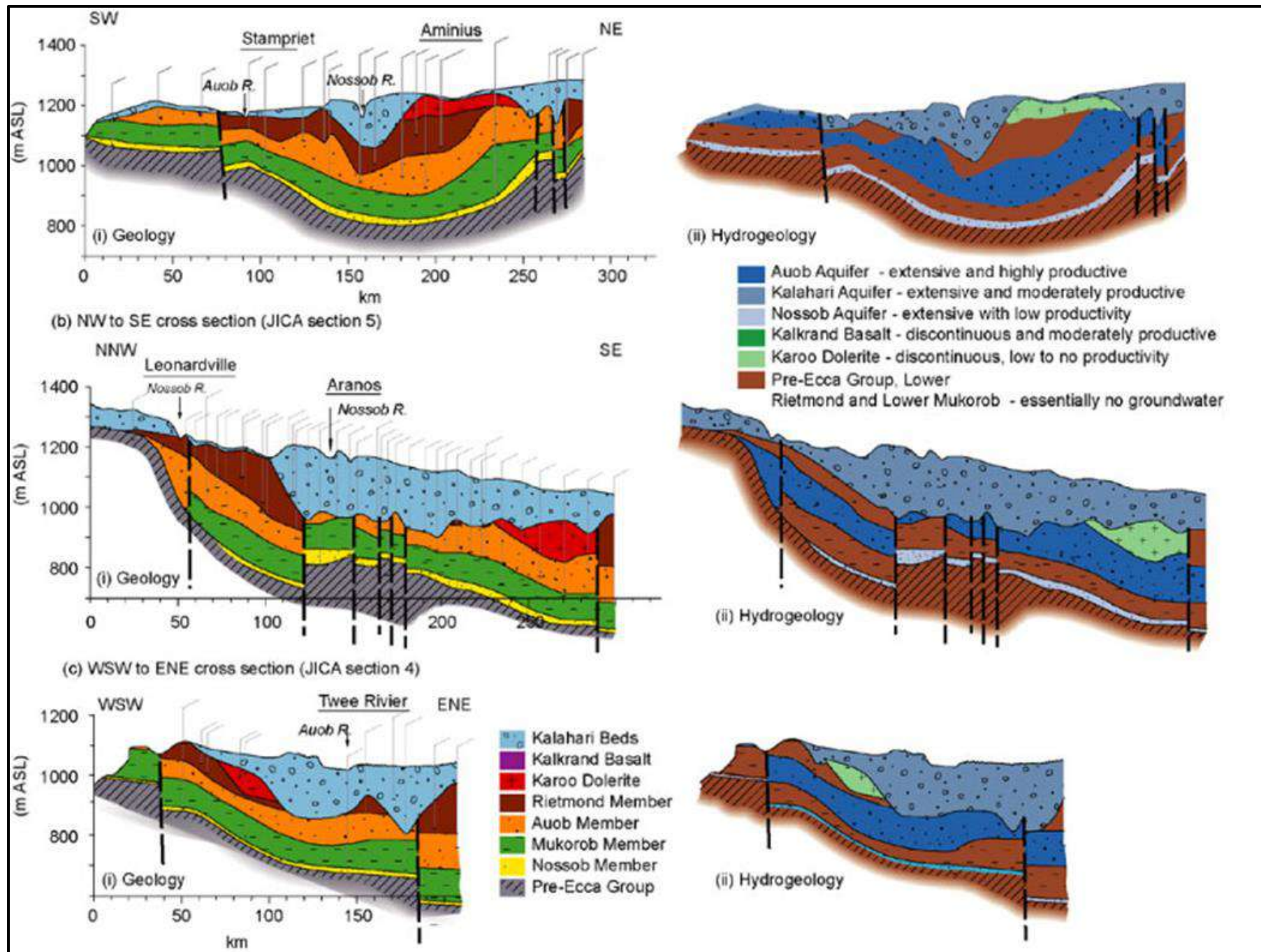


Figure 4.10: Geology and hydrogeological setting of the Stampriet Artesian Basin (SAB) (Source: JICA 2002).

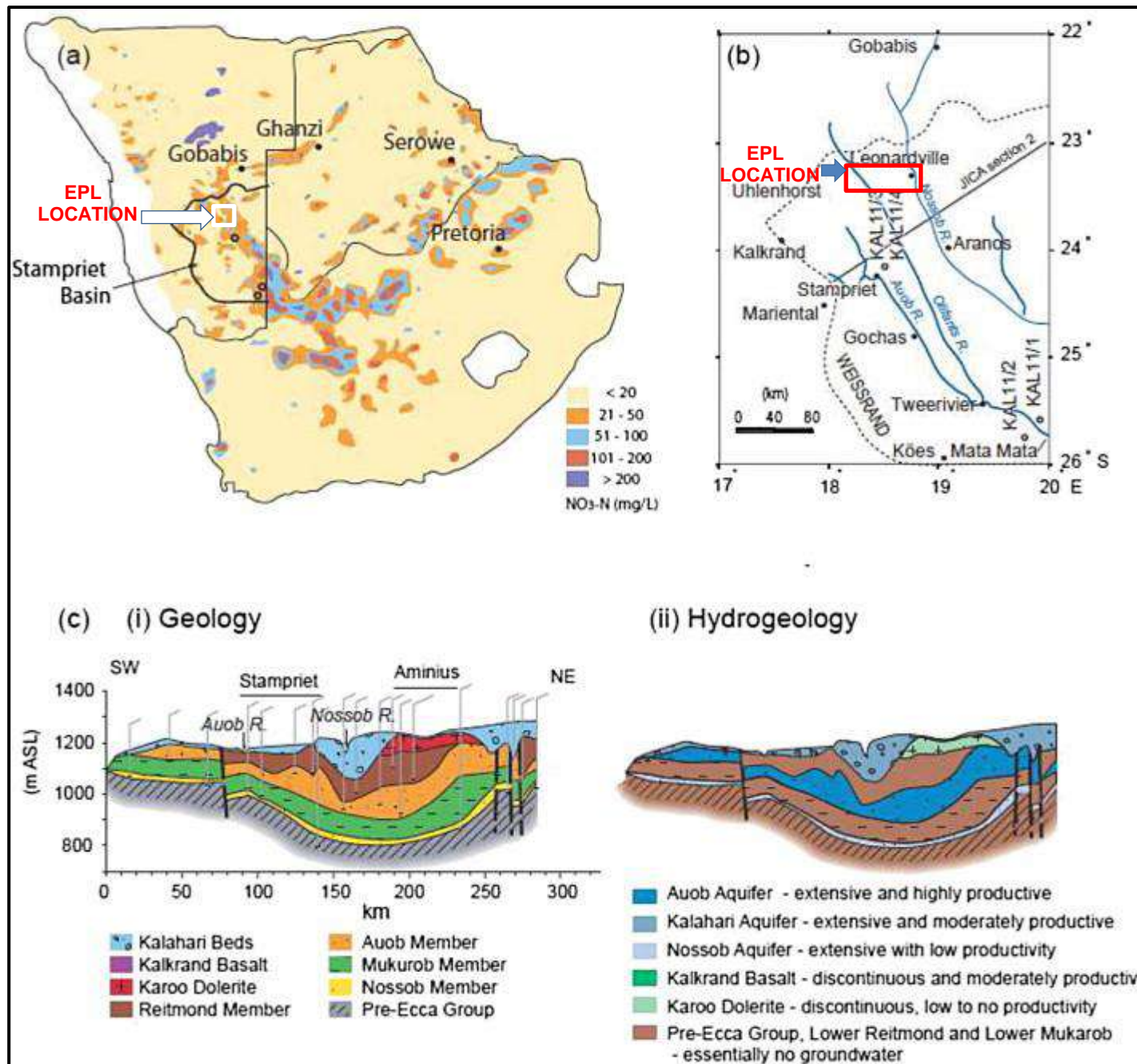


Figure 4.11: Water quality, geology and hydrogeological setting of the Stampriet Artesian Basin (SAB) (Source: JICA 2002).



### 4.5.3 Evaluation of Water Vulnerability

Vulnerability assessment of surface water covered possible runoff, the presence of source factors and major flow routes such as major high order discontinuities such as faults, ephemeral river channels, valleys and gullies as pathways and the presence of surface water in the Ephemeral Rivers body as a target. The groundwater assessments covered hydraulic properties and thickness of the unsaturated and saturated zones derived from geological and hydrogeological data. The assessment of the unsaturated characteristics was based on the ability for source factors to influence the system through known pathway factors such as discontinuities. The combined effects of the unsaturated and saturated flow probabilities were used as indicator for groundwater vulnerability. However, groundwater or surface water will only be vulnerable to contamination if the following three (3) components are all present at the same time and at a site specific area within the EPL:

- (i) Contaminant sources such as oils, chemicals and drilling discharges resulting from proposed exploration programme;
- (ii) Potential pathways for contaminants to migrate and reach a groundwater / surface water body such as porous rock formation / surficial deposits, major high order discontinuities, ephemeral river channels, valleys and gullies;
- (iii) Targets (economic water resources) present within the project area.

Overall, economic and protected groundwater resources are found in the area and form part of the Stampriet Artesian Basin (SAB) protection zone (Figs. 4.8 -4.11). During the rainy season, surface water bodies can be found along the local ephemeral river systems. This surface water often recharges the local and regional groundwater resources along the faults, solutions holes and other discontinuities along these ephemeral rivers in the general surrounding areas. The same surface water also replenishes the local and regional dams. Surface and groundwater resources within the EPL area maybe vulnerable to pollution as a result of some of the proposed drilling operations and some of the supporting exploration activities associated with the detailed site-specific local field-based prospecting / exploration activities. Drilling and trenching as well as the related supporting activities such as campsite and discharge of liquid and solid waste are potential sources that could affect local water resources. If not managed properly the effect of the proposed site-specific field-based exploration activities could have cumulative negative effects on the local water resources in addition to the already existing threatening activities / pressures such as:

- (i) Small settlements, farms, tourism / hospitality facilities discharge sewage into poorly designed waste water management facilities and sometimes in close proximity to their water boreholes. This can cause severe nitrate (and nitrite) and other bacterial load poisoning of the groundwater, which will develop some time after the construction of such waste water facilities;
- (ii) Kraals for livestock situated close to the borehole or on unsuitable ground conditions with discontinuities or porous materials. Farmers should always try to construct kraals for livestock several hundred metres away from boreholes and on suitable ground which is less porous and specialist knowledge is highly necessary on site selection;
- (iii) Unused boreholes and wells used as refuse tips. All unused boreholes must be sealed when not in use;
- (iv) Poorly planned sewage treatment plants and solid waste disposal sites, and;

- (v) Large-scale agriculture and intensive farming practices have a significant impact on the groundwater resources through the introduction of leachable chemicals into the ground affecting the water quality as well as depletion of the existing often poorly recharged groundwater resources quantity.

Table 4.2: Regional groundwater vulnerability within the Stampriet Artesian Basin (SAB) (Source: International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), 2016).

Pollution Source	Rationale for Pollution Source Intensity / Impact			
	BOTSWANA	South Africa	NAMIBIA	
Settlements	<b>Pit Latrines</b>	<b>Very low:</b> Pit latrines constitute the common form of sanitation in the Stampriet settlements in Botswana (45.9% out of 1254 households). However the pollution potential is very localised as there are only three settlements in the entire Stampriet area which combined have a population (3229). Also, the general depth of the water table in the broader area is 120m (KDDC, 2008).	<b>Very low:</b> Given the population density of the area	<b>Very low:</b> Given the low percentage of pit latrines (only 3% of households).
	<b>Septic Tanks &amp; Effluent Soakaways</b>	<b>Very low:</b> because out of 1254 households, 13.2% septic tank flush toilets. There is probably a few septic tanks used in campsites in the park (KTP)	<b>Very low:</b> Given the population density of the area	<b>Medium:</b> As there is high use of septic tanks in centres like Aranos Aminuis, Kries, Hoachanas and Leonardville.
	<b>Sewage Works &amp; Oxidation Ponds</b>	<b>No Impact:</b> Because this land use is non-existent	<b>No Impact:</b> Because this land use is non-existent	<b>Medium-High:</b> Because there is use of oxidation ponds to manage effluent in all the urban centres. Also, most of the oxidation ponds were constructed before the new ponds standards were adopted hence they are not sealed with the necessary impermeable structures to avoid seepage effluent in to groundwater.
	<b>Burial Sites</b>	<b>Very low:</b> Given the population density of the area	<b>Very low:</b> Given the population density of the area	<b>Very low:</b> Given the population density of the area
	<b>Oil/Fuel Storage &amp; Disposal</b>	<b>Very low:</b> The intensity of the source relates to storage and disposal of borehole machinery related oils, which if not properly handled and disposed of can be washed down in to boreholes or pans by run-off	<b>Very low:</b> Assumed as there could be some oil or fuel storage & disposal activities in the lodges in KTP.	<b>Medium:</b> This relates to storage & disposal of oils or fuels used in service stations, and irrigation & borehole related machinery.
Rural areas	<b>Irrigation (incl. use of fertilisers &amp; pesticides)</b>	<b>No Impact:</b> Because this land use is non-existent:	<b>No Impact:</b> Because this land use is non-existent:	<b>Medium-High:</b> Irrigation poses the most significant pollution threat to groundwater. However the intensity of this source is reduced by the fact that the irrigation farms area scattered not continuous, and the total area under irrigation is around 620ha.
	<b>Livestock Excreta</b>	<b>Very low:</b> because only a small part is affected; the northern edge of the STAS area (Ncojane-Ukwi area) which is a key livestock area, basically BH led cattleposts & the Ncojane leasehold ranches (a little further north). There is tendency to kraal and water livestock by the boreholes & pans in the districts. This puts the water resources at a high risk of pollution as run-off could wash livestock excreta in to boreholes & pans.	<b>No Impact:</b> Because this land use is non-existent	<b>Very low:</b> because only a small part is affected;

#### 4.5.4 Recommendations on Water Resources Protection

As shown in Fig. 4.12, groundwater within the Stampriet Artesian Basin (SAB) is highly vulnerable to pollution. It is important that the proposed exploration activities as well as the existing farms / tourism / hospitality and local community related potential polluting activities must not be placed or undertaken in areas with high order discontinuities, valleys or gullies systems (International Hydrological Programme of the United Nations Educational Scientific and Cultural Organisation (UNESCO), 2016)).

Ephemeral Rivers in the area such as the Nossob, Seeis, Auob and Olifants play a vital role in the recharge of the various national water supply scheme operated by local framers, Regional Council, Local Authorities and NamWater within the Stampriet Artesian Basin (SAB).

Discharge of solid waste or wastewater into a public stream is prohibited. The drilling operations could result in mixing of the poor and good quality water horizons. Due to the location of the EPL area within the SAB, the proponent will be required to apply for a drilling permit from the Department of Water Affairs (DWA). It's highly likely that the DWA may request that all boreholes drilled within the EPL area shall have casing installed in order to minimise the risk of mixing the good and poor quality groundwater horizons.

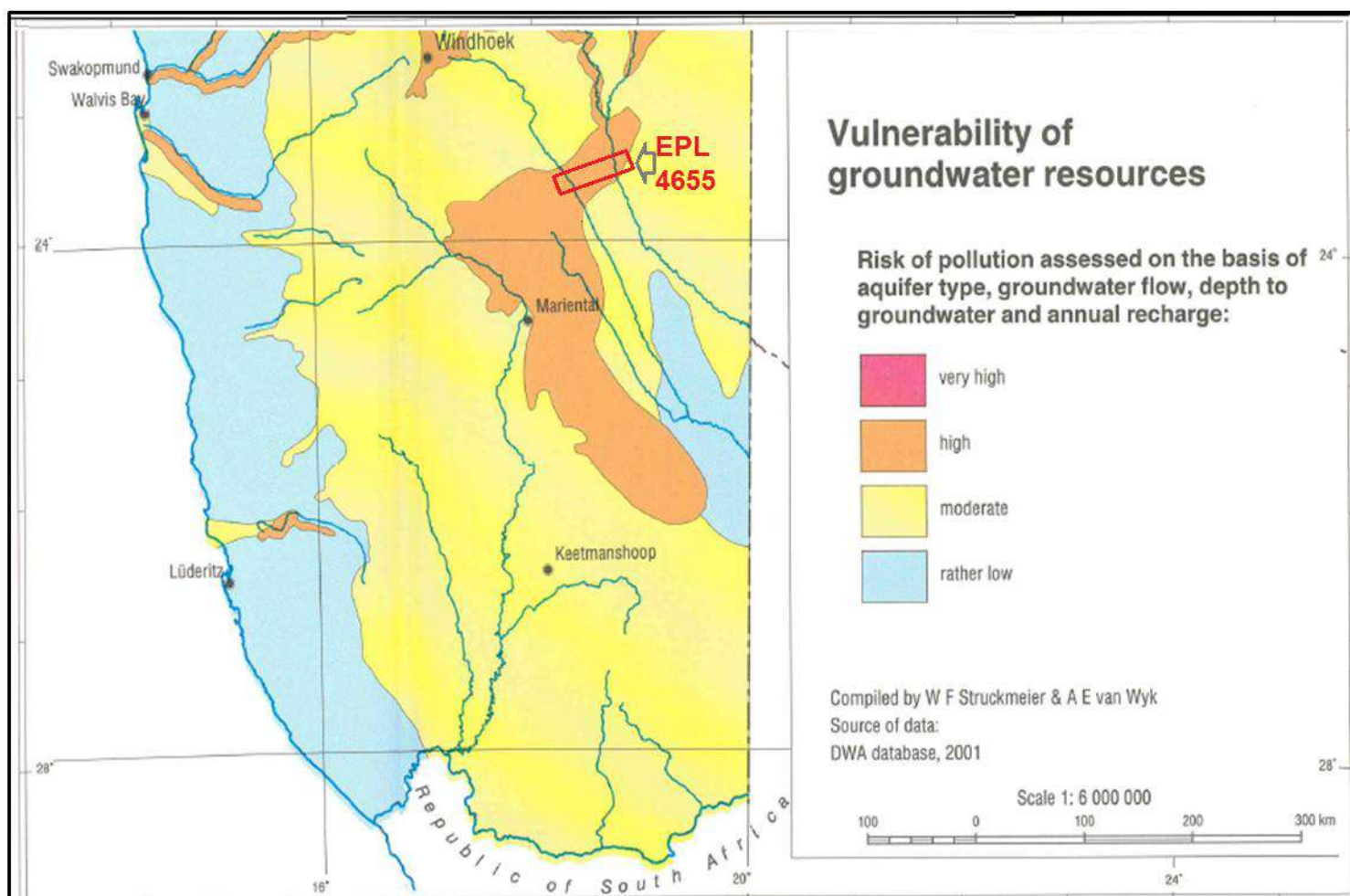


Figure 4.12: Regional groundwater vulnerability around the EPL 4655 (Source: Department of Water Affairs and Forestry, 2001).

## **5. IMPACT ASSESSMENT AND RESULTS**

### **5.1 Impact Assessment Procedure**

The environmental monitoring and assessment process that has been undertaken with respect to the ongoing / proposed exploration programme for the EPL No. 4655 has been conducted in accordance with the provisions of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007).

### **5.2 Approach, Alternatives, Key Issues and Methodology**

#### **5.2.1 Terms of Reference (ToR) and Approach**

Risk-Based Solutions (RBS) was appointed by the proponent to prepare the Environmental monitoring based on the environmental monitoring activities undertaken for the period 2012 – 2018 and update Environmental Scoping and Environmental Management Plan (EMP) report in order to support the application for the renewal of the Environmental Clearance Certificate (ECC) for the EPL No. 4655 with respect to the proposed / ongoing exploration activities.

The Scoping desktop study reviewed the receiving environmental settings (physical, biological, socioeconomic and ecosystem services, function, use values and non-use) and proposed / ongoing exploration activities and then assessed the likely impacts (positive and negative) on the receiving environment (Table 5.1).

The key deliverable comprised the environmental monitoring report for the period 2012 -2018 and this updated Environmental Scoping and Environmental Management Plan (EMP) detailing appropriate mitigation measures that will enhance the positive impacts and reduce the likely negative impacts identified.

The Final updated Environmental Scoping and Environmental Management Plan (EMP) report and the completed Application for Environmental Clearance Certificate (ECC) shall be submitted to the client (Proponent) and the Office of the Environmental Commissioner, Department of Environmental Affairs (DEA), Ministry of Environment and Tourism (MET) through the Ministry of Mines and Energy (the Competent Authority) for review and final decision on the renewal of the ECC.

The Environmental Scoping and EMP has been performed with reasonable skill, care and diligence in accordance with professional standards and practices existing at the date of performance of the assessment and that the guidelines, methods and techniques that have been applied are all in conformity to the national regulatory requirements, process and specifications in Namibia as required by Ministry of Mines and Energy (MME), Ministry of Environment and Tourism (MET) and the client (Proponent). The Scoping and EMP has been prepared in line with the January 2015 MET Environmental Assessment Reporting Guideline.

Table 5.1: Summary of the proposed / ongoing activities, alternatives and key issues considered during the Environmental monitoring and assessment (EA) process.

PROPOSED / ONGOING PROJECT ACTIVITIES	ALTERNATIVES TO BE CONSIDERED	KEY ISSUES TO BE EVALUATED AND ASSESSED WITH ENVIRONMENTAL MANAGEMENT PLAN (EMP) / MITIGATION MEASURES DEVELOPED	
<p>(i) Initial desktop exploration activities (review of existing information and all previous activities in order identify any potential target/s)</p> <p>(ii) Regional reconnaissance field-based activities such mapping and sampling to identify areas with potential targets based on the recommendations of the desktop work</p> <p>(iii) Initial local field-based activities such as widely spaced mapping, sampling, surveying and possible drilling in order to determine the viability of any delineated local target</p> <p>(iv) Detailed local field-based activities such very detailed mapping, sampling, surveying and possible drilling in order to determine the feasibility of any delineated local target</p> <p>(v) Prefeasibility and feasibility studies to be implemented on a site specific area if the local field-based studies proves positive</p>	<p>(i) Location for Minerals Occurrence: A number of economic deposits are known to exist in different parts of Namibia and some have been explored by different companies over the years. The proponent intend to explore / prospect for possible economic minerals occurrence in the EPL area;</p> <p>(ii) Other Alternative Land Uses: Game Farming, Tourism and Agriculture</p> <p>(iii) Ecosystem Function (What the Ecosystem Does;</p> <p>(iv) Ecosystem Services;</p> <p>(v) Use Values;</p> <p>(vi) Non-Use, or Passive Use;</p> <p>(vii) The No-Action Alternative</p>	Potential land use conflicts / opportunities for coexistence between proposed / ongoing exploration and other existing land uses such as agriculture, tourism and conservation	
		Impacts on the Physical Environment	Natural Environment such as air, noise, water, dust etc.
			Built Environment such as existing houses, roads, transport systems, buildings, energy and water and other supporting infrastructure
			Socioeconomic, Archaeological and Cultural impacts on the local societies and communities
		Impacts on the Biological Environment	Flora
Fauna			
Habitat			
Ecosystem functions, services, use values and non-Use or passive use			
Others to be identified during the public consultation process and preparation of the Scoping and EMP Report			

## 5.2.2 Alternatives and Ecosystem Assessments

The following alternatives have been considered:

- (i) **EPL Location:** A number of potential economic minerals deposits are known to exist in the general area and linked to the regional geology of the EPL area. The proponent intend to explore / prospect for all the licensed minerals groups likely to be associated with the regional and local geology. The minerals occurrences are site-specific and related to the regional and local geology of a specific area to which there are no alternatives sites to consider with respect to the license location. The only other alternative is the no-action option (no exploration activities are implemented);
- (ii) **The No-Action Alternative** - A comparative assessment of the environmental impacts of the 'no-action' alternative (a future in which the proposed / ongoing exploration activities do not take place) has been undertake. An assessment of the environmental impacts of a future, in which the proposed / ongoing exploration and

possible discovery of economic minerals resources does not take place, may be good for the receiving environment because there will be no negative environmental impacts due to the proposed minerals exploration or possible mining operation that may take place in the EPL area. The environmental benefits will include: no mineral exploration or potential future mining related negative environmental impact on the receiving environment. However, it is important to understand that even if the proposed / ongoing exploration activities do not take place, to which the likely negative environmental impacts is likely to be low and localised, the other current and future land uses such as agriculture and tourism will still have some negative impacts on the receiving environment. Kraals, pit latrines and chemical leaching from agricultures are some of the major point sources of water pollution in many parts of Namibia.

The likely negative environmental impacts of the other current and future land uses that may still happen in the absence of the proposed / ongoing minerals exploration activities includes: Water pollution, land degradation due to drought, poor land management practices, erosion and overgrazing. Furthermore, it's also important to understand what benefits might be lost if the proposed / ongoing exploration activities do not take place. Key losses that may never be realised if the proposed / ongoing project activities do not go-ahead include: Loss of potential added value to the unknown underground minerals resources that maybe found within the EPL No. 4655, socioeconomic benefits derived from current and future exploration, direct and indirect contracts and employment opportunities, export earnings, foreign direct investments, license rental fees, royalties and various other taxes payable to the Government;

- (iii) **Other Alternative Land Uses:** The EPL area fall within the well-known commercial agricultural land uses area dominated by small stock farming activities. The growing game farming is also making tourism a vital socioeconomic opportunity in the general area. Minerals exploration and small scale mining activities are well known land use options in Namibia. Due to the limited scope of the proposed / ongoing exploration and the implementation of the EMP, it's likely that the proposed / ongoing exploration can coexist with the current and potential future land uses within the general area;
- (iv) **Potential Land Use Conflicts:** Considering the current land use practices (agriculture and tourism) as well as potential other land uses including minerals exploration, it's likely that potential economic derivatives from any positive exploration outcomes leading to the development of a mine in the general area can still co-exist with the existing and potential future land use options of the general area. However, much more detailed assessments of any likely visual and other socioeconomic impacts will need to be included in the EIA that must be undertaken as part of the prefeasibility and feasibility studies if economic minerals resources are discovered. The use of thematic mapping and delineation of various land use zones for specific uses such as agriculture, conservation, mining or tourism etc, within the EPL area will greatly improve the multiple land use practices and promote coexistence for all the possible land use options;
- (v) **Ecosystem Function (What the Ecosystem Does):** Ecosystem functions such as wildlife habitats, carbon cycling or the trapping of nutrients and characterised by the physical, chemical, and biological processes or attributes that contribute to the self-maintenance of an ecosystem in this area are vital components of the receiving

environment. However, the proposed / ongoing exploration activities will not affect the ecosystem function due to the limited scope of the proposed / ongoing activities because the ecosystem of this EPL area is part of the larger local and regional ecosystems which are all interlinked;

- (vi) **Ecosystem Services:** Food chain, harvesting of animals or plants, and the provision of clean water or scenic views are some of the local ecosystem services associated with the EPL area. However, the proposed / ongoing exploration activities will not affect the ecosystem services due to the limited scope and area of coverage of the proposed / ongoing activities because the ecosystem of this EPL area is part of the larger local and regional ecosystems which are all interlinked;
- (vii) **Use Values:** The EPL area has direct values for other land uses such as agriculture, conservation and tourism as well as indirect values which includes: Watching a television show about the general area and its wildlife, food chain linkages that sustains the complex life within this area and bequest value for future generations to enjoy. The proposed / ongoing exploration activities will not destroy the current use values due to the limited scope of the proposed / ongoing activities as well as the adherence to the provisions of the EMP as detailed in Chapter 6 of this report, and;
- (viii) **Non-Use or Passive Use:** The EPL area has an existence value that is not linked to the direct use / benefits to current or future generations. The proposed / ongoing exploration activities will not affect the ecosystem current or future none or passive uses due to the limited scope of the proposed / ongoing activities that will leave much of the EPL area untouched because the ecosystem of this EPL area is part of the larger local and regional ecosystems which are all interlinked.

## 5.3 Key Issues Considered in the Assessment Process

### 5.3.1 Sources of Impacts (Proposed / Ongoing Project Activities)

The ongoing exploration activities being undertaken in the EPL 4655 and as assessed in this environmental assessment covering Environmental Scoping and Environmental Management Plan (EMP) are as follows:

- (i) Initial desktop exploration activities (no field-work undertaken);
- (ii) Regional reconnaissance field-based mapping and sampling activities;
- (iii) Initial local field-based mapping and sampling activities;
- (iv) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling, and;
- (v) Prefeasibility and feasibility studies leading to test mining and mining if proves positive.

## 5.3.2 Likely Environmental Impacts

The likely negative impacts that the proposed / ongoing project activities (exploration / prospecting) would have on the receiving environment would depend on the extent of the proposed / ongoing exploration, management of the area and how the proposed mitigations are eventually implemented by the proponent. The following is the summary of the likely key components of the receiving environment (physical, biological, socioeconomic environments and ecosystem functions, services, use and non-use values or passive uses) that have been assessed in this report and are likely to be impacted by the proposed / ongoing exploration / prospecting activities:

- (i) Impacts on the physical environment such as the following:
  - ❖ Natural Environment such as air quality, surface water, groundwater, dust noise, waste water management and solid waste management etc;
  - ❖ Built Environment such as land use and user conflicts (agriculture, tourism, conservation) and built environment (houses, roads, transport systems, buildings, infrastructure, and;
  - ❖ Socioeconomic and cultural / archaeological—characteristics of the local societies and communities matters.
  
- (ii) Impacts on the Biological Environment such as the following:
  - ❖ Flora and fauna;
  - ❖ Habitat, and;
  - ❖ Ecosystem functions, services, use values and non-use or passive use.

## 5.4 Impact Assessment Methodology

### 5.4.1 Impact Definition

For the purpose of this Scoping and EMP Report, a natural and/or human environmental impact is defined as: “Change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s environmental aspects.” (ISO 14001).

All proposed project activities (routine and non-routine) were considered during the Scoping Phase in terms of their potential to:

- ❖ Interact with the existing environment (physical, biological and social elements), and;
- ❖ Breach relevant national legislation, relevant international legislation, standards and guidelines, and corporate environmental policy and management systems.

Where a project activity and receptor were considered to have the potential to interact, the impact has been defined and ranked according to its significance. Table 5.1 provides the definition of different categories of impacts identified and used in this report.



This Scoping and EMP Report has assessed the potential impacts resulting from routine Project activities, assuming that the Project activities that may cause an impact will occur but the impact itself will be dependent on the likelihood (Probability) (Table 5.2).

Correct control measures through the implementation of the EMP and monitoring thereof, often reduce any negative significant impacts on the receiving environment as the results of the project activities. The assessment therefore, has focussed on the measures aimed at preventing the occurrence of an impact as well as mitigation measures that may be employed.

Table 5.2: Definition of impact categories used in this report.

<b>Nature of Impact</b>	Adverse	Considered to represent an adverse change from the baseline, or to introduce a new undesirable factor.
	Beneficial	Considered to represent an improvement to the baseline or to introduce a new desirable factor.
<b>Type of Impact</b>	Direct	Results from a direct interaction between a planned or unplanned Project activity and the receiving environment.
	Indirect	Results from the Project but at a later time or at a removed distance or which may occur as a secondary effect of a direct impact.
	Cumulative	Results from (i) interactions between separate Project-related residual impacts; and (ii) interactions between Project-related residual impacts in combination with impacts from other projects and their associated activities. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
<b>Duration of Impact</b>	Short-term	Predicted to last only for a limited period but will cease on completion of the activity, or as a result of mitigation/reinstatement measures and natural recovery typically within a year of the project completion.
	Medium-	Predicted to last only for a medium period after the Project finishing, typically one to five years.
	Long-term	Continues over an extended period, typically more than five years after the Project's completion.
	Permanent	Occurs during the development of the Project and causes a permanent change in the affected receptor or resource that endures substantially beyond the Project lifetime.
<b>Scale of Impact</b>	Local	Affects locally important environmental resources or is restricted to a single habitat/biotope, a single community.
	Regional	Affects nationally important environmental resources, or an area that is nationally important/protected or has macro-economic consequences.
	National	Affects nationally important environmental resources, or an area that is nationally important/protected or has macro-economic consequences.
	International	Affects internationally important resources such as areas protected by international Conventions
	Transboundary	Impacts experienced in one country as a result of activities in another.
<b>Probability</b>	Negligible	Possibility negligible
	Improbable	Possibility very low
	Probable	Distinct possibility
	Highly Probable	Most likely
	Definite	Impact will occur regardless of preventive measures

## 5.4.2 Sensitivity of Receptors

Potential environmental and social effects were assessed in relation to the baseline conditions, i.e. the conditions that would prevail should the project not proceed. For the purpose of this assessment, receptors are defined as elements of the natural or human environment which may interact with, or be interacted by, the project. Baseline conditions are those that existed at the time of the assessment. Impact identification will be considered in terms of receptors and resources sensitive to changes:

- ❖ Resources will be defined as biophysical features, which include flora, fauna, water, landscape, seascape, cultural heritage sites, infrastructure and service facilities, among others, and;
- ❖ Receptors will comprise human beings, either individually or collectively, and the socio-economic systems on which they depend, such as communities and local or regional economies.

It is recognised that some receptors and resources may be more vulnerable to change or to have greater importance than others. Within the Project Area of Influence, the importance and sensitivity of receptors (physical, biological and human) was determined based on professional judgement and taking into account:

- ❖ Relevant legislative or policy standards or guidelines;
- ❖ Relative importance/value assigned to existing social or environmental features and receptors;
- ❖ Capacity of the receptor to absorb change, and;
- ❖ Capacity of the receptor to recover from change.

In evaluating the severity of potential environmental impacts, the following factors have been taken into consideration:

- ❖ Receptor/ Resource Characteristics: The nature, importance and sensitivity to change of the receptors / target or resources that could be affected;
- ❖ Impact Magnitude: The magnitude of the change that is induced;
- ❖ Impact Duration: The time period over which the impact is expected to last;
- ❖ Impact Extent: The geographical extent of the induced change;
- ❖ Probability of Occurrence: Chance of an impact occurring, and;
- ❖ Regulations, Standards and Guidelines: The status of the impact in relation to regulations (e.g. discharge limits), standards (e.g. environmental quality criteria) and guidelines.

The overall impact severity has been categorised using a semi-quantitative subjective scale as shown in Table 5.3 for sensitivity of receptors, Table 5.4 for magnitude, Table 5.5 for duration, Table 5.6 for extent and Table 5.7 showing probability.

Table 5.3: Definitions used for determining the sensitivity of receptors.

SENSITIVITY RATING		CRITERIA
1	Negligible	The receptor or resource is resistant to change or is of little environmental value.
2	Low	The receptor or resource is tolerant of change without detriment to its character, is of low environmental or social value, or is of local importance.
3	Medium	The receptor or resource has low capacity to absorb change without fundamentally altering its present character, is of high environmental or social value, or is of national importance.
4	High	The receptor or resource has moderate capacity to absorb change without significantly altering its present character, has some environmental or social value, or is of district/regional importance.
5	Very High	The receptor or resource has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental or social value, or is of international importance.

Table 5.4: Scored on a scale from 0 to 5 for impact magnitude.

SCALE (-) or (+)	DESCRIPTION
0	no observable effect
1	low effect
2	tolerable effect
3	medium high effect
4	high effect
5	very high effect (devastation)

Table 5.5: Scored time period (duration) over which the impact is expected to last.

SCALE (-) or (+)	DESCRIPTION
T	Temporary
P	Permanent

Table 5.6: Scored geographical extent of the induced change.

SCALE (-) or (+)	DESCRIPTION
L	limited impact on location
O	impact of importance for municipality;
R	impact of regional character
N	impact of national character
M	impact of cross-border character

### 5.4.3 Likelihood (Probability) of Occurrence

The likelihood (probability) of the pre-identified events occurring has been ascribed using a qualitative scale of probability categories (in increasing order of likelihood) as shown in Table 5.7. Likelihood is estimated on the basis of experience and/ or evidence that such an outcome has previously occurred. Impacts resulting from routine/planned events (i.e., normal operations) are classified under category (E).

Table 5.7: Summary of the qualitative scale of probability categories (in increasing order of likelihood).

SCALE (-) or (+)		DESCRIPTION
A		Extremely unlikely (e.g. never heard of in the industry)
B		Unlikely (e.g. heard of in the industry but considered unlikely)
C		Low likelihood (egg such incidents/impacts have occurred but are uncommon)
D		Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry)
E		High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken)

### 5.4.4 Project Activities Summary of Impacts Results

The results of the impacts assessment and evaluation has adopted a matrix framework similar to the Leopold matrix. Assessment results of the magnitude, duration, extent and probability of the potential impacts due to the proposed / ongoing project activities interacting with the receiving environment are presented in form of a matrix table as shown in Tables 5.8-5.11.

The overall severity of potential environmental impacts of the proposed / ongoing project activities on the receiving environment will be of low magnitude (Table 5.8), temporally duration (Table 5.9), localised extent (Table 5.10) and low probability of occurrence (Table 5.11) due to the limited scope of the proposed activities and the use of step progression approach in advancing exploration.

The step progressional approach will allow the proponent to the results of exploration success and the implementation of the next stage of exploration will be subject to the positive outcomes of previous activities as graded (Tables 5.8-5.11). It is important to note that the assessment of the likely impacts as shown in Tables 5.8 - 5.11, have been considered without the implementation of mitigation measures detailed in Section 6 of this Report.

The need for implementation of the appropriate mitigation measures as presented in the Section 6 of this report have be determined on the results of the impact assessment (Tables 5.8 - 5.11) and the significant impacts as detailed in Tables 5.12 and 5.13.

Table 5.8: Results of the scored on a scale from 0 to 5 for negative impact magnitude.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
SCALE	DESCRIPTION		Land Use ( Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Fauna	Habitat	Ecosystem [Services, Function, Use and Non Use Values
0	no observable effect								
1	low effect								
2	tolerable effect								
3	medium high effect								
5	very high effect (devastation)								
EXPLORATION STAGES		ACTIVITIES							
SOURCES OF POTENTIAL IMPACT	1. INITIAL DESKTOP EXPLORATION ACTIVITIES	(i) General evaluation of the EPL area covering satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment	-0	-0	+0	-0	-0	-0	-0
		(ii) Purchase and analysis of existing Government high resolution magnetics and radiometric geophysical data	-0	-0	+0	-0	-0	-0	-0
		(iii) Purchase and analysis of existing Government aerial hyperspectral data if available	-0	-0	+0	-0	-0	-0	-0
		(iv) Interpretation of the results and delineating of potential targets for future reconnaissance regional field-based activities if potential targets have been delineated	-0	-0	+0	-0	-0	-0	-0
	2. REGIONAL RECONNAISSANCE FIELD-BASED ACTIVITIES	(i) Regional geological, topographical and remote sensing mapping and data analysis	-0	-0	+0	-0	-0	-0	-0
		(ii) Regional geochemical sampling aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-0	-0	+0	-0	-0	-0	-0
		(iii) Regional geological mapping aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-0	-0	+0	-0	-0	-0	-0
		(iv) Limited field-based support and logistical activities including exploration camp site lasting between one (1) to two (2) days	-2	-2	+2	-2	-2	-2	-2
		(v) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-0	-0	+0	-0	-0	-0	-0

Table 5.8: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
SCALE	DESCRIPTION		Land Use ( Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values
0	no observable effect								
1	low effect								
2	tolerable effect								
3	medium high effect								
5	very high effect (devastation)								
EXPLORATION STAGES	ACTIVITIES								
SOURCES OF POTENTIAL IMPACT	3. INITIAL LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-2	-0	+0	-2	-2	-2	-2
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-0	-0	+0	-0	-0	-0	-0
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above)	-2	-2	+2	-2	-2	-2	-2
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-2	-2	+2	-2	-2	-2	-2
		(v) Field-based support and logistical activities will be very limited because the local field-based activities will only focus on a site-specific area for a very short time (maximum five (5) days)	-2	-2	+2	-2	-2	-2	-2
		(vi) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-0	-0	+0	-0	-0	-0	-0

Table 5.8: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)								
		PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT					
SCALE	DESCRIPTION	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment –Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem		
0	no observable effect									[Services, Function, Use and Non Use Values]
1	low effect									
2	tolerable effect									
3	medium high effect									
4	high effect									
5	very high effect (devastation)									
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES								
	4. DETAILED LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-1	-1	+1	-1	-1	-1	-1	
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-0	-0	+0	-0	-0	-0	-0	
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above);	-2	-2	+2	-2	-2	-2	-2	
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-2	-2	+2	-2	-2	-2	-2	
		(v) Drilling of boreholes (Subject to the outcomes of i - vi above)	-3	-3	+3	-3	-3	-3	-3	
		(vi) Sampling (Subject to the outcomes of i -vi above)	-3	-3	+3	-3	-3	-3	-3	
		(vii) Access preparation and related logistics to support activities	-3	-3	+3	-3	-3	-3	-3	
		(viii) Laboratory analysis's of collected samples	-0	-0	+0	-0	-0	-0	-0	

Table 5.8: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)							
		PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT				
SCALE	DESCRIPTION	Land Use ( Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment –Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic - Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values	
0	no observable effect								
1	low effect								
2	tolerable effect								
3	medium high effect								
4	high effect								
5	very high effect (devastation)								
EXPLORATION STAGES	ACTIVITIES								
SOURCES OF POTENTIAL IMPACT	5. PREFEASIBILITY AND FEASIBILITY STUDIES	(i) Detailed site-specific surveys	-0	-0	+0	-0	-0	-0	-0
	(ii) Detailed geological mapping	-0	-0	+0	-0	-0	-0	-0	
	(iii) Additional detailed drilling and bulk sampling and testing	-2	-0	+3	-3	-3	-3	-3	
	(iv) Ore reserve calculations	-0	-0	+0	-0	-0	-0	-0	
	(v) Geotechnical studies for mine design	-0	-0	+0	-0	-0	-0	-0	
	(vi) Detailing technical viability studies including forecasts of estimated expenditure and financial	-0	-0	+0	-0	-0	-0	-0	
	(vii) Mine planning and designs including all supporting infrastructures (water, energy and access	-0	-0	+0	-0	-0	-0	-0	
	(viii) Environmental Impact Assessment for mining	-0	-0	+0	-0	-0	-0	-0	
	(ix) Environmental Management Plan for mining	-0	-0	+0	-0	-0	-0	-0	
	(x) Test mining activities	-4	-4	+4	-4	-4	-4	-4	
	(xi) Preparation of feasibility report and application for Mining License	-0	-0	+0	-0	-0	-0	-0	
	(xii) Field-based support and logistical activities will be very extensive because the local field-based activities will on a specific area for a very long time (up to one year or more in some instances)	-3	-3	+3	-3	-3	-3	-3	



Table 5.9: Results of the scored time period over which the impact is expected to last.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			SCALE			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT
DESCRIPTION		T	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Fauna	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
P									
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES							
	1. INITIAL DESKTOP EXPLORATION ACTIVITIES	(i) General evaluation of the EPL area covering satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment	-T	-T	+T	-T	-T	-T	-T
		(ii) Purchase and analysis of existing Government high resolution magnetics and radiometric geophysical data	-T	-T	+T	-T	-T	-T	-T
		(iii) Purchase and analysis of existing Government aerial hyperspectral data if available	-T	-T	+T	-T	-T	-T	-T
		(iv) Interpretation of the results and delineating of potential targets for future reconnaissance regional field-based activities if potential targets have been delineated	-T	-T	+T	-T	-T	-T	-T
	2. REGIONAL RECONNAISSANCE FIELD-BASED ACTIVITIES	(i) Regional geological, topographical and remote sensing mapping and data analysis	-T	-T	+T	-T	-T	-T	-T
		(ii) Regional geochemical sampling aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-T	-T	+T	-T	-T	-T	-T
		(iii) Regional geological mapping aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-T	-T	+T	-T	-T	-T	-T
		(iv) Limited field-based support and logistical activities including exploration camp site lasting between one (1) to two (2) days	-T	-T	+T	-T	-T	-T	-T
		(v) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-T	-T	+T	-T	-T	-T	-T

Table 5.9: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)												
		SCALE			DESCRIPTION			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
		T		P	Temporary	Permanent	Land Use (Agriculture, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]	
EXPLORATION STAGES	ACTIVITIES													
SOURCES OF POTENTIAL IMPACT	3. INITIAL LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-T	-T	+T	-T	-T	-T	-T	-T	-T			
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-T	-T	+T	-T	-T	-T	-T	-T	-T			
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above)	-T	-T	+T	-T	-T	-T	-T	-T	-T			
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-T	-T	+T	-T	-T	-T	-T	-T	-T			
		(v) Field-based support and logistical activities will be very limited because the local field-based activities will only focus on a site-specific area for a very short time (maximum five (5) days)	-T	-T	+T	-T	-T	-T	-T	-T	-T			
		(vi) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-T	-T	+T	-T	-T	-T	-T	-T	-T			

Table 5.9: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)																		
		<table border="1"> <thead> <tr> <th>SCALE</th> <th colspan="2">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>T</td> <td>Temporary</td> <td></td> </tr> <tr> <td>P</td> <td>Permanent</td> <td></td> </tr> </tbody> </table>			SCALE	DESCRIPTION		T	Temporary		P	Permanent		PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
					SCALE	DESCRIPTION														
T	Temporary																			
P	Permanent																			
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]											
	4. DETAILED LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-T	-T	+T	-T	-T	-T	-T											
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-T	-T	+T	-T	-T	-T	-T											
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above);	-T	-T	+T	-T	-T	-T	-T											
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-T	-T	+T	-T	-T	-T	-T											
		(v) Drilling boreholes (Subject to the outcomes of i - vi above)	-T	-T	+T	-T	-T	-T	-T											
		(vi) Bulk Sampling (Subject to the outcomes of i -vi above)	-P	-P	+P	-P	-P	-P	-P											
		(vii) Access preparation and related logistics to support activities	-T	-T	+T	-T	-T	-T	-T											
		(viii) Laboratory analysis's of collected samples	-T	-T	+T	-T	-T	-T	-T											

Table 5.9: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)											
		SCALE		DESCRIPTION		PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT				
		T		Temporary			Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]			
P		Permanent											
EXPLORATION STAGES		ACTIVITIES					PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT			
							Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
<b>SOURCES OF POTENTIAL IMPACT</b>	<b>5. PREFEASIBILITY AND FEASIBILITY STUDIES</b>	(i) Detailed site-specific surveys	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(ii) Detailed geological mapping	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(iii) Additional detailed drilling and bulk sampling and testing	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(iv) Ore reserve calculations	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(v) Geotechnical studies for mine design	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(vi) Detailing technical viability studies including forecasts of estimated expenditure and financial	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(vii) Mine planning and designs including all supporting infrastructures (water, energy and access	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(viii) Environmental Impact Assessment for mining	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(ix) Environmental Management Plan for mining	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(x) Test mining activities	-P	-P	+P	-P	-P	-P	-P	-P	-P		
		(xi) Preparation of feasibility report and application for Mining License	-T	-T	+T	-T	-T	-T	-T	-T	-T		
		(xii) Field-based support and logistical activities will be very extensive because the local field-based activities will on a specific area for a very long time (up to one year or more in some instances)	-T	-T	+T	-T	-T	-T	-T	-T	-T		

Table 5.10: Results of the scored geographical extent of the induced change.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
SCALE		DESCRIPTION	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Fauna	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
L		limited impact on location							
O		impact of importance for municipality							
R		impact of regional character							
N		impact of national character							
M		impact of cross-border character							
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES							
	1. INITIAL DESKTOP EXPLORATION ACTIVITIES	(i) General evaluation of the EPL area covering satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment	-L	-L	+L	-L	-L	-L	-L
		(ii) Purchase and analysis of existing Government high resolution magnetics and radiometric geophysical data	-L	-L	+L	-L	-L	-L	-L
		(iii) Purchase and analysis of existing Government aerial hyperspectral data if available	-L	-L	+L	-L	-L	-L	-L
		(iv) Interpretation of the results and delineating of potential targets for future reconnaissance regional field-based activities if potential targets have been delineated	-L	-L	+L	-L	-L	-L	-L
	2. REGIONAL RECONNAISSANCE FIELD-BASED ACTIVITIES	(i) Regional geological, topographical and remote sensing mapping and data analysis	-L	-L	+L	-L	-L	-L	-L
		(ii) Regional geochemical sampling aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-L	-L	+L	-L	-L	-L	-L
		(iii) Regional geological mapping aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-L	-L	+L	-L	-L	-L	-L
		(iv) Limited field-based support and logistical activities including exploration camp site lasting between one (1) to two (2) days	-L	-L	+L	-L	-L	-L	-L
		(v) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-L	-L	+L	-L	-L	-L	-L

Table 5.10: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
SCALE	DESCRIPTION		Land Use (Exploration and Mining, , Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values
L	limited impact on location								
O	impact of importance for municipality								
R	impact of regional character								
N	impact of national character								
M	impact of cross-border character								
EXPLORATION STAGES	ACTIVITIES								
<b>SOURCES OF POTENTIAL IMPACT</b>	<b>3. INITIAL LOCAL FIELD-BASED ACTIVITIES</b>	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-L	-L	+L	-L	-L	-L	-L
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-L	-L	+L	-L	-L	-L	-L
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above)	-L	-L	+L	-L	-L	-L	-L
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-L	-L	+L	-L	-L	-L	-L
		(v) Field-based support and logistical activities will be very limited because the local field-based activities will only focus on a site-specific area for a very short time (maximum five (5) days)	-L	-L	+L	-L	-L	-L	-L
		(vi) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-L	-L	+L	-L	-L	-L	-L

Table 5.10: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)									
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT						
SCALE	DESCRIPTION		Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values			
L	limited impact on location					-L	-L	+L	-L	-L	-L	-L
O	impact of importance for municipality					-L	-L	+L	-L	-L	-L	-L
R	impact of regional character					-L	-L	+L	-L	-L	-L	-L
N	impact of national character					-L	-L	+L	-L	-L	-L	-L
M	impact of cross-border character					-L	-L	+L	-L	-L	-L	-L
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES										
	4. DETAILED LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-L	-L	+L	-L	-L	-L	-L			
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-L	-L	+L	-L	-L	-L	-L			
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above);	-L	-L	+L	-L	-L	-L	-L			
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-L	-L	+L	-L	-L	-L	-L			
		(v) Drilling boreholes (Subject to the outcomes of i - vi above)	-L	-L	+L	-L	-L	-L	-L			
		(vi) Bulk Sampling (Subject to the outcomes of i -vi above)	-L	-L	+L	-L	-L	-L	-L			
		(vii) Access preparation and related logistics to support activities	-L	-L	+L	-L	-L	-L	-L			
(viii) Laboratory analysis's of collected samples	-L	-L	+L	-L	-L	-L	-L					

Table 5.10: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)							
		PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT				
SCALE	DESCRIPTION	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values	
L	limited impact on location				-L	-L	-L	-L	-L
O	impact of importance for municipality				-L	-L	-L	-L	-L
R	impact of regional character				-L	-L	-L	-L	-L
N	impact of national character				-L	-L	-L	-L	-L
M	impact of cross-border character	-L	-L	-L	-L	-L			
EXPLORATION STAGES	ACTIVITIES								
<b>SOURCES OF POTENTIAL IMPACT</b>	5. <b>PREFEASIBILITY AND FEASIBILITY STUDIES</b>	(i) Detailed site-specific surveys	-L	-L	+L	-L	-L	-L	-L
	(ii) Detailed geological mapping	-L	-L	+L	-L	-L	-L	-L	
	(iii) Additional detailed drilling and bulk sampling and testing	-L	-L	+L	-L	-L	-L	-L	
	(iv) Ore reserve calculations	-L	-L	+L	-L	-L	-L	-L	
	(v) Geotechnical studies for mine design	-L	-L	+L	-L	-L	-L	-L	
	(vi) Detailing technical viability studies including forecasts of estimated expenditure and financial	-L	-L	+L	-L	-L	-L	-L	
	(vii) Mine planning and designs including all supporting infrastructures (water, energy and access	-L	-L	+L	-L	-L	-L	-L	
	(viii) Environmental Impact Assessment for mining	-L	-L	+L	-L	-L	-L	-L	
	(ix) Environmental Management Plan for mining	-L	-L	+L	-L	-L	-L	-L	
	(x) Test mining activities	-L	-L	+L	-L	-L	-L	-L	
	(xi) Preparation of feasibility report and application for Mining License	-L	-L	+L	-L	-L	-L	-L	
	(xii) Field-based support and logistical activities will be very extensive because the local field-based activities will on a specific area for a very long time (up to one year or more in some instances)	-L	-L	+L	-L	-L	-L	-L	



Table 5.11: Results of the qualitative scale of probability occurrence.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
SCALE	DESCRIPTION		Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Fauna	Habitat	Ecosystem [Services, Function, Use and Non Use Values
A	Extremely unlikely (e.g. never heard of in the industry)								
B	Unlikely (e.g. heard of in the industry but considered unlikely)								
C	Low likelihood (egg such incidents/impacts have occurred but are uncommon)								
D	Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry)								
E	High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken)								
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES							
	1. INITIAL DESKTOP EXPLORATION ACTIVITIES	(i) General evaluation of the EPL area covering satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment	-A	-A	+A	-A	-A	-A	-A
		(ii) Purchase and analysis of existing Government high resolution magnetics and radiometric geophysical data	-A	-A	+A	-A	-A	-A	-A
		(iii) Purchase and analysis of existing Government aerial hyperspectral data if available	-A	-A	+A	-A	-A	-A	-A
		(iv) Interpretation of the results and delineating of potential targets for future reconnaissance regional field-based activities if potential targets have been delineated	-A	-A	+A	-A	-A	-A	-A
	2. REGIONAL RECONNAISSANCE FIELD-BASED ACTIVITIES	(i) Regional geological, topographical and remote sensing mapping and data analysis	-A	-A	+A	-A	-A	-A	-A
		(ii) Regional geochemical sampling aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-A	-A	+A	-A	-A	-A	-A
		(iii) Regional geological mapping aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	-A	-A	+A	-A	-A	-A	-A
		(iv) Limited field-based support and logistical activities including exploration camp site lasting between one (1) to two (2) days	-A	-A	+A	-A	-A	-A	-A
		(v) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-A	-A	+A	-A	-A	-A	-A

Table 5.11: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
SCALE		DESCRIPTION	PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
A		Extremely unlikely (e.g. never heard of in the industry)	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
B		Unlikely (e.g. heard of in the industry but considered unlikely)							
C		Low likelihood (egg such incidents/impacts have occurred but are uncommon)							
D		Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry)							
E		High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken)							
EXPLORATION STAGES		ACTIVITIES							
<b>SOURCES OF POTENTIAL IMPACT</b>	<b>3. INITIAL LOCAL FIELD-BASED ACTIVITIES</b>	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-C	-C	+C	-C	-C	-C	-C
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-A	-A	+A	-A	-A	-A	-A
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above)	-C	-C	+C	-C	-C	-C	-C
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-C	-C	+C	-C	-C	-C	-C
		(v) Field-based support and logistical activities will be very limited because the local field-based activities will only focus on a site-specific area for a very short time (maximum five (5) days)	-C	-C	+C	-C	-C	-C	-C
		(vi) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	-A	-A	+A	-A	-A	-A	-A

Table 5.11: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
SCALE	DESCRIPTION		PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
A	Extremely unlikely (e.g. never heard of in the industry)		Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
B	Unlikely (e.g. heard of in the industry but considered unlikely)								
C	Low likelihood (egg such incidents/impacts have occurred but are uncommon)								
D	Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry)								
E	High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken)								
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES							
	4. DETAILED LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	-C	-C	+C	-C	-C	-C	-C
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	-A	-A	+A	-A	-A	-A	-A
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above);	-C	-C	+C	-C	-C	-C	-C
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	-C	-C	+C	-C	-C	-C	-C
		(v) Drilling boreholes (Subject to the outcomes of i - vi above)	-C	-C	+C	-C	-C	-C	-C
		(vi) Bulk Sampling (Subject to the outcomes of i -vi above)	-C	-C	+C	-C	-C	-C	-C
		(vii) Access preparation and related logistics to support activities	-C	-C	+C	-C	-C	-C	-C
		(viii) Laboratory analysis's of collected samples	-A	-A	+A	-A	-A	-A	-A

Table 5.11: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)									
		PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT						
SCALE	DESCRIPTION	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values			
A	Extremely unlikely (e.g. never heard of in the industry)				-B	-B	+B	-B	-B	-B	-B
B	Unlikely (e.g. heard of in the industry but considered unlikely)				-A	-A	+A	-A	-A	-A	-A
C	Low likelihood (egg such incidents/impacts have occurred but are uncommon)				D	D	+D	D	D	D	D
D	Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry)				-A	-A	+A	-A	-A	-A	-A
E	High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken)	-A	-A	+A	-A	-A	-A	-A			
EXPLORATION STAGES		ACTIVITIES									
SOURCES OF POTENTIAL IMPACT	5. PREFEASIBILITY AND FEASIBILITY STUDIES	(i) Detailed site-specific surveys	-B	-B	+B	-B	-B	-B	-B		
		(ii) Detailed geological	-A	-A	+A	-A	-A	-A	-A		
		(iii) Additional detailed drilling and bulk sampling and testing	D	D	+D	D	D	D	D		
		(iv) Ore reserve calculations	-A	-A	+A	-A	-A	-A	-A		
		(v) Geotechnical studies for mine design	-A	-A	+A	-A	-A	-A	-A		
		(vi) Detailing technical viability studies including forecasts of estimated expenditure and financial	-A	-A	+A	-A	-A	-A	-A		
		(vii) Mine planning and designs including all supporting infrastructures (water, energy and access	-A	-A	+A	-A	-A	-A	-A		
		(viii) Environmental Impact Assessment for mining	-A	-A	+A	-A	-A	-A	-A		
		(ix) Environmental Management Plan for mining	-A	-A	+A	-A	-A	-A	-A		
		(x) Test mining activities	-D	-D	+D	-D	-D	-D	-D		
		(xi) Preparation of feasibility report and application for Mining License	-A	-A	+A	-A	-A	-A	-A		
		(xii) Field-based support and logistical activities will be very extensive because the local field-based activities will on a specific area for a very long time (up to one year or more in some instances)	-D	-D	+D	-D	-D	-D	-D		

## 5.5 Evaluation of Significant Impacts

### 5.5.1 Overview

The significance of each impact has been determined by assessing the impact severity against the likelihood (probability) of the impact occurring as summarised in the impact significance assessment matrix provided in Table 5.12.

### 5.5.2 Significance Criteria

Significance criteria for negative/adverse impacts (i.e., relative ranking of importance) are defined in Table 5.12. It is important to note that impacts have been considered without the implementation of mitigation measures. The need for and appropriate mitigation measures as presented in the EMP Section 6 of this report have been determined on the basis of the impact assessment presented in this report.

Table 5.12: Scored impact significance criteria.

IMPACT SEVERITY	IMPACT LIKELIHOOD				
	Extremely Unlikely (-) or (+) [0]	Unlikely (-) or (+) [1]	Low Likelihood (-) or (+) [2]	Medium Likelihood (-) or (+) [3]	High Likelihood (-) or (+) [4]
Negligible (-) or (+) [A]	Negligible Impact [A0]	Negligible Impact [A1]	Negligible Impact [A2]	Negligible Impact [A3]	Negligible Impact [A4]
Low (-) or (+) [B]	Negligible Impact [B0]	Negligible Impact [B1]	Negligible Impact [B2]	Negligible to Low Impact [B3]	Low Impact [B4]
Medium (-) or (+) [C]	Negligible Impact [C0]	Negligible Impact [C1]	Low Impact [C2]	Low to Medium Impact [C3]	Medium Impact [C4]
High (-) or (+) [D]	Negligible to Low Impact [D0]	Low Impact [D1]	Medium Impact [D2]	High Impact [D3]	High to Unacceptable Impact [D4]

### 5.5.3 Assessment Likely Significant Impacts

The assessment of significant impacts depended upon the degree to which the proposed / ongoing project activities are likely to result in unwanted consequences on the receptor covering physical and biological environments (Table 5.13). Overall, the assessment of significant impacts has focused on the ecosystem-based approach that considers potential impacts to the ecosystem. The main key sources of impacts that have been used in the determination of significant impacts posed by the proposed / ongoing minerals exploration

comprised activities. Each of the main areas of impact have been identified and assessed as follows:

- ❖ Positive Impacts are classified under a single category; they are then evaluated qualitatively with a view to their enhancement, if practical;
- ❖ Negligible or Low Impacts will require little or no additional management or mitigation measures (on the basis that the magnitude of the impact is sufficiently small, or that the receptor is of low sensitivity);
- ❖ Medium or High Impacts require the adoption of management or mitigation measures;
- ❖ High Impacts always require further management or mitigation measures to limit or reduce the impact to an acceptable level.

Overall the results of the significant impact assessment matrix for the proposed / ongoing minerals exploration activities on the physical and biological environments are shown in Tables 5.13.

Table 5.13: Significant impact assessment matrix for the proposed / ongoing exploration activities.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)									
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT						
IMPACT SEVERITY	IMPACT LIKELIHOOD					Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management	Socioeconomic Characteristics of the local societies and communities matters	Flora	Fauna	Habitat	Ecosystem [Services, Function, Use and Non Use Values]
	Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]							
Slight [A]	[A0]	[A1]	[A2]	[A3]	[A4]							
Low [B]	[B0]	[B1]	[B2]	[B3]	[B4]							
Medium [C]	[C0]	[C1]	[C2]	[C3]	[C4]							
High [D]	[D0]	[D1]	[D2]	[D3]	[D4]							
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES										
	1. INITIAL DESKTOP EXPLORATION ACTIVITIES	(i) General evaluation of the EPL area covering satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(ii) Purchase and analysis of existing Government high resolution magnetics and radiometric geophysical data	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(iii) Purchase and analysis of existing Government aerial hyperspectral data if available	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(iv) Interpretation of the results and delineating of potential targets for future reconnaissance regional field-based activities if potential targets have been delineated	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]
	2. REGIONAL RECONNAISSANCE FIELD-BASED ACTIVITIES	(i) Regional geological, topographical and remote sensing mapping and data analysis	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	
		(ii) Regional geochemical sampling aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	
		(iii) Regional geological mapping aimed at identifying possible targeted based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	
		(iv) Limited field-based support and logistical activities including exploration camp site lasting between one (1) to two (2) days	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	
		(v) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	

Table 5.13: Cont.

		ENVIRONMENTAL IMPACT KEY					RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)						
		IMPACT LIKELIHOOD					PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT			
IMPACT SEVERITY		Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values
Slight [A]		[A0]	[A1]	[A2]	[A3]	[A4]							
Low [B]		[B0]	[B1]	[B2]	[B3]	[B4]							
Medium [C]		[C0]	[C1]	[C2]	[C3]	[C4]							
High [D]		[D0]	[D1]	[D2]	[D3]	[D4]							
EXPLORATION STAGES	ACTIVITIES												
<b>SOURCES OF POTENTIAL IMPACT</b>	<b>3. INITIAL LOCAL FIELD-BASED ACTIVITIES</b>	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	[-B2]	[-B2]	[+B2]	[-B2]	[-B2]	[-B2]	[-B2]	[-B2]			
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]			
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above)	[-B2]	[-B2]	[+B2]	[-B2]	[-B2]	[-B2]	[-B2]	[-B2]			
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	[-B2]	[-B2]	[+B2]	[-B2]	[-B2]	[-B2]	[-B2]	[-B2]			
		(v) Field-based support and logistical activities will be very limited because the local field-based activities will only focus on a site-specific area for a very short time (maximum five (5) days)	[-B2]	[-B2]	[+B2]	[-B2]	[-B2]	[-B2]	[-B2]	[-B2]			
		(vi) Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for future detailed site-specific exploration if the results are positive and supports further exploration of the delineated targets	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]			



Table 5.13: Cont.

ENVIRONMENTAL IMPACT KEY			RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)										
			PHYSICAL ENVIRONMENT			BIOLOGICAL ENVIRONMENT							
IMPACT SEVERITY	IMPACT LIKELIHOOD					Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure	Natural Environment –Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values	
	Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]								
Slight [A]	[A0]	[A1]	[A2]	[A3]	[A4]								
Low [B]	[B0]	[B1]	[B2]	[B3]	[B4]								
Medium [C]	[C0]	[C1]	[C2]	[C3]	[C4]								
High [D]	[D0]	[D1]	[D2]	[D3]	[D4]								
SOURCES OF POTENTIAL IMPACT	EXPLORATION STAGES	ACTIVITIES											
	4. DETAILED LOCAL FIELD-BASED ACTIVITIES	(i) Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional geochemical sampling and analysis undertaken	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(ii) Local geological mapping aimed at identifying possible targeted based on the results of the regional geological and analysis undertaken	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(iii) Ground geophysical survey (Subject to the positive outcomes of i and ii above);	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(iv) Possible Trenching (Subject to the outcomes of i - iii above)	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(v) Drilling boreholes (Subject to the outcomes of i - vi above)	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(vi) Bulk Sampling (Subject to the outcomes of i -vi above)	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(vii) Access preparation and related logistics to support activities	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]	[+D2]
		(viii) Laboratory analysis's of collected samples	[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]	[-A0]

Table 5.13: Cont.

ENVIRONMENTAL IMPACT KEY		RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES)											
		IMPACT LIKELIHOOD			PHYSICAL ENVIRONMENT			PHYSICAL ENVIRONMENT					
IMPACT SEVERITY	Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]	Land Use (Exploration and Mining, Tourism, Conservation) and Built Environment (Houses, Roads, Transport Systems, Buildings, Infrastructure)	Natural Environment – Air Quality, Surface Water, Groundwater, Dust Noise, Waste Water Management, Solid Waste Management etc	Socioeconomic Characteristics of the local societies and communities matters	Flora	Flora	Habitat	Ecosystem [Services, Function, Use and Non Use Values]	
Slight [A]	[A0]	[A1]	[A2]	[A3]	[A4]								
Low [B]	[B0]	[B1]	[B2]	[B3]	[B4]								
Medium [C]	[C0]	[C1]	[C2]	[C3]	[C4]								
High [D]	[D0]	[D1]	[D2]	[D3]	[D4]								
EXPLORATION STAGES		ACTIVITIES											
<b>SOURCES OF POTENTIAL IMPACT</b>	<b>5. PREFEASIBILITY AND FEASIBILITY STUDIES</b>	(i) Detailed site-specific surveys					[-B2]	[-B2]	[+B2]	[-B2]	[-B2]	[-B2]	[-B2]
		(ii) Detailed geological					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(iii) Additional detailed drilling and bulk sampling and testing					[-D3]	[-D3]	[+D3]	[-D3]	[-D3]	[-D3]	[-D3]
		(iv) Ore reserve calculations					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(v) Geotechnical studies for mine design					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(vi) Detailing technical viability studies including forecasts of estimated expenditure and financial					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(vii) Mine planning and designs including all supporting infrastructures (water, energy and access					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(viii) Environmental Impact Assessment for mining					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(ix) Environmental Management Plan for mining					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(x) Test mining activities					[-D3]	[-D3]	[+D3]	[-D3]	[-D3]	[-D3]	[-D3]
		(xi) Preparation of feasibility report and application for Mining License					[-A0]	[-A0]	[+A0]	[-A0]	[-A0]	[-A0]	[-A0]
		(xii) Field-based support and logistical activities will be very extensive because the local field-based activities will on a specific area for a very long time (up to one year or more in some instances)					[-D3]	[-D3]	[+D3]	[-D3]	[-D3]	[-D3]	[-D3]

## 5.6 Assessment of Overall Impacts

### 5.6.1 Summary of the Results of the Impact Assessment

In accordance with Tables 5.8 - 5.13, the following is the summary of the overall likely negative and significant impacts of the proposed / ongoing exploration activities on the receiving environment (physical, biological and socioeconomic environments) without and with mitigations:

- (i) Initial desktop exploration activities: Overall likely negative impact on the receiving environment will be negligible with extremely unlikely probability of occurrence without mitigations. Overall significant impacts will be negligible **[A0]** (Table 5.13). Except for the socioeconomic components which carries a **(+)**, all the other likely impacts are negative **(-)**;
- (ii) Regional reconnaissance field-based activities: Overall likely negative impact on the receiving environment will be negligible with extremely unlikely probability of occurrence without mitigations. Overall significant impacts will be negligible **[A0]**. Some field-based activities will have localised low impacts with low probability of occurrence without mitigations and negligible with mitigations. Overall significant impacts will be negligible **[B2]** (Table 5.13). Except for the socioeconomic components which carries a **(+)**, all the other likely impacts are negative **(-)**;
- (iii) Initial local field-based activities: Initial field-based activities will have localised low impacts with low probability of occurrence without mitigations and negligible with mitigations. Overall significant impacts will be negligible **[B2]**. All desktop related activities and laboratory assessments will have negligible impacts with extremely unlikely probability of occurrence without mitigations. Overall significant impacts will be negligible **[A0]** (Table 5.13). Except for the socioeconomic components which carries a **(+)**, all the other likely impacts are negative **(-)**;
- (iv) Detailed local field-based activities: Overall likely negative impact on the receiving environment will be high and localised impacts without mitigations and localised low impacts with mitigations. Overall significant impacts will be medium **[D2]** without mitigations and low with mitigations (Table 5.13). Except for the socioeconomic components which carries a **(+)**, all the other likely impacts are negative **(-)**;
- (v) Prefeasibility and feasibility studies to be implemented on a site specific area if the local field-based studies proves positive: Overall likely negative impact on the receiving environment will be high and localised impacts without mitigations and localised medium impacts with mitigations. Overall significant impacts will be high **[D3]** without mitigations and low with mitigations for bulk sampling, test mining and field logistics (Table 5.13). Except for the socioeconomic components which carries a **(+)**, all the other likely impacts are negative **(-)**.

## 6. THE EMP

### 6.1 Summary of the EMP Objectives

The Environmental Management Plan (EMP) provides a detailed plan of action required in the implementation of the mitigation measures for minimising and maximising the identified negative and positive impacts respectively. The EMP gives commitments including financial and human resources provisions for effective management of the likely environmental liabilities during and after the exploration. Regular assessments and evaluation of the environmental liabilities during the exploration will need to be undertaken and will ensure adequate provision of the necessary resources towards good environmental management at various stages of the project development.

### 6.2 Implementation of the EMP

#### 6.2.1 Roles and Responsibilities

Management of the environmental elements that may be affected by the different activities of the proposed / ongoing exploration is an important element of the proposed / ongoing exploration activities. The EMP also identifies the activity groups / environmental elements, the aspects / targets, the indicators, the schedule for implementation and who should be responsible for the management to prevent major impacts that the different exploration activities may have on the receiving environment (physical and biological environments).

#### 6.2.2 Proponent's Representative (PR) / Project Manager (PM)

The proponent is to appoint a **Proponent's Representative (PR) / Project Manager (PM)** with the following responsibilities with respect to the EMP implementation:

- ❖ Act as the site project manager and implementing agent;
- ❖ Ensure that the proponent's responsibilities are executed in compliance with the relevant legislation;
- ❖ Ensure that all the necessary environmental authorizations and permits have been obtained;
- ❖ Assist the exploration contractor/s in finding environmentally responsible solutions to challenges that may arise;
- ❖ Should the PR be of the opinion that a serious threat to, or impact on the environment may be caused by the exploration activities, he/she may stop work; the proponent must be informed of the reasons for the stoppage as soon as possible;
- ❖ The PR has the authority to issue fines for transgressions of basic conduct rules and/or contravention of the EMP;
- ❖ Should the Contractor or his/her employees fail to show adequate consideration for the environmental aspects related to the EMP, the PR can have person(s) and/or equipment removed from the site or work suspended until the matter is remedied;

- ❖ Maintain open and direct lines of communication between the landowners and proponent, as well as any other identified Interested and Affected Parties (I&APs) with regards to environmental matters; and
- ❖ Attend regular site meetings and inspections as may be required for the proposed / ongoing exploration programme.

### 6.2.3 Project Health, Safety and Environment (Project HSE)

The proponent is to appoint a Project Health, Safety and Environment (Project HSE) with the following responsibilities with respect to the EMP implementation:

- ❖ Assist the PR in ensuring that the necessary environmental authorizations and permits have been obtained;
- ❖ Assist the PR and Contractor in finding environmentally responsible solutions to challenges that may arise;
- ❖ Conduct environmental monitoring as per EMP requirements;
- ❖ Carry out regular site inspections (on average once per week) of all exploration areas with regards to compliance with the EMP; report any non-compliance(s) to the PR as soon as possible;
- ❖ Organize for an independent internal audit on the implementation of and compliance to the EMP to be carried out half way through each field-based exploration activity; audit reports to be submitted to the PR;
- ❖ Continuously review the EMP and recommend additions and/or changes to the EMP document;
- ❖ Monitor the Contractor's environmental awareness training for all new personnel coming onto site;
- ❖ Keep records of all activities related to environmental control and monitoring; the latter to include a photographic records of the exploration activities, rehabilitation process, and a register of all major incidents; and
- ❖ Attend regular site meetings.

### 6.2.4 Contractors and Subcontractors

The responsibilities of the **Contractors and Subcontractors** that may be appointed by the proponent to undertake certain field-based activities of the proposed / ongoing exploration programme include:

- ❖ Comply with the relevant legislation and the EMP provision;
- ❖ Preparation and submission to the proponent through the Project HSE of the following Management Plans:

- Environmental Awareness Training and Inductions;
  - Emergency Preparedness and Response;
  - Waste Management; and;
  - Health and Safety.
- ❖ Ensure adequate environmental awareness training for senior site personnel;
  - ❖ Environmental awareness presentations (inductions) to be given to all site personnel prior to work commencement; the Project HSE is to provide the course content and the following topics, at least but not limited to, should be covered:
    - The importance of complying with the EMP provisions;
    - Roles and Responsibilities, including emergency preparedness;
    - Basic Rules of Conduct (Do's and Don'ts);
    - EMP: aspects, impacts and mitigation;
    - Fines for Failure to Adhere to the EMP;
    - Health and Safety Requirements.
  - ❖ Record keeping of all environmental awareness training and induction presentations; and
  - ❖ Attend regular site meetings and environmental inspections.

## **6.3 Specific Mitigation Measures**

### **6.3.1 Hierarchy of Mitigation Measures Implementation**

A hierarchy of methods for mitigating significant adverse effects has been adopted in order of preference and as follows:

- (i) Enhancement, e.g. provision of new habitats;
- (ii) Avoidance, e.g. sensitive design to avoid effects on ecological receptors;
- (iii) Reduction, e.g. limitation of effects on receptors through design changes; and
- (iv) Compensation, e.g. community benefits.

### **6.3.2 Mitigation Measures Implementation**

The Environmental Management Plan (EMP) provides a detailed plan of action required in the implementation of the mitigation measures for minimising and maximising the identified negative and positive impacts respectively. The EMP also provides the management actions

with roles and responsibilities requirements for implementation of environmental management strategies by the proponent through the Contractors and Subcontractors who will be undertaking the exploration activities. The EMP gives commitments including financial and human resources provisions for effective management of the likely environmental liabilities during and after the implementation of the proposed / ongoing exploration programme.

Based on the findings of the Scoping work, Table 6.1 – 6.18 provides the detailed specific mitigations measures to be implemented by the proponent with respect to the proposed / ongoing exploration programme activities and in particular for the field-based exploration activities. The following is the summary of the key areas of the migration measures provided in Tables 6.1-6.18:

1. Protect the pans habitats through effective project planning and implementation;
2. Implementation of the EMP;
3. Public and stakeholders relations;
4. Measures to enhance positive socioeconomic impacts;
5. Environmental awareness briefing and training;
6. Erection of supporting exploration infrastructure;
7. Use of existing access roads, tracks and general vehicle movements;
8. Mitigation measures for preventing flora destruction;
9. Mitigation measures for preventing faunal destruction;
10. Mitigation measures to be implemented with respect to the exploration camps and exploration sites;
11. Mitigation measures for surface and groundwater protection as well as general water usage;
12. Mitigation measures to minimise negative socioeconomic impacts;
13. Mitigation measures to minimise health and safety impacts;
14. Mitigation measures to minimise visual impacts;
15. Mitigation measures to minimise vibration, noise and air quality;
16. Mitigation measures for waste (solid and liquid) management;
17. Rehabilitation plan, and;
18. Environmental data collection.

Table 6.1: Project planning and implementation.

OBJECTIVES	INDICATOR	SCHEDULE	RESPONSIBILITY
<p>Protect the pans habitats and establish a strong environmental awareness protocol from project implementation to final closure in order to ensure the least possible impact to the environment.</p>	<ol style="list-style-type: none"> <li>1. Resources (Human and Financial) are provided for the Environmental Awareness and Training, Regular Safety, Health and Environment meetings and for internal and external Environmental Monitoring Costs as well as for any rehabilitation costs that may arise.</li> <li>2. Appointment of a senior and experienced persons as Proponent's Representative (PR), Project Manager (PM) and Project HSE to assume responsibility for environmental issues.</li> <li>3. All individuals including sub-contractors who work on, or visit, the sites are aware of the contents of the Environmental Policy and the EMP.</li> <li>4. The EMP and Environmental Policy will be included in Tender Documents.</li> <li>5. Field visit will take place during which main access tracks will be discussed in cooperation with the land owner/s</li> <li>6. Limit damage to the various ephemeral pans throughout the area – i.e. access routes onto pans should be limited to prospecting areas only;</li> <li>7. Limit exploration activities to the dry season only as heavy vehicles would leave more scars on wet soils requiring more rehabilitation;</li> <li>8. Rehabilitate all damage to the pans affected by the exploration activities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Regional reconnaissance field-based mapping and sampling activities;</li> <li>2. Initial local field-based mapping and sampling activities;</li> <li>3. Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>4. Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.2: Implementation of the EMP.

OBJECTIVES	INDICATOR	SCHEDULE	RESPONSIBILITY
<ol style="list-style-type: none"> <li>1. Define roles and responsibilities in terms of the EMP. To make all personnel, contractors and subcontractors aware of these roles and responsibilities to ensure compliance with the EMP provisions.</li> <li>2. Implement environmental management that is preventative and proactive.</li> <li>3. Establish the resources, skills, etc. required for effective environmental management.</li> </ol>	<ol style="list-style-type: none"> <li>1. Senior staff and senior contractors are aware of, and practice the EMP requirements. These persons shall be expected to know and understand the objectives of the EMP and will, by example, encourage suitable environmentally friendly behaviour to be adopted during the exploration</li> <li>2. Recognition will be given to appropriate environmentally acceptable behaviour.</li> <li>3. Inappropriate behaviour will be corrected. An explanation to why the behaviour is unacceptable must be given, and, if necessary, the person will be disciplined. e.g. fees set out for non-compliance</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>



Table 6.3: Public and stakeholders relations.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
Maintain sound relationships with the Other land users/ land owner/s and other stakeholders / public	<ol style="list-style-type: none"> <li>1. No littering or any other activity prohibited</li> <li>2. Permission to utilise water as well as all applicable permits are obtained.</li> </ol>	<ol style="list-style-type: none"> <li>1. Regional reconnaissance field-based mapping and sampling activities;</li> <li>2. Initial local field-based mapping and sampling activities;</li> <li>3. Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>4. Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.4: Measures to enhance positive socioeconomic impacts.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Measures to enhance positive socioeconomic impacts in order to:</p> <ol style="list-style-type: none"> <li>1. Avoid exacerbating the influx of unemployed people to the area.</li> <li>2. Develop a standardised recruitment method for sub-contractor and field workers.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stipulate a preference for local contractors in its tender policy. Preference to local contractors should still be based on competitive business principles and salaries and payment to local service providers should still be competitive;</li> <li>2. Develop a database of local businesses that qualify as potential service providers and invite them to the tender process;</li> <li>3. Scrutinise tender proposals to ensure that minimum wages were included in the costing;</li> <li>4. Stipulate that local residents should be employed for temporary unskilled/skilled and where possible in permanent unskilled/skilled positions as they would reinvest in the local economy;</li> <li>5. Must ensure that potential employees are from the area, they need submit proof of having lived in the area for a minimum of 5 years;</li> <li>6. Must ensure that contractors adhere to Namibian Affirmative Action, Labour and Social Security, Health and Safety laws. This could be accomplished with a contractual requirement stipulating that monthly proof should be submitted indicating payment of minimum wages to workers, against their ID numbers, payment of social security and submission of affirmative action data;</li> <li>7. Encouraged to cater for the needs of employees to increase the spending of wages locally.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.5: Environmental awareness briefing and training.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
Implement environmental awareness briefing / training for individuals who visit, or work, on site.	<ol style="list-style-type: none"> <li>Every senior/supervisory member of the team shall familiarise themselves with the contents of the EMP. They shall understand their roles and responsibilities with regard to personnel and project compliance with the EMP.</li> <li>Subject to agreement of the parties, the Environmental Coordinator will hold an Environmental Awareness Briefing meeting, which shall be attended by all contractors before the start of the mineral exploration activities.</li> <li>Briefings on the EMP and Environmental Policy shall discuss the potential dangers to the environment of the following activities: public relations, littering, off-road driving, waste management, poaching and plant theft etc. The need to preserve soil, conserve water and implement water saving measures shall be presented.</li> <li>Individuals can be questioned on the Environmental Philosophy and EMP and can recall contents.</li> </ol>	<ol style="list-style-type: none"> <li>Regional reconnaissance field-based mapping and sampling activities;</li> <li>Initial local field-based mapping and sampling activities;</li> <li>Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>Proponent's Representative (PR)</li> <li>Project Manager (PM)</li> <li>Project HSE</li> <li>Contractor</li> <li>Subcontractors</li> </ol>

Table 6.6: Erection of supporting exploration infrastructure.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<ol style="list-style-type: none"> <li>Get Environmental Clearance before implementation</li> <li>Establishment of the supporting exploration infrastructure done on an area with the least disturbance to the environment and within the non-sensitive areas</li> </ol>	<ol style="list-style-type: none"> <li>Documented Environmental Clearance from MET.</li> <li>All on site exploration infrastructure (e.g. water tanks, sewage tanks, waste disposal) are not situated on environmental sensitive area and have disturbed as less as possible.</li> <li>No littering.</li> </ol>	<ol style="list-style-type: none"> <li>Regional reconnaissance field-based mapping and sampling activities;</li> <li>Initial local field-based mapping and sampling activities;</li> <li>Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>Proponent's Representative (PR)</li> <li>Project Manager (PM)</li> <li>Project HSE</li> <li>Contractor</li> <li>Subcontractors</li> </ol>

Table 6.7: Use of existing access roads, tracks and general vehicle movements.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>1. Plan a road/track network that considers the environmental sensitivity of the area and a long-term tourism potential, and which is constructed in a technically and environmentally sound manner.</p> <p>2. Stick to the recommended track and sensitivity management zones.</p>	<ol style="list-style-type: none"> <li>1. Avoid unnecessary affecting areas viewed as important habitat – i.e. Ephemeral River and its network of tributaries of ephemeral rivers; rocky outcrops; clumps of protected tree species;</li> <li>2. Make use of existing tracks/roads as much as possible throughout the area;</li> <li>3. Ensure that no hydraulic fluid, oils and fuel contaminate the pans;</li> <li>4. Capture/contain leaks and/or remove all contaminated soils to an appropriate landfill site;</li> <li>5. Conduct daily inspections of all vehicles entering the pans to prevent accidental spillages;</li> <li>6. Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna and unique flora; accidental fires; erosion related problems, etc.);</li> <li>7. Avoid off-road driving at night as this increases mortalities of nocturnal species;</li> <li>8. Implement and maintain off-road track discipline with maximum speed limits (e.g.30km/h) as this would result in fewer faunal mortalities and limit dust pollution;</li> <li>9. Use of "3-point-turns" rather than "U-turns";</li> <li>10. Where tracks have to be made to potential exploration sites off the main routes, the routes should be selected causing minimal damage to the environment – e.g. use the same tracks; cross drainage lines at right angles; avoid placing tracks within drainage lines; avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species);</li> <li>11. Leave vehicles on tracks and walk to point of interest, when possible;</li> <li>12. Rehabilitate all new tracks created.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.8: Mitigation measures for preventing flora and ecosystem destruction and promotion of conservation.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>1. Prevent flora and ecosystem destruction and promote conservation</p>	<ol style="list-style-type: none"> <li>1. Limit the development and avoid rocky outcrops throughout the entire area;</li> <li>2. Avoid development and associated infrastructure in sensitive areas – e.g. Ephemeral River, in/close to drainage lines, cliffs, boulder and rocky outcrops in the area, etc. This would minimise the negative effect on the local environment especially unique features serving as habitat to various species;</li> <li>3. Avoid placing access routes (roads and tracks) through sensitive areas – e.g. over rocky outcrops/ridges and along drainage lines. This would minimise the effect on localised potentially sensitive habitats in the area;</li> <li>4. Avoid driving randomly through the area (i.e. “track discipline”), but rather stick to permanently placed roads/tracks – especially during the detailed field-based exploration phase. This would minimise the effect on localised potentially sensitive habitats in the area;</li> <li>5. Stick to speed limits of maximum 30km/h as this would result in less dust pollution which could affect certain flora – e.g. lichen species. Speed humps could also be used to ensure the speed limit;</li> <li>6. Remove unique and sensitive flora (e.g. all Aloe sp.) before commencing with the development activities and relocate to a less sensitive/disturbed site if possible;</li> <li>7. Prevent and discourage the collecting of firewood as dead wood has an important ecological role – especially during the development phase(s). Such collecting of firewood, especially for economic reasons, often leads to abuses – e.g. chopping down of live and/or protected tree species such as Acacia erioloba which is a good quality wood;</li> <li>8. Attempt to avoid the removal of bigger trees during the development phase(s) – especially with the development of access routes – as these serve as habitat for a myriad of fauna;</li> <li>9. Prevent and discourage fires – especially during the development phase(s) – as this could easily cause runaway veld fires causing problems (e.g. loss of grazing and domestic stock mortalities, etc.) for the neighbouring farmers;</li> <li>10. Rehabilitation of the disturbed areas – i.e. initial development access route “scars” and associated tracks as well as temporary accommodation sites. Preferably workers should be transported in/out to the EPL area on a daily basis to avoid excess damage to the local environment (e.g. fires, wood collection, poaching, etc.). Such rehabilitation would not only confirm the company’s environmental integrity, but also show true local commitment to the environment;</li> <li>11. Implement erosion control. The area(s) towards and adjacent the drainage line(s) are easily eroded and further development may exacerbate this problem. Avoid undertaking any exploration activities including supporting activities such as camping within 20m of the main drainage line(s) to minimise erosion problems as well as preserving the riparian associated fauna;</li> <li>12. Conduct a thorough investigation on the flora associated with the proposed exploration site(s);</li> <li>13. Prevent the introduction of potentially invasive alien plant species (e.g. Tecoma stans, Pennisetum setaceum, etc.) for ornamental purposes as part of the landscaping should mining activities eventually commence. Alien species often “escape” and become invasive causing further ecological damage;</li> <li>14. A thorough investigation of water use and ground water extraction should take place before actual mining activities commence as this would affect the local flora, especially the ephemeral riparian vegetation, not only locally, but downstream as well.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent’s Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.9: Mitigation measures for preventing faunal and ecosystem destruction and promotion of conservation.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Prevent faunal and ecosystem destruction and promote conservation</p>	<ol style="list-style-type: none"> <li>1. Limit the development and avoid rocky outcrops throughout the entire area;</li> <li>2. Avoid development &amp; associated infrastructure in sensitive areas – e.g. in/close to drainage lines, cliffs, boulder and rocky outcrops in the area, etc. This would minimise the negative effect on the local environment especially unique features serving as habitat to various species;</li> <li>3. Avoid placing access routes (roads &amp; tracks) through sensitive areas – e.g. over rocky outcrops/ridges and along drainage lines. This would minimise the effect on localised potentially sensitive habitats in the area;</li> <li>4. Avoid driving randomly through the area (i.e. “track discipline”), but rather stick to permanently placed roads/tracks – especially during the detailed field-based exploration phase. This would minimise the effect on localised potentially sensitive habitats in the area;</li> <li>5. Stick to speed limits of maximum 30km/h as this would result in fewer faunal road mortalities. Speed humps could also be used to ensure the speed limit;</li> <li>6. Remove (e.g. capture) unique fauna and sensitive fauna before commencing with the development activities and relocate to a less sensitive/disturbed site if possible;</li> <li>7. Prevent and discourage the setting of snares (poaching), illegal collecting of veld foods (e.g. tortoises, etc.), indiscriminate killing of perceived dangerous species (e.g. snakes, etc.) and collecting of wood as this would diminish and negatively affect the local fauna – especially during the development phase(s);</li> <li>8. Attempt to avoid the removal of bigger trees during the development phase(s) – especially with the development of access routes – as these serve as habitat for a myriad of fauna;</li> <li>9. Prevent and discourage fires – especially during the development phase(s) – as this could easily cause runaway veld fires affecting the local fauna, but also causing problems (e.g. loss of grazing &amp; domestic stock mortalities, etc.) for the neighbouring farmers;</li> <li>10. Rehabilitation of the disturbed areas – i.e. initial development access route “scars” and associated tracks as well as temporary accommodation sites. Preferably workers should be transported in/out to the EPL area on a daily basis to avoid excess damage to the local environment (e.g. fires, wood collection, poaching, etc.). Such rehabilitation would not only confirm the company’s environmental integrity, but also show true local commitment to the environment;</li> <li>11. Implement erosion control. The area(s) towards &amp; adjacent the drainage line(s) are easily eroded and further development may exacerbate this problem. Avoid undertaking exploration activities including supporting activities such as camping within 20m of the main drainage line(s) to minimise erosion problems as well as preserving the riparian associated fauna;</li> <li>12. Conduct a thorough investigation on the fauna associated with the proposed exploration site(s);</li> <li>13. Prevent the number of domestic pets – e.g. cats &amp; dogs – accompanying the workers during the field-based exploration activities as cats decimate the local fauna and interbreed &amp; transmit diseases to the indigenous African Wildcat found in the area. Dogs often cause problems when bonding on hunting expeditions thus negatively affecting the local fauna. The indiscriminate and wanton killing of the local fauna by such pets should be avoided at all costs.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent’s Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.10: Mitigation measures to be implemented with respect to the exploration camps and exploration sites.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Promotion of conservation through preservation of flora, fauna and ecosystem around the exploration camps and exploration sites</p>	<ol style="list-style-type: none"> <li>1. Select camp sites and other temporary lay over sites with care – i.e. avoid important habitats (e.g. raptor breeding sites);</li> <li>2. Use portable toilets to avoid faecal pollution around camp and exploration sites;</li> <li>3. Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, etc.;</li> <li>4. Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect;</li> <li>5. Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site;</li> <li>6. Prevent the setting of snares for ungulates (i.e. poaching) or collection of veld foods (e.g. tortoises, monitor lizard) and unique plants (e.g. various <i>Aloe</i> and <i>Lithop</i>) or any form of illegal hunting activities;</li> <li>7. Avoid introducing dogs and cats as pets to camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs);</li> <li>8. Remove and relocate slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes, etc.) to suitable habitat elsewhere on property;</li> <li>9. Avoid the removal and/or damaging of protected flora potentially occurring in the general area e.g. various <i>Aloe</i>, <i>Commiphora</i>, and <i>Lithop</i> species, etc.;</li> <li>10. Avoid introducing ornamental plants, especially potential invasive alien species, as part of the landscaping of the camp site, etc., but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water);</li> <li>11. Remove all invasive alien species on site – e.g. <i>Opuntia</i> sp. This would not only indicate environmental commitment, but actively contribute to a better landscape;</li> <li>12. Inform contractors/workers regarding the above mentioned issues prior to exploration activities and monitor for compliance thereof throughout;</li> <li>13. Rehabilitate all areas disturbed by the exploration activities – i.e. camp sites, exploration sites, etc.;</li> <li>14. Implement a policy of replacing 2 tree species (preferably the same species) for every 1 protected tree species having to be removed (if necessary);</li> <li>15. Ensure that adequate firefighting equipment (e.g. fire beaters; extinguishers, etc.) is available at camp sites and clear kitchen areas to avoid accidental fires;</li> <li>16. Employ an independent environmental auditor to ensure compliance, especially of the rehabilitation of all the affected areas.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.11: Mitigation measures for surface and groundwater protection as well as general water usage.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Effective management / protection of surface and groundwater resources and general water resources usage</p>	<ol style="list-style-type: none"> <li>1. Always use as little water as possible. Reduce, reuse and re-cycle water where possible;</li> <li>2. All leaking pipes / taps must be repaired immediately they are noticed;</li> <li>3. Never leave taps running. Close taps after you have finished using them.</li> <li>4. Never allow any hazardous substance to soak into the soil;</li> <li>5. Immediately tell your Contractor or Environmental Control Officer / Site Manager when you spill, or notice any hazardous substance being spilled during the field-based exploration activities or around the camp site;</li> <li>6. Report to your Contractor or Environmental Control Officer / Site Manager when you notice any container, which may hold a hazardous substance, overflow, leak or drip;</li> <li>7. Immediately report to your Contractor or Environmental Control Officer / Site Manager when you notice overflowing problems or unhygienic conditions at the ablution facilities;</li> <li>8. No washing of vehicles, equipment and machinery, containers and other surfaces;</li> <li>9. Limit the operation to a specific site and avoid sensitive areas and in particular the Ephemeral River Channel. This would sacrifice the actual area for other adjacent Ephemeral River areas and thus minimise any likely negative effect on water resources;</li> <li>10. Disposal of wastewater into any public stream is prohibited;</li> <li>11. The Proponent must obtain permission of the land owners before utilising any water resources or any associated infrastructure;</li> <li>12. If there is a need to drilling a water borehole to support the exploration programme the proponent (Proponent) must obtain permission from the land owner and Department of Water Affairs in the Ministry of Agriculture and Forestry. In an event of discovery of economic minerals resources, the sources of water supply for the mining related operations will be supplied by NamWater;</li> <li>13. If there are any further (larger scale) exploration/drilling activities and/or mining activities to follow from the initial planned drill holes, groundwater monitoring must be implemented to include water level monitoring and also water sampling on a bi-annual basis. In order to have greater transparency on the water monitoring activities, the affected landowners / farmers must be given full access to the results of the water monitoring analyses.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.12: Mitigation measures to minimise negative socioeconomic impacts.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Effective management of socioeconomic benefits of the proposed / ongoing project activities</p>	<ol style="list-style-type: none"> <li>1. The employment of local residents and local companies should be a priority. To ensure that potential employees are from the area, they need submit proof of having lived in the area for a minimum of 5 years;</li> <li>2. Providing information such as the number and types of jobs available, availability of accommodation facilities and rental costs and living expenses, could make potential job seekers wary of moving to the area;</li> <li>3. Addressing unrealistic expectations about large numbers of jobs would be created;</li> <li>4. Exploration camp if required should be established in close consultation with the land owners;</li> <li>5. Exploration camp should consider provision of basic services;</li> <li>6. When employees contracts are terminated or not renewed, contractors should transport the employees out of the area to their hometowns within two days of their contracts coming to an end;</li> <li>7. Tender documents could stipulate that contractors have HIV/Aids workplace policies and programmes in place and proof of implementation should be submitted with invoicing;</li> <li>8. Develop strategies in coordination with local health officers and NGO's to protect the local communities, especially young girls.</li> <li>9. Contract companies could submit a code of conduct, stipulating disciplinary actions where employees are guilty of criminal activities in and around the vicinity of the EPL. Disciplinary actions should be in accordance with Namibian legislation;</li> <li>10. Contract companies could implement a no-tolerance policy regarding the use of alcohol and workers should submit to a breathalyser test upon reporting for duty daily;</li> <li>11. Request that the Roads Authority erect warning signs of heavy exploration vehicles on affected public roads;</li> <li>12. Ensure that drivers adhere to speed limits and that speed limits are strictly enforced;</li> <li>13. Ensure that vehicles are road worthy and drivers are qualified;</li> <li>14. Train drivers in potential safety issues.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>



Table 6.13: Mitigation measures to minimise health and safety impacts.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Promotion of health and safe working environment in line with national Labour Laws</p>	<ol style="list-style-type: none"> <li>1. Physical hazards: Follow national and international regulatory and guidelines provisions, use of correct Personal Proactive Clothing at all times, training programme, as well as the implementation of a fall protection program in accordance with the Labour Act;</li> <li>2. Some of the public access management measures that may be considered in an event of vandalism occurring are: <ul style="list-style-type: none"> <li>• All exploration equipment must be in good working condition and services accordingly;</li> <li>• Control access to the exploration site through using gates on the access road(s) if required;</li> <li>• The entire site, must be fenced off; the type of fencing to be used would, however, be dependent on the impact on the visual resources and/or cost; and;</li> <li>• Notice or information boards relating to public safety hazards and emergency contact details to be put up at the gate(s) to the exploration area.</li> </ul> </li> <li>3. There is a comprehensive First Aid Kit on site and that suitable anti-histamine for bee stings / snake bites should be available.</li> <li>4. Rubber gloves are used in case of an accident to reduce the risk of contracting HIV/AIDS;</li> <li>5. All individuals have received instructions concerning the dangers of dehydration or hyperthermia. Encourage all to drink plenty of clean water not directly from the surface water bodies.</li> <li>6. No person under the influence of alcohol or drugs is allowed to work on site.</li> <li>7. The Exploration Manager ensures compliance with the requirements of the relevant Namibian Labour, Mining and Health and Safety Regulations.</li> <li>8. Dangerous or protected / sensitive areas are clearly marked and access to these areas is controlled or restricted.</li> <li>9. Due care must be taken when driving any vehicles on any roads particularly the gravel roads. ALL Drivers must drive with their headlights switched on when travelling on the gravel roads (day and night).</li> <li>10. Persons driving a vehicle must be in possession of a valid driver's license</li> <li>11. Awareness on HIV/AIDS among workers is raised</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.14: Mitigation measures to minimise visual impacts.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Preserve the landscape character in the development of supporting infrastructure and choice of visual screening</p>	<ol style="list-style-type: none"> <li>1. Consider the landscape character and the visual impacts of the exploration area including camp site from all relevant viewing angles, particularly from public roads;</li> <li>2. Use vegetation screening where applicable. Do not cut down vegetation unnecessary around the site and use it for site screening;</li> <li>3. Avoid the use of very high fencing;</li> <li>4. Minimise access roads and no off-road that could results in land scarring is allowed;</li> <li>5. Minimise the presence of secondary structures: remove inoperative support structures;</li> <li>6. Remove all infrastructure and reclaim, or rehabilitate the project site after exploration activities are completed.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.15: Mitigation measures to minimise vibration, noise and air quality.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Promote of effective management of vehicle movement, drilling and blasting operations and use of Personal Protective Equipment (PPE) in mitigating air quality and vibrations impacts in line with national laws</p>	<ol style="list-style-type: none"> <li>1. Limit vehicle movements and adhere to the speed of 60 km/h;</li> <li>2. Vehicles and all equipment must be properly serviced to minimise noise pollution;</li> <li>3. Use of Personal Protective Equipment (PPE) to minimise Occupational Health Safety impacts due to noise pollution around the site;</li> <li>4. National or international acoustic design standards must be followed.</li> <li>5. Drilling and blasting operations can major sources of vibration, noise and dust and where required the following mitigation measure shall be implemented; <ul style="list-style-type: none"> <li>• Drilling and blasting operations shall only be done by a qualified person who must at all times adhere to the required blasting protocol;</li> <li>• Prior warning shall be given to all persons, neighbor and visitors before the blasting takes place;</li> <li>• Careful planning and timing of the blast program to minimise the size of the charge;</li> <li>• Where practicable, use of explosive products with lower detonation velocities, but noting that this would require more explosives to achieve the same blast result;</li> <li>• Use of detonating caps with built-in time delays, as this effectively reduces each detonation into a series of small explosions;</li> <li>• Use of a procedure ("decking the charge") which subdivides the charge in one blast hole into a series of smaller explosions, with drill patterns restricted to a minimum separation from any other loaded hole;</li> <li>• Over-drilling the holes to ensure fracturing of the rock;</li> <li>• Staggering the detonation for each blast hole in order to spread the explosive's total overpressure over time;</li> <li>• Matching, to the extent possible, the energy needed in the "work effort" of the borehole to the rock mass to minimise excess energy vented into the receiving environment.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.16: Mitigation measures for waste (solid and liquid) management.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Promotion of effective waste (solid and liquid) management through the adoption of sound and hierarchical approach to waste management, which would include waste minimisation, re-use, recovery, recycling, treatment, and proper disposal.</p>	<ol style="list-style-type: none"> <li>1. Burial of waste on anywhere within the EPL area is not allowed and all generated solid waste must be disposed at the at an approved municipal waste disposal site;</li> <li>2. Toilet and ablution facilities must be provided on site and should not be located close to Ephemeral Rivers or visible discontinuities (fractures, joints or faults);</li> <li>3. Provide site information on the difference between the two main types of waste, namely: <ul style="list-style-type: none"> <li>• General Waste; and</li> <li>• Hazardous Waste.</li> </ul> </li> <li>4. Sealed containers, bins, drums or bags for the different types of wastes must be provided. Never dispose of hazardous waste in the bins or skips intended for general waste;</li> <li>5. All solid and liquid wastes generated from the proposed / ongoing project activities shall be reduced, reused, or recycled to the maximum extent practicable;</li> <li>6. Trash may not be burned or buried, except at approved sites under controlled conditions in accordance with the municipal regulations;</li> <li>7. Never overfill any waste container, drum, bin or bag. Inform your Contractor or the Environmental Control Officer / Site Manager if the containers, drums, bins or skips are nearly full;</li> <li>8. Never litter or throwaway any waste on the site, in the field or along any road. No illegal dumping;</li> <li>9. Littering is prohibited.</li> <li>10. Latrines and French drains built &gt;100m from watercourses or pans to avoid pollution of primary and secondary aquifers.</li> <li>11. Chemical toilets or suitable waste water management system shall be provided on site and around the camp as may be required.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Regional reconnaissance field-based mapping and sampling activities;</li> <li>(ii) Initial local field-based mapping and sampling activities;</li> <li>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</li> <li>(iv) Prefeasibility and feasibility studies.</li> </ol>	<ol style="list-style-type: none"> <li>(i) Proponent's Representative (PR)</li> <li>(ii) Project Manager (PM)</li> <li>(iii) Project HSE</li> <li>(iv) Contractor</li> <li>(v) Subcontractors</li> </ol>

Table 6.17: Rehabilitation plan.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>Contributions toward environmental preservation and sustainability through rehabilitation of disturbed areas such as exploration sites and remove all unwanted part of the fixtures and restore the sites to close an approximation of the pristine state as is technically, financially and reasonably possible.</p>	<p>1. The following rehabilitation actions are practiced:</p> <ul style="list-style-type: none"> <li>• Small samples are preferably removed from site to avoid additional scars in the landscape;</li> <li>• Litter from the site has been taken to the appropriate disposal site.</li> <li>• Debris, scrap metal, etc is removed before moving to a new site or closure of the mine.</li> <li>• Water tanks are dismantled and removed if not need for after use.</li> <li>• Tracks on site and the access road are rehabilitated by smoothing the 'middle mannetjie'(middle ridge between the tracks) and raking the surface.</li> </ul> <p>2. The following should be undertaken at all disturbed areas that require further rehabilitation:</p> <ul style="list-style-type: none"> <li>• if applicable the stockpiled subsoil to be replaced (spread) and/or the site is neatly contoured to establish effective wind supported landscape patterns;</li> <li>• Replace the stored topsoil seed bank layer.</li> <li>• Five (5) years after rehabilitation the sites are not visible from 500 m away.</li> </ul>	<p>(i) Regional reconnaissance field-based mapping and sampling activities;</p> <p>(ii) Initial local field-based mapping and sampling activities;</p> <p>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</p> <p>(iv) Prefeasibility and feasibility studies.</p>	<p>(i) Proponent's Representative (PR)</p> <p>(ii) Project Manager (PM)</p> <p>(iii) Project HSE</p> <p>(iv) Contractor</p> <p>(v) Subcontractors</p>

Table 6.18: Environmental data collection.

OBJECTIVES	MITIGATION MEASURES	SCHEDULE	RESPONSIBILITY
<p>1. Collect data that will add value to environmental monitoring and reporting to the regulators</p> <p>2. Collect data that will add to the general scientific and geographic knowledge of the environment in which the exploration process takes place.</p> <p>3. Acknowledged that the required skills and knowledge to collect all the suggested data may not be available within the mine /exploration team, however, as much data as is practical should be collected.</p>	<p>1. Environmental Monitoring Report Compiled and submitted by the Environmental Coordinator to the regulators</p> <p>2. The following types of information should be gathered:</p> <ul style="list-style-type: none"> <li>• Fauna. What tracks or signs of animal activity have been seen? (photographs and GPS recording) What animals, birds etc were identified? Alternatively provide a description and/ or photo if unidentified.</li> <li>• Unusual weather conditions, e.g. records of the prevailing wind direction and the direction from which storm events come. Was there fog or rain, frost overnight or intense heat? Preferably have a thermometer and rain gauge on site.</li> <li>• Vegetation. Record trees, shrubs, grass, etc. that are found in the vicinity along each of the profiles. Some plants do only occur after rainfall and might not have been seen for decades.</li> <li>• Any archaeological, cultural or historical sites that may be found. GPS coordinates, photograph and plot the position on a 1: 50 000 map.</li> <li>• other including surface water, spring, large scale geological features etc</li> </ul>	<p>(i) Regional reconnaissance field-based mapping and sampling activities;</p> <p>(ii) Initial local field-based mapping and sampling activities;</p> <p>(iii) Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling;</p> <p>(iv) Prefeasibility and feasibility studies.</p>	<p>(i) Proponent's Representative (PR)</p> <p>(ii) Project Manager (PM)</p> <p>(iii) Project HSE</p> <p>(iv) Contractor</p> <p>(v) Subcontractors</p>

## 6.4 Monitoring of the Environmental Performance

### 6.4.1 Overview

The monitoring of the environmental performances for the proposed / ongoing exploration project can be divided into two (2) parts and these are:

- (i) Routine / ongoing daily monitoring activities to be undertaken by the Project HSE Officer with the support of the external specialist consultants as maybe required;
- (ii) Preparation of annual Environmental Monitoring Report and Environmental Closure covering all activities related to the Environmental Management Plan during exploration / prospecting stages and at closure of the proposed / ongoing exploration to be undertaken by the Project HSE Officer with the support of the external specialist consultants as maybe required.

The proponent will be required to report regularly (twice in a year or as the case maybe) to the Environmental Commissioner in the Ministry of Environment and Tourism (MET), the environmental performances as part of the ongoing environmental monitoring programme. Environmental monitoring programme is part of the EMP performances assessments and will need to be compiled and submitted as determined by the Environmental Commissioner. The process of undertaking appropriate monitoring as per specific topic (such as fauna and flora) and tracking performances against the objectives and documenting all environmental activities is part of internal and external auditing to be coordinated by the Project HSE Officer.

The second part of the monitoring of the EMP performance will require a report outlining all the activities related to effectiveness of the EMP at the end of the planned mineral exploration to be undertaken by the Project HSE Officer with the support of the external specialist consultants as maybe required. The objective will be to ensure that corrective actions are reviewed and steps are taken to ensure compliance for future EIA and EMP implementation.

The report shall outline the status of the environment and any likely environmental liability after the completion of the proposed / ongoing project activities. The report shall be submitted to the Environmental Commissioner in the Ministry of Environment and Tourism and will represent the final closure and fulfilment of the conditions of the Environmental Clearance Certificate (ECC) issued by the Environmental Commissioner and the conditions of the Pro-Forma Environmental Contract signed by the Proponent, Environmental Commissioner and the Mining Commissioner.

## 7. CONCLUSION AND RECOMMENDATION

### 7.1 Conclusions

Headspring Investments (Pty) Ltd (**the Proponent**) intends to undertake exploration activities in the Exclusive Prospecting Licence (EPL) No. 4655, with special focus on base and rare metals and nuclear fuels. The exploration activities to be undertaken as assessed in this environmental assessment are as follows:

- (i) Initial desktop exploration activities;
- (ii) Regional reconnaissance field-based activities;
- (iii) Initial local field-based activities including detailed mapping, sampling and drilling operations;
- (iv) Detailed local field-based activities including detailed mapping, sampling and drilling operations, and;
- (v) Prefeasibility and feasibility studies including possible test mining.

The overall severity of potential environmental impacts of the proposed / ongoing project activities on the receiving environment (physical, biological, socioeconomic environments and ecosystem functions, services, use and non-use values or passive uses) will be of low magnitude, temporally duration, localised extent and low probability of occurrence. Mitigation measures must be implemented as detailed in Section 6 (EMP) of this report. *The proponent must obtain permission of the land owners (surface rights holders) before exercising their subsurface rights in all the farms covered by the EPL 4655.*

### 7.2 Recommendations

It's hereby recommended that the proposed / ongoing exploration activities be issued with an Environmental Clearance Certificate (ECC). The proponent shall take into consideration the following key requirements for implementing the proposed exploration programme:

- (i) Mitigation measures must be implemented as detailed in Section 6 (EMP) of this Scoping and EMP report;
- (ii) The proponent negotiate an Access Agreement with the land owner/s;
- (iii) The Proponent shall adhere to all the provisions of the EMP and conditions of the Access Agreement to be entered between the proponent and the land owner/s in line with all applicable national regulations;
- (iv) Before entering any private property such as a private farm, the proponent must give advance notices and obtain permission to access such private property from the land owners at all times, and;
- (v) Where possible, and if water is found during the detailed exploration boreholes drilling operations, the proponent shall support other land users in the area in terms of access to freshwater supply for both human consumption, wildlife and agricultural support as may be requested by the local community / land owners/s.



The abstraction of the groundwater resources shall include water levels monitoring, sampling and quality testing on a bi-annual basis, and that the affected landowners must have access to the results of the water monitoring analyses as part of the ongoing stakeholder disclosure requirements on shared water resources as maybe applicable.

The proponent must take all the necessary steps to implement all the recommendations of the EMP for the successful implementation and completion of the proposed exploration programme covering the EPL 4655. Recommended actions to be implemented by the proponent as part of the implementations of the EMP are as follows:

- (i) The proponent must implement precautionary measures / approach to environmental management. Once a viable and potential economic resources have been identified, the proponent must develop and implement a separate EIA and EMP inclusive of the specialist studies such as fauna and flora to be undertaken by specialist consultants as part of the feasibility study stage;
- (ii) Before detailed site-specific exploration activities such as extensive drilling operations and access routes are selected, the Project HSE Officer with the support of the external specialist consultants as maybe required, should consider the flora, fauna and archaeological sensitivity of the area and commission a field survey in advance of any site development as may be required based on the assessment undertaken;
- (iii) The Project HSE Officer shall lead, implement and promote environmental culture through awareness raising of the workforce, contractors and sub-contractors in the field during the whole duration of the proposed / ongoing exploration period;
- (iv) The proponent to provide all the necessary support including human and financial resources, for the implementation of the proposed / ongoing mitigations and effective environmental management during the planned exploration activities for the EPL 4655;
- (v) Project HSE Officer with the support of the external specialist consultants as maybe required to develop a simplified environmental induction and awareness programme for all the workforce, contractors and sub-contractors;
- (vi) Where contracted service providers are likely to cause environmental impacts, these will need to be identified and contract agreements need to be developed with costing provisions for environmental liabilities;
- (vii) Implement internal and external monitoring of the actions and management strategies developed during the mineral exploration process. Final Environmental Monitoring report shall be prepared by the Project HSE Officer with the support of the external specialist consultants as maybe required to be submitted to the regulators and to mark the closure of the proposed / ongoing mineral exploration, and;
- (viii) Develop and implement a monitoring programme that will fit into the overall company's Environmental Management Systems (EMS) as well as for any future EIA for possible mining projects.

### 7.3 Summary ToR for Test Mining and Mining Stages

In an event that economic minerals resources are discovered within the EPL 4655 area and could lead to the development of mining project, a new Environmental Clearance Certificate (ECC) for mining will be required. The ECC being supported by this Scoping and EMP report only covers the exploration phase. A separate field-based and site-specific Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports supported by specialist studies as maybe applicable must be prepared in order to support the application for the new ECC for mining operations.

The EIA and EMP studies shall form part of the prefeasibility and feasibility study with respect to the test mining or possible mining operations. The site-specific EIA and EMP shall cover the area identified to have potential economic minerals resources as well as all areas to be used for infrastructural support areas such as pit / shaft area/s, waste rock, tailings dump, access, office blocks, water and energy infrastructure support areas (water, energy and road / access). In addition to the Terms of Reference (ToR) to be developed during the Environmental Scoping study phase for the test mining / mining stages, the following field-based and site-specific specialist studies shall be undertaken as part of the EIA and EMP for possible test mining or mining operations in an event of a discovery of economic minerals resources and possible development of a mining project:

- (i) Groundwater studies including modelling as maybe applicable;
- (ii) Field-based flora and fauna diversity;
- (iii) Noise and Sound modelling linked to engineering studies;
- (iv) Socioeconomic assessment, and;
- (v) Others as may be identified / recommended by the stakeholders/ land owners/ Environmental Commissioner or specialists.

The aims and objectives of the Environmental Assessment (EA) covering EIA and EMP to be implemented as part of the feasibility study if a variable resources are discovered are:

- (i) To assess all the likely positive and negative short- and long-term impacts on the receiving environment (physical, biological and socioeconomic environments) at local (EPL Area), regional, national (Namibia) and Global levels using appropriate assessment guidelines, methods and techniques covering the complete project lifecycle. The EIA and EMP to be undertaken shall be performed with reasonable skill, care and diligence in accordance with professional standards and practices existing at the date of performance of the assessment and that the guidelines, methods and techniques shall conform to the national regulatory requirements, process and specifications in Namibia and in particular as required by the Ministry of Mines and Energy, Ministry of Environment and Tourism and Ministry of Agriculture, Water Affairs and Forestry, and;
- (ii) The development of appropriate mitigation measures that will enhance the positive impacts and reduce the likely negative influences of the negative impacts identified or anticipated. Such mitigation measures shall be contained in a detailed EMP report covering the entire project lifecycle.

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## **9. ANNEXES**

- 1. Copy of the EPL**
- 2. CV of the EAP (Dr. Sindila Mwiya)**
- 3. Copy of the Expired ECC**