BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROSPECTING RIGHTS APPLICATION IN VARIOUS PROPERTIES OF BARST VLEY, DOORN KNIE AND SAND KOLKJES FARMS.

DMR Ref: NCS 30/5/1/1/2/ 12750 PR

DRAFT REPORT

13 JUNE 2021

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

PREPARED BY:	**PREPARED FOR:**
Basia Environmental Consultants **Contact Person:** Mr. Tshia Malehase **Tell:** 012 382 6343 **Cell:** 079 263 0597 **Email:** info@basiaec.co.za **Fax**: 086 226 4397	**Barzani Mining (PTY) LTD** **Contact Person**: Mr. Thabo Moloto **Cell:** 082 825 8871 **Email:** thabo@barzanigroup.co.za

COMPANY NAME:	**BASIA ENVIRONMENTAL CONSULTANTS (PTY) LTD**
REPORT TITLE:	BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROSPECTING RIGHTS APPLICATION IN IN VARIOUS PROPERTIES OF BARST VLEY, DOORN KNIE AND SAND KOLKJES FARMS.
PROJECT:	PROSPECTING RIGHTS APPLICATION
FINAL REPORT DATE:	JUNE 2021
REPORT WRITE-UP:	**Mahlangu Seli (Cand.Sci.Nat)** Environmental Consultant Signature: ___  ___ 12 June 2021
REVIEWER:	**Malehase Tshia (Pr. Sci. Nat) (EAPASA)** Environmental Consultant Signature:  Date: 12 June 2021
PREPARED FOR:	**Barzani Mining (Pty) Ltd** Mr. Thabo Moloto 082 825 8871 thabo@barzanigroup.co.za
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Contents

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1. LIST OF ABBREVIATIONS & ACRONYMS

DMR- Department of Mineral Resources

BAR – Basic Assessment Report

EA- Environmental Authorisation

EAP- Environmental Assessment Practitioner

EIA- Environmental Impact Assessment

EMPr- Environmental Management Programme Report

EAP- Environmental Assessment Practitioner

IDP- Integrated Development Plan

MPRDA- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)

NEMA- National Environmental Management Act, 1998 (Act 107 of 1998)

NEMAQA- National Environmental Management Air Quality Act, 2004 (Act 39 of 2004)

PPP- Public Participation Process

SHE - Safety, Health and the Environmental

2. EXECUTIVE SUMMARY

Barzani Mining (Pty) Ltd is applying for a Prospecting right for Copper, lead, zinc and chrome on the remaining extent of Barst Vley Farm No. 192, portions 1 and remaining extent of Doorn Knie Farm N0.193, portions 1, 3,4,5 and 6 of Sand Kolkjes Farm No.194 and the remaining extent of Sandkolk Farm No.159 located near Kenhard town, in Kai !Garib Local Municipality, within the district of Namaqualand in the Northern Cape Province. The application was accepted on the **07th of April 2021** and bears the following reference number, **NCS 30/5/1/1/2/ 12750 PR.**

Prospecting is the first stage of the geological analysis in search for mineral deposits, especially by drilling. Drilling rig machines are used to create a small hole of about 20 cm in diameter to the depth of 200 m in the earth's subsurface to obtain a mineral sample.

The commencement of the proposed prospecting project will result in the undertaking of activities that are considered as listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended. The proposed activities trigger Government Notice 327 of 7 April 2017 (Listing notice 1; Activity 20) which requires a Basic Assessment to be conducted as part of the prospecting right application.

Barzani Mining (Pty) Ltd has appointed Basia Environmental Consultants (BEC) as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorization process for its proposed prospecting right application. Basia Environmental Consultants has undertaken site assessment and are currently conducting a public consultation process. The consultation process involves the landowners, general public and identified by affording then access to this document. This document must be reviewed and comments must be submitted to the EAP on or before the closing date which is **16 July 2021**. The public consultation meeting will be held on the **17 July 2021**.

The consultation meeting will be announced to registered I&AP's as well as adhering to the Disaster Management Regulations on COVID-19. The comments received from

I&APs are incorporated in this final BAR and EMP Report submitted to the competent authority (DMRE, Northern Cape)**.** This document intends to supply the competent authority with the required information, an insight of the proposed project, and the processes that were undertaken. In order to enable the Authority to make a decision.

This document provides a basic assessment study with identified environmental impacts, mitigation measures and Environmental Management Plan (EMP) for the proposed prospecting activities. The sensitive environmental aspects in the area are depressional wetlands (pans) and servitudes which are earmarked as NO-GO area.

This document is compiled in line with Appendix 1 of the EIA Regulations 326, 2017.

The EAP recommends that the application must be granted with firm compliance conditions in respect to wildlife and water resources management.

PART A: BASIC ASSESSMENT REPORT

3. THE OBJECTIVES OF THE BASIC ASSESSMENT PROCESS

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

1. determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
2. identify the alternatives considered, including the activity, location, and technology alternatives;
3. describe the need and desirability of the proposed alternatives,
4. through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    a. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    b. the degree to which these impacts— (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be managed, avoided or mitigated;

5. through a ranking of the site sensitivities and possible impacts the activity and

    technology alternatives will impose on the sites and location identified through the life of the activity to—

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

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

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

4. DETAILS OF THE APPLICANTS AND EAP's

4.1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

Applicant's Contact Details

ITEM	COMPANY CONTACT DETAILS
Name	Barzani Mining (Pty) Ltd
Email address:	thabo.moloto@manmol.com
Postal address:	P.O Box 852 Krugersdorp 1739

Details of the EAP

Name of the Practitioner	Tshia Malehase
Tel No	079 263 0597
Fax No	086 226 4397
Email address	info@basiec.co.za
Company Name	Basia Environmental Consultant
Postal Address	Unit 10 Oakview, 40 Lynn Road, Karenpark Ext 42, Akasia, 0182

Name of the Practitioner	Seli Mahlangu
Tel No	076 025 8684
Email address	mahlangup@basiec.co.za

Assistant Practitioner	Nomphumelelo Zungu
Email address	Zungumpumi925@gmail.com

Expertise of the EAP

The qualifications of the EAP

1) Mr. T Malehase holds an M.Tech in Environmental Management from Tshwane University of Technology (TUT) which he completed in 2016. His research project was titled “Determination of mercury and its fractionation products in gold mine tailings dams and their surrounding areas in Gauteng. He was able to publish two scientific papers in reputable peered reviewed journals from this project and co-authored two scientific publications. He is registered as a Professional Natural Scientist with SACNASP in the field of Environmental Science (SACNASP: Reg no; 117391) and with Environmental Assessment Practitioners Association of South Africa (EAPASA: Reg: 2020/1413).

2) Ms. S.Mahlangu holds a National Diploma in Environmental Sciences from Tshwane University of Technology (TUT) which she completed in 2019 and she is currently in pursuit of an Advanced Diploma qualification in the same field. She is a registered Candidate Natural Scientist with SACNASP in the field of Environmental Science (SACNASP: Reg no: 134515).

3) Ms. Nomphumelelo Zungu is an Environmental Sciences student at Tshwane University of Technology, who is currently doing her Work Integrated Learning with Basia.

Summary of the EAP’s experience

1) Mr. Tshia Malehase is an Environmental Assessment Practitioner with extensive experience in a wide-range of environmental related projects, processes and Mining permit applications.

Mr. T. Malehase have been trained and worked in different Environmental Consulting Companies for six (6) years, where he was groomed and exposed to different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment, Water Use Licences. He also had a privilege to work at the Department of Mineral Resources where he worked with

the applications for Mining permit, mining permit and mining rights applications including the contingency plans and rehabilitation strategies.

He has undertaken environmental compliance (including basic assessments, water use license applications, social and environmental management systems, mining permits and prospecting right applications) and public participation processes. Overall, he has been in the field of environmental science and management, environmental chemistry, and mining for over twelve (12) years. Please refer to Appendix A for Mr Malehase's CV which provides a detailed list of projects which illustrate his competence in carrying out the EIA process.

2) Ms. S Mahlangu is an Environmental Assessment Practitioner (Junior) with over one-year experience in a wide-range of environmental related projects, processes and Mining permit applications. She has been training and working in an Environmental Consulting Company where she is being groomed and exposed into different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment and Water Use License.

As a student, Ms. Mahlangu was part of the green campus initiative team which was responsible for promoting green leadership on campus by raising environmental awareness and building sustainable living practices through advocating for water conservation, energy conservation and efficiency, recycling and waste reduction. She would attend Educational excursions which involved training on aspects of wetland and nature reserve science and the facilitation of wetland education.

3) Ms. Nomphumelelo Zungu is an Environmental Science student, she is being trained and is working in an Environmental Consulting Company where she is being groomed and exposed into different environmental applications, processes and documentation.

5. DETAILS OF THE PROPOSED PROJECT

Location of the overall Activity

Table 1: *Location of overall activity*

(a) Location of the overall Activity

Table 1*: Location of overall activity*

Farm Name	The remaining extent of Barst Vley Farm No. 192, portions 1 and remaining extent of Doorn Knie Farm N0.193, portions 1, 3,4,5 and 6 of Sand Kolkjes Farm No.194 and the remaining extent of Sandkolk Farm No.159
Application area (Ha)	39 492.568691
Magisterial district	Namaqualand
Distance and direction from nearest town	The proposed prospecting area is located approximately at 56 Km West of Kenhardt. And about 126 Km South West from Upington, 80 South from Keimoes, within the Kai !Garib Local Municipality
21 digit Surveyor General Code for each farm portion	N0HS0000001920000000000 N0HS0000001930000000000 N0HS0000001930000000001 N0HS0000001940000000001 N0HS0000001940000000003 N0HS0000001940000000004 N0HS0000001940000000005 N0HS0000001940000000006 N0HS0000001590000000000

Table 2*: Details of the farms*

Details will be uploaded after the consultation meeting

LIST OF LANDOWNERS AND CONTACT DETAILS				
FARM NAME	**PORTION NUMBER**	**OWNER**	**DEEDS NUMBER**	**CONTACT PERSON**
Barst Vley No. 192	Remaining extent	Unknown	Unknown	Unknown
Doorn Knie No. 193	Remaining extent	Unknown	Unknown	Unknown

Doorn Knie No.193	Portion 1	Unknown	Unknown	Unknown
Sand Kolkjes No.194	Portion 1	Unknown	Unknown	Unknown
Sand Kolkjes No.194	Portion 3	Unknown	Unknown	Unknown
Sand Kolkjes No.194	Portion 4	Unknown	Unknown	Unknown
Sand Kolkjes No.194	Portion 5	Unknown	Unknown	Unknown
Sand Kolkjes No.194	Portion 6	Unknown	Unknown	Unknown
Sandkolk No.159	Remaining extent	Unknown	Unknown	Unknown

(b) Locality map

There are about 9 farms located on the proposed Prospecting Right Area. The affected farms are; The Remaining extent of Barst Vley 192; Portion 1 and Remaining Extent of Doorn Knie 193; Portion 1,3,4,5 and 6 of Sand Kolkjes 194; Remaining Extent Sandkolk 159. The proposed site is located within the Kai !Garib Local Municipality. Kai !Garib is an administrative area in the ZF Mgcawu District of Northern Cape in South Africa. The name Kai !Garib originates from the Khoi language and means "big great river", referring to the Orange River that flows through the area, the Kai! Garib Local Municipality is a Category B municipality. It is bordered by Dawid Kruiper Local Municipality in the north-east and Namibia in the north-west. It is the second-largest of the five municipalities that make up the district, accounting for a quarter of its geographical area. It is characterized by its unique landscape, with the Kalahari Desert on the one side and the Orange River on the other side. The area of the place is 26

377km². cities or towns found there are Eksteenskuil, Kakamas, Keimoes, Kenhardt. Main Economic Sectors: Agriculture (51.8%), community and government services (15.9%), wholesale and retail trade (11.3%), finance services (7.6%), manufacturing (5.1%). The rich cultures of Kai! Garib municipality include the so called ‘coloureds’ who descent from the original Khoi-khoi and Korannas, the Namas situated in Riemvasmaak and surrounding areas, the Xhosas especially from Vredesvallei, as well as the White Afrikaner mainly concentrated in the three towns and on commercial farms.

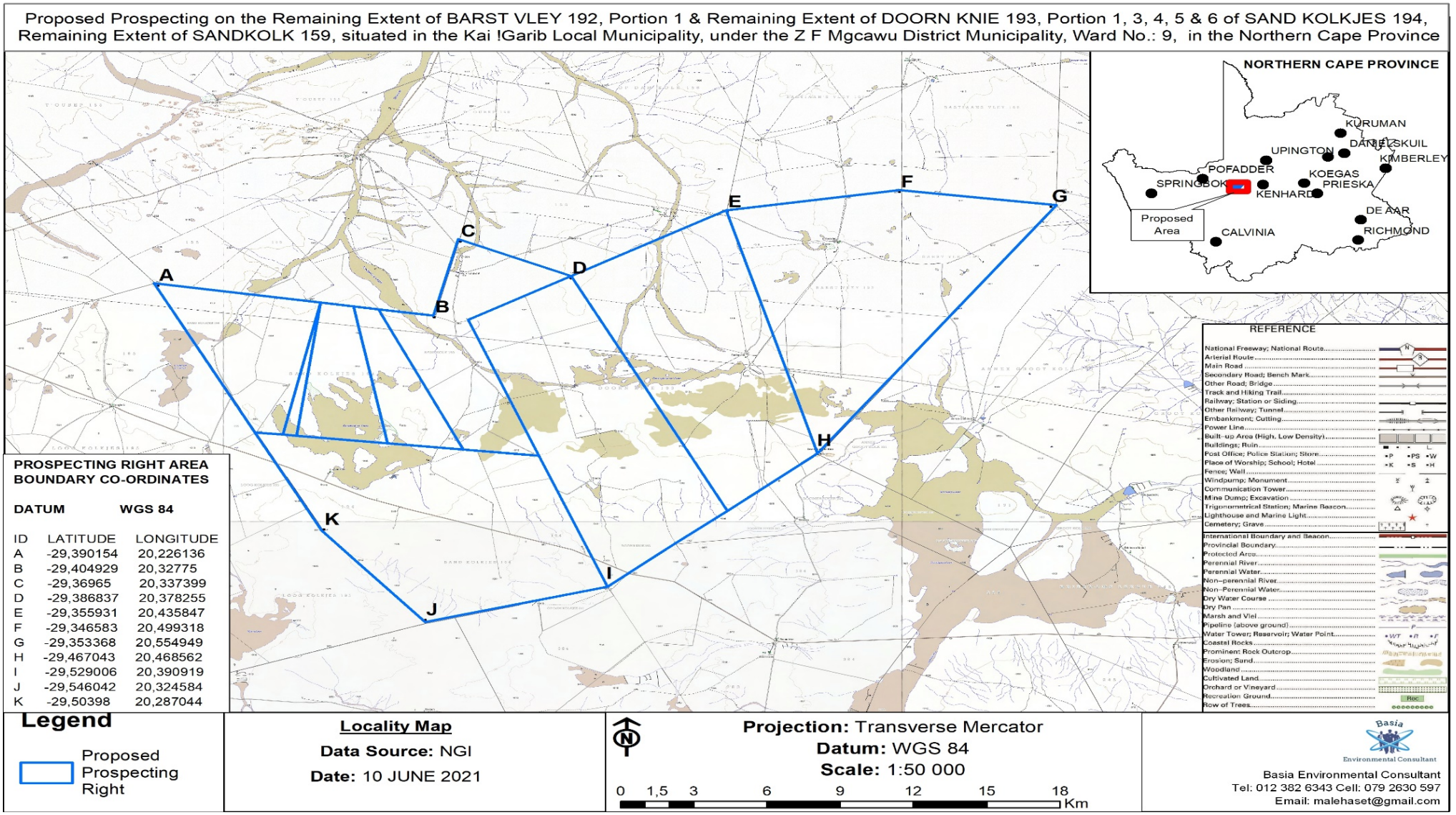


Figure 1: Locality map

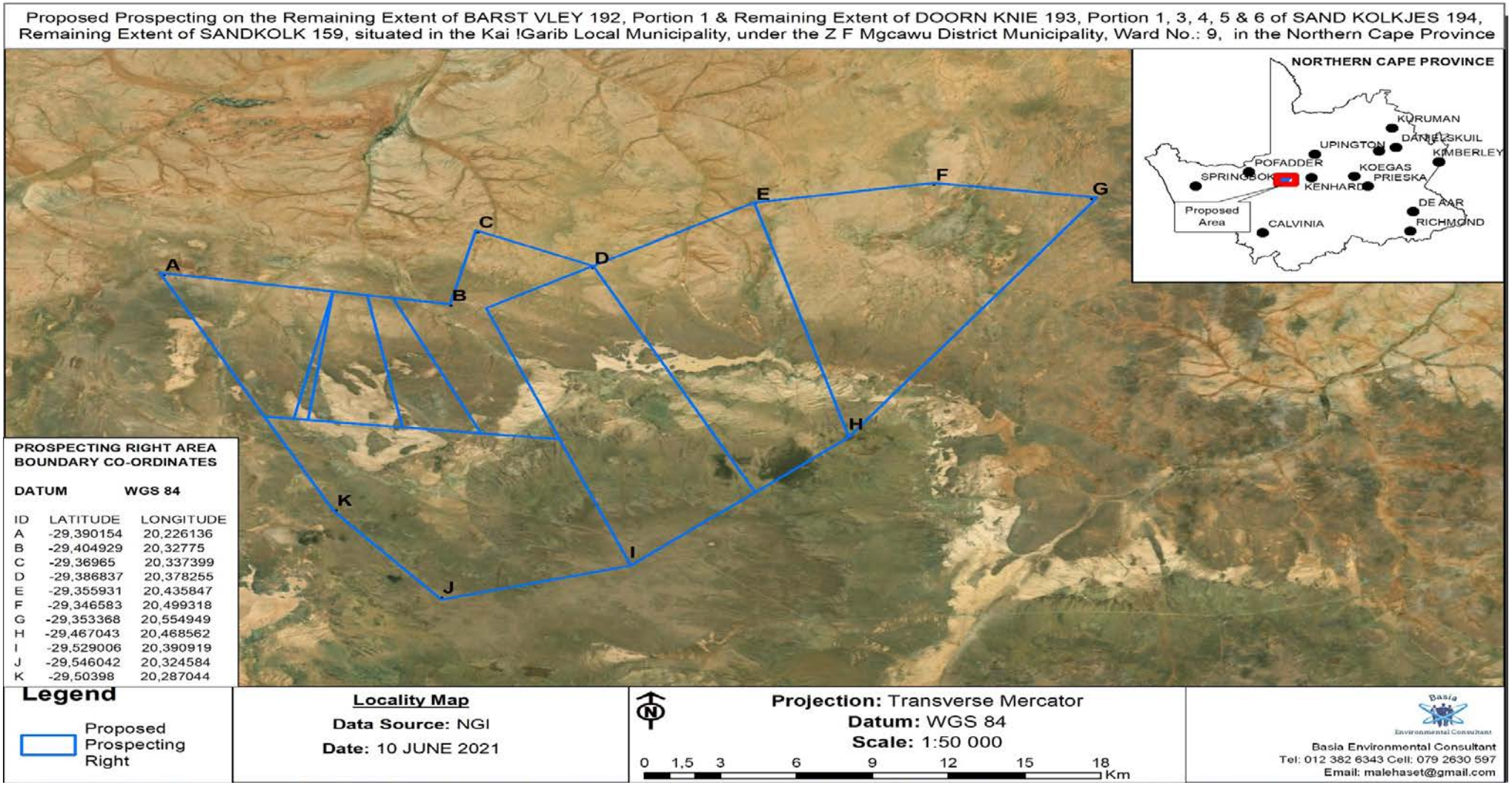


Figure 2: Google map view of the proposed site.

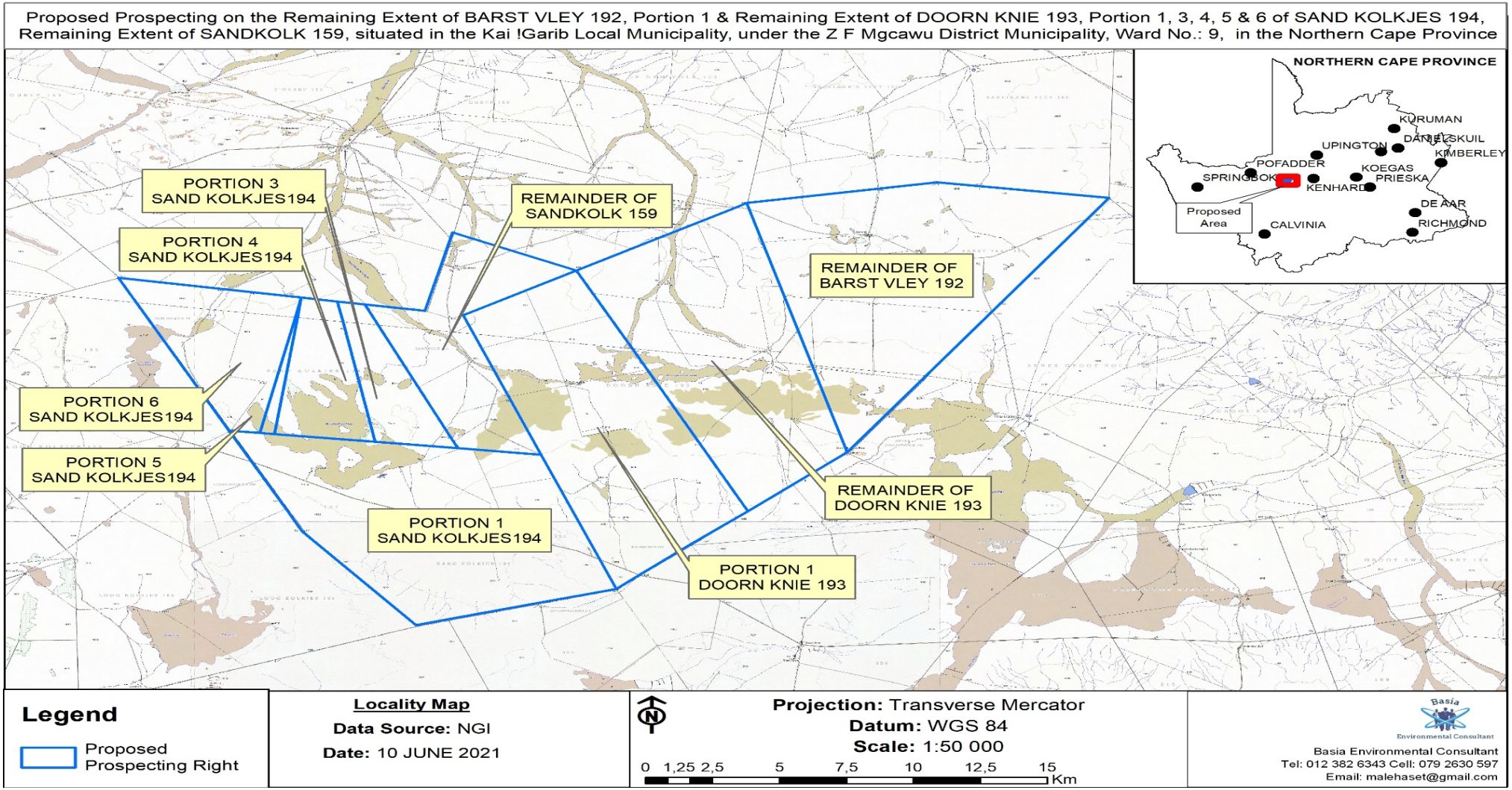


Figure 3: Farm Portions

6. DESCRIPTION OF THE RECEIVING ENVIRONMENT AND REGIONAL SETTING

6.2. Baseline Environment (site specific)

Location of the proposed area:

Photo 1

Photo 2

Entrance to the site is accessed through the intersection of the gravel that off-ramps from the R27 Provincial Route which links Kenhardt with Keimoes. The proposed site is located at approximately 40 km east from this intersection.

Access Roads:

Photo 3

Photo 4

Photo 5

Photo 6

There are several tracks or off roads crosses within these farm portions. The pictures depict the entrances to the farm portions and track access roads inside. All farm portions are easily accessible and there is no need for creating new roads.

Biodiversity:

The proposed prospecting Right application is located within the Bushmanland Arid Grassland of the Bushmanland Bioregion of the Karoo Biome and the Bushman land vioere of the inland Saline Vegetation Bioregion of the Azonal Vegetation Biome. *The Bushmanland Vloere is characterized by shrubland with dominant Rhigozum trichotomum (Bignoniaceous) and yellow flowered plant which is the annual Gazania lichtensteinii (Asteraceae).*

Photo 7

Photo 8

Photo 9

Photo 10

The proposed site is chraterized by undulating landscapes which are dominated by sparsely distributed grass species such as *Stipagrotis*. There are occasional rocky outcrops present at the site of limited extent. Typical species in this area include *Acacia mellifera subsp*. d*etinensE*, *Boscia foetida subsp*. *Foetida* and the tall Shrubs are *Lycium cinereum (d), Rhigozum trichotomum (d), Cadaba aphylla* and *Parkinsonia africana Enneapogon scaber, Jamesbrittenia atropurpurea subsp*. *atropurpurea, Aloe falcata*, *Lycium oxycarpum*, *Dyerophytum africanum* and *Asparagus capensis.*

Surface Water

The proposed prospecting area is located with the Orange River Catchment Area. The affected quaternary catchment are the D53G & D53D. The Orange River meets its main tributary, the Vaal River southwest of Kimberley and it forms much of the northern border of the Northern Cape Province.

Photo 11

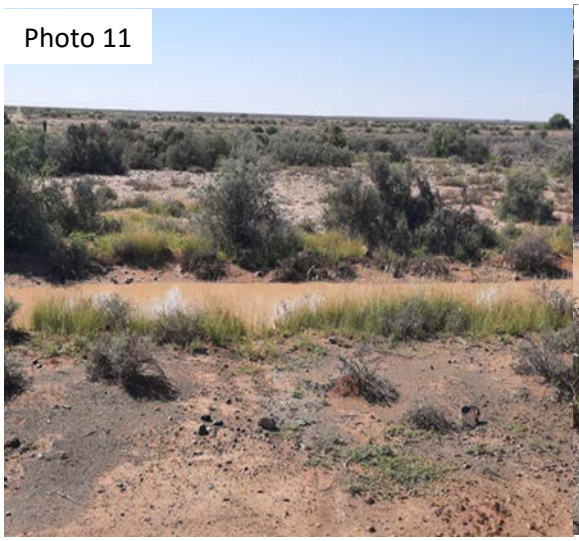
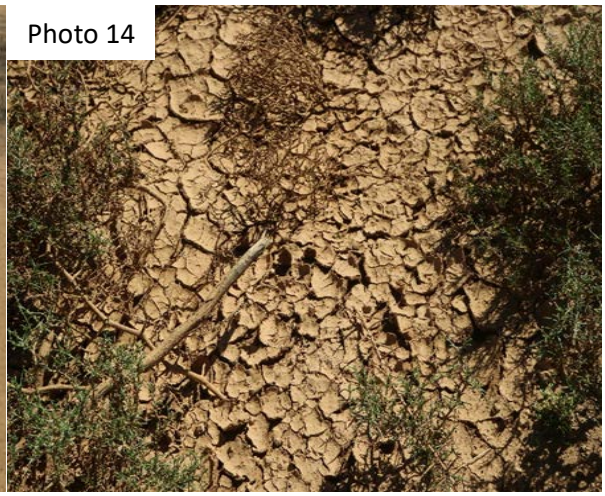


Photo 12

There is stream passing through the proposed site.

Photo 13

Photo 14



There are major Pans (deppressional wetlands) located within and in close proximity cutting through the proposed prospecting right application area.

Photo 15

It should be noted that legislation dictates (as per the National Water Act No. 36 of 1998) that wetland areas are protected and therefore development within 30 meters of the wetland is prohibited. The affected Quaternary catchment are the D53G & D53D

Surface, terrain and Soils

Photo 16

Photo 17

The proposed prospecting area is characterized by flat terrains which are dominated by pieces of rocks lying on the surfaces. Briefly, the main underlying geology in the proposed area is the Mbizane formation from the Dwyka Group which is characterized by Diamictite, Sandstone, siltstone and mud rock. There are some isolated areas of quaternary and karoo dolerite formation.

Photo 18

The proposed area is dominated sandy soils with high drainage and there are white gleaming quartzite visible on higher ground covered by sand, gravel, alluvium and calcrete.

Houses (farmsteads):

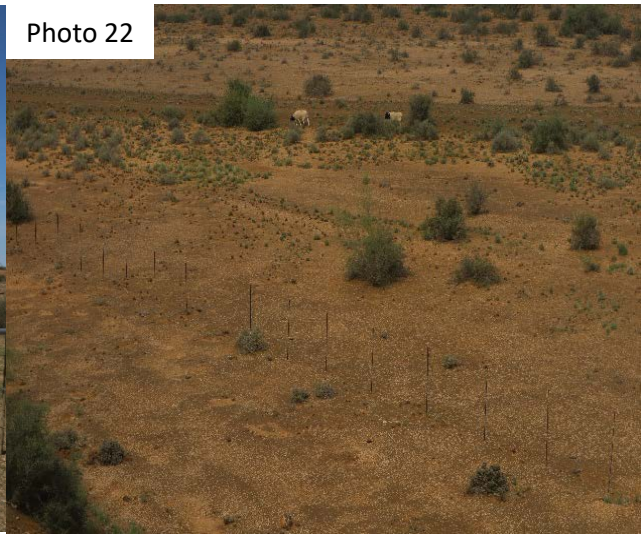
Photo 19

Photo 20

There are several farm houses located at the centre of the proposed prospecting area.

Photo 21

Photo 22



The region is characterised by livestock farming, the main focus being on sheep farming which occurs mainly on large farms that are managed for extensive production. There is no crop farming in the area because of the arid weather conditions and lack of adequate water resources to support crop production under irrigation.

Servitudes:

Photo 23

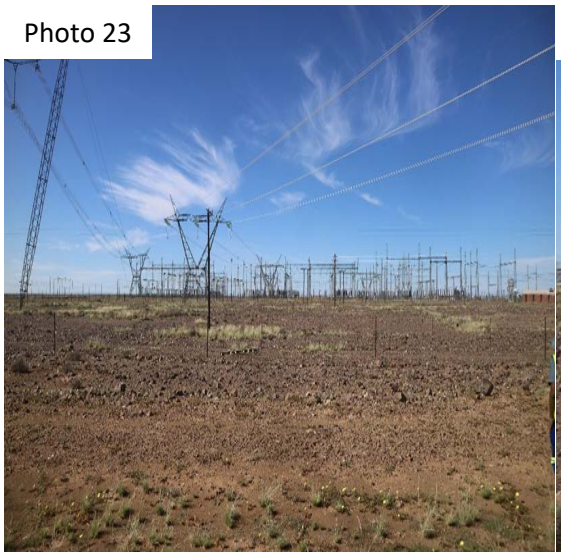


Photo 24

The Eskom Solar Power substation at about 15 m from the proposed site.

Photo 25

Photo 26

Identified servitudes on the proposed site are low voltage power lines and the telephone lines

7. Summary of Environmental screening tool results and assessment outcomes

The area has a plant species theme with low sensitivity, animal species theme with medium sensitivity and terrestrial biodiversity theme with very high sensitivity, a very sensitive aquatic biodiversity theme, this is due to the pans and streams with and in close proximity to the site, the archaeological and cultural heritage theme sensitivity has very high sensitivity because the proposed activity is within 50 m of a Grade IIIc heritage site. The palaeontology theme sensitivity has medium sensitivity

No protected trees were identified at the vicinity of the proposed prospecting area; no wetlands were seen to occur at vicinity of the development. However, there are streams and pans traversing through and in close proximity to the proposed site some of which are dry. There is no Critical Ecological Support Area within and around the proposed site and a small area that is a Critical Biodiversity Area within the proposed site and the vegetation type in the area is not considered sensitive or threatened.

Therefore, ECO and ecologist on site will have to list all sensitive species with their unique identifiers for which information is required.

8. Description of Geographic Information System (GIS) Maps

Apart from site assessment GIS maps of the area are an integral source of information. These databases are established by various stakeholder and considers important aspects of the socio-economic and environmental wellbeing. These maps are described below in order to get an insight of the proposed area.

Current land use

The proposed Prospecting Right Area is dominated by a Barren land with scattered low shrub land (Nama-Karoo). There are also a lot of Water Bodies with Artificial Dams (including canals). There are also Dry Pans fallow land and bare riverbed materials. There is a small portion of open woodland and crop rain-fed land.

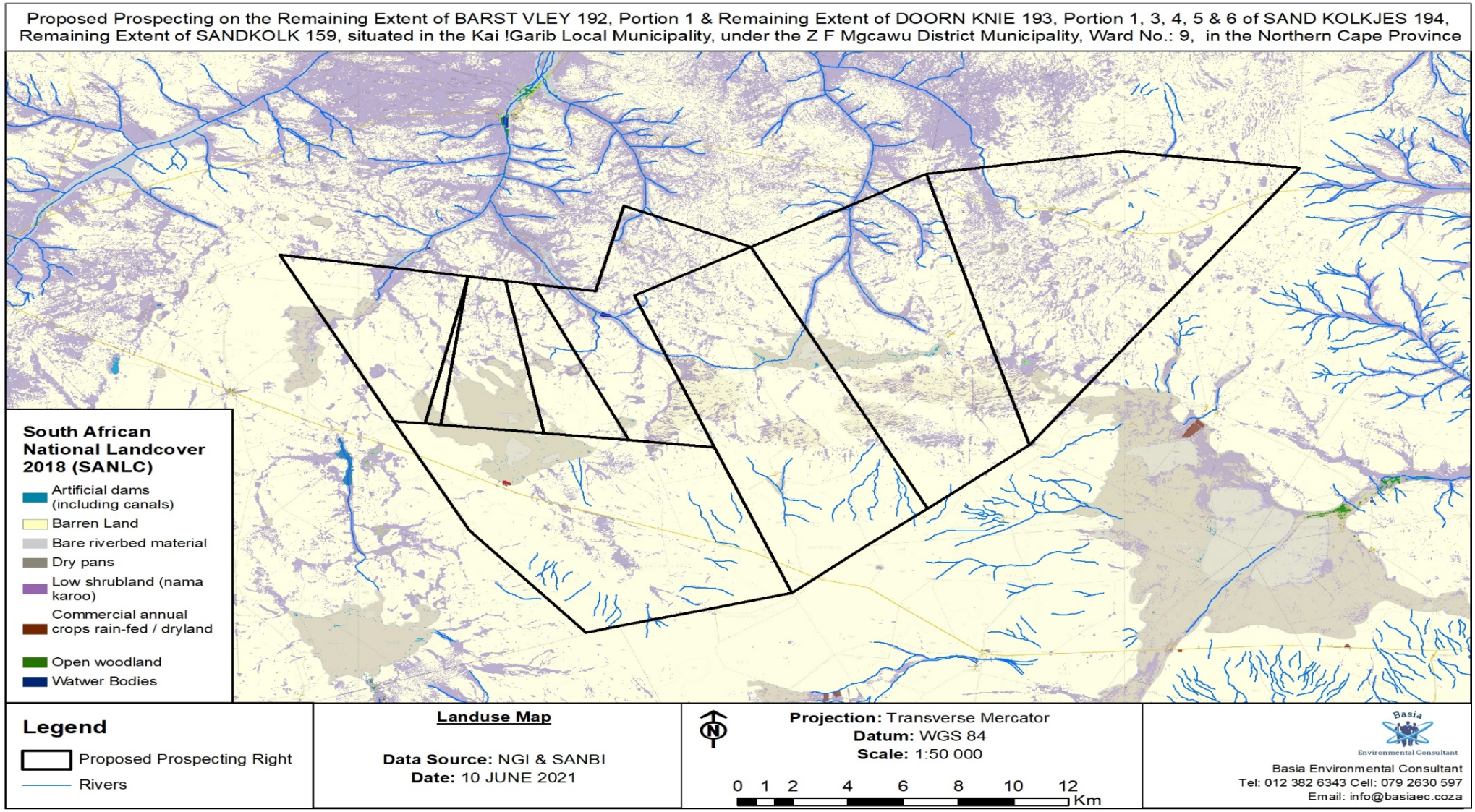


Figure 4: Land use map of the proposed site

Vegetation

The proposed Prospecting Right is located within the Bushmanland Basin Shrubland and the Bushmaland Arid Grassland both of the Bushmanland Bioregion of the Nama-Karoo Biome. With an extent of 34690 km^2 Bushmanland Basin Shrubland is one of the most extensive vegetation types in South Africa. Bushmanland Basin Shrubland occurs on the extensive basin centred on Brandvlei and Van Wyksvlei, spanning Granaatboskolk in the west to Copperton in the east, and Kenhardt in the north to around Williston in the south. The area is characterised by slightly irregular plains dominated by a dwarf shrubland, with succulent shrubs or perennial grasses in places.

Dominant species *include Pentzia incana, Zygophyllum lichtensteinianum, Eriocephalus spinescens, Aptosimum spinescens, Tripteris sinuata, Tetragonia fruticosa, Hermannia spinosa, Felicia clavipilosa, Osteospermum armatum, Pegolettia retrofracta, Pteronia glomerata, Pteronia sordida, Thesium hystrix, Euphorbia decussata and Salsola tuberculata; as well as forbs such as Aptosimum indivisum, Hypertelis salsoloides, Gazania lichtenstein*i and *Fockea sinuata; succulent shrubs include Aridaria noctiflora, Ruschia intricata and Sarcocaulon patersonii; taller shrubs are usually restricted to run-on environments and consist of species such as Lycium pilifolium and Rhigozum trichotomum.*

There are occasional rocky outcrops present at the site of limited extent, which can also be attributed to this vegetation type; typical species include Enneapogon scaber, Jamesbrittenia atropurpurea subsp. atropurpurea, Aloe falcata, Lycium oxycarpum, Dyerophytum africanum and Asparagus capensis. The Bushmanland Basin Shrubland habitat is not considered highly sensitive as it has low diversity and few species of concern present. This is a dominant habitat type along large sections.

The proposed area is also located within the Bushmaland Vloere of the Inland Saline Vegetation bioregion of the Azonal Vegetation Type.

The Bushmanland Vloere is characterized by shrubland with dominant Rhigozum trichotomum (Bignoniaceous) and yellow flowered plant which is the annual Gazania lichtensteinii (Asteraceae).

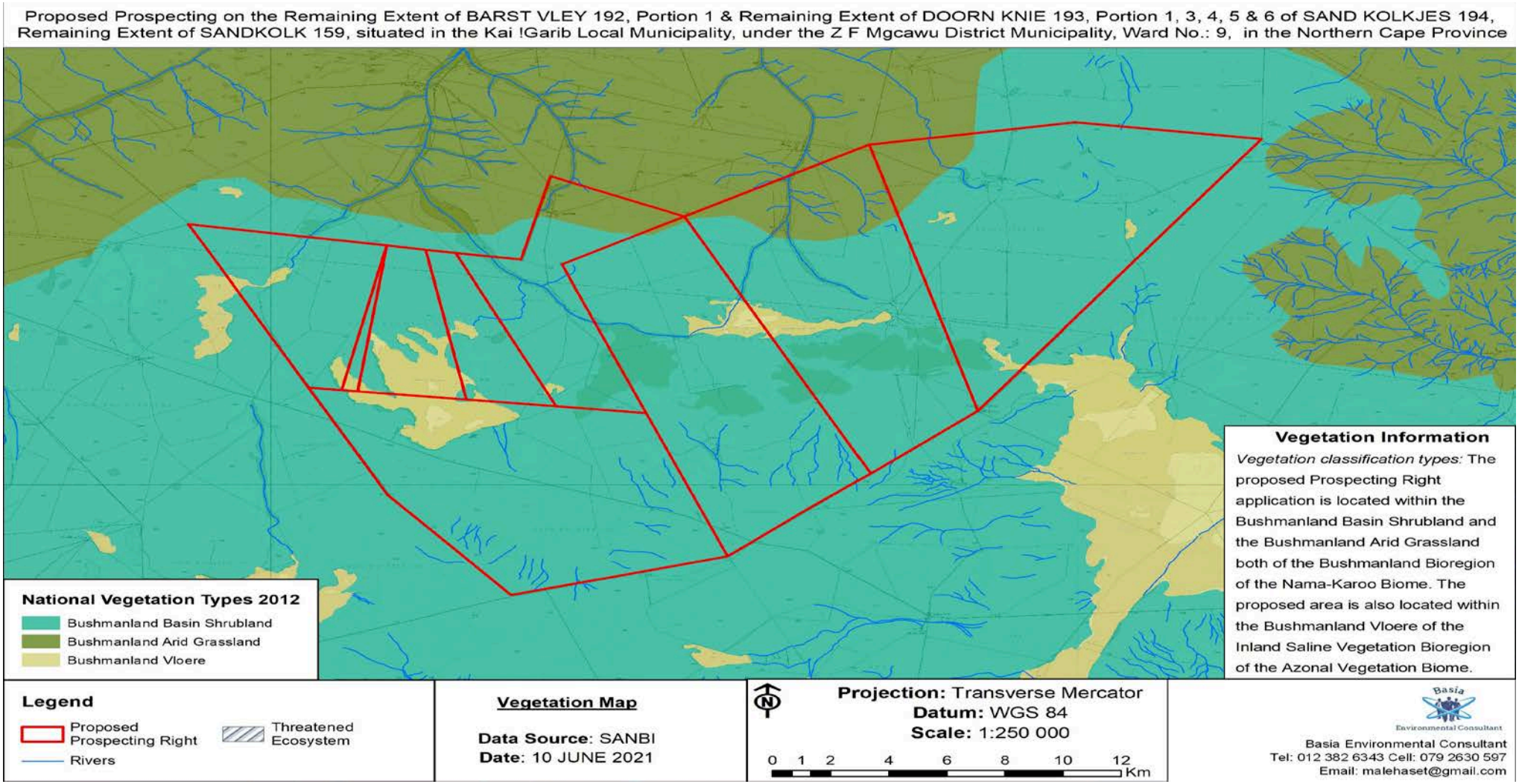


Figure 5: Vegetation map of the proposed area

Hydrology

There are River streams and Wetlands located close or in the proposed Prospecting Right Area. Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season**.** Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communities living in.

The proposed Prospecting Right Area is in the Orange River Catchment Area, South Africa's longest and major river, rising in the Drakensberg in Lesotho (where it is known as the Senqu) it flows westward for 2200 km, where it finally reaches the Atlantic Ocean at Alexander Bay. At the source of the Orange River in Lesotho the rainfall is 2000 mm per Year. It decreases Westwards so that at its mouth, rainfall is less than 50 mm per Year. The total catchment Area of the Orange River (including that of a major tributary, the Vaal) is 973 000 km2 (which is 77% of the land area of the entire South Africa: 1 268 535 km2). Approximately 366 000 km2 (38%) are however situated outside the Country in Lesotho, Botswana and Namibia.

The affected Quaternary catchment are the D53G & D53D.Quaternary catchments are hydrological it's that are hierarchically nested from the primary drainage basin, through to secondary, tertiary and quaternary level**.**

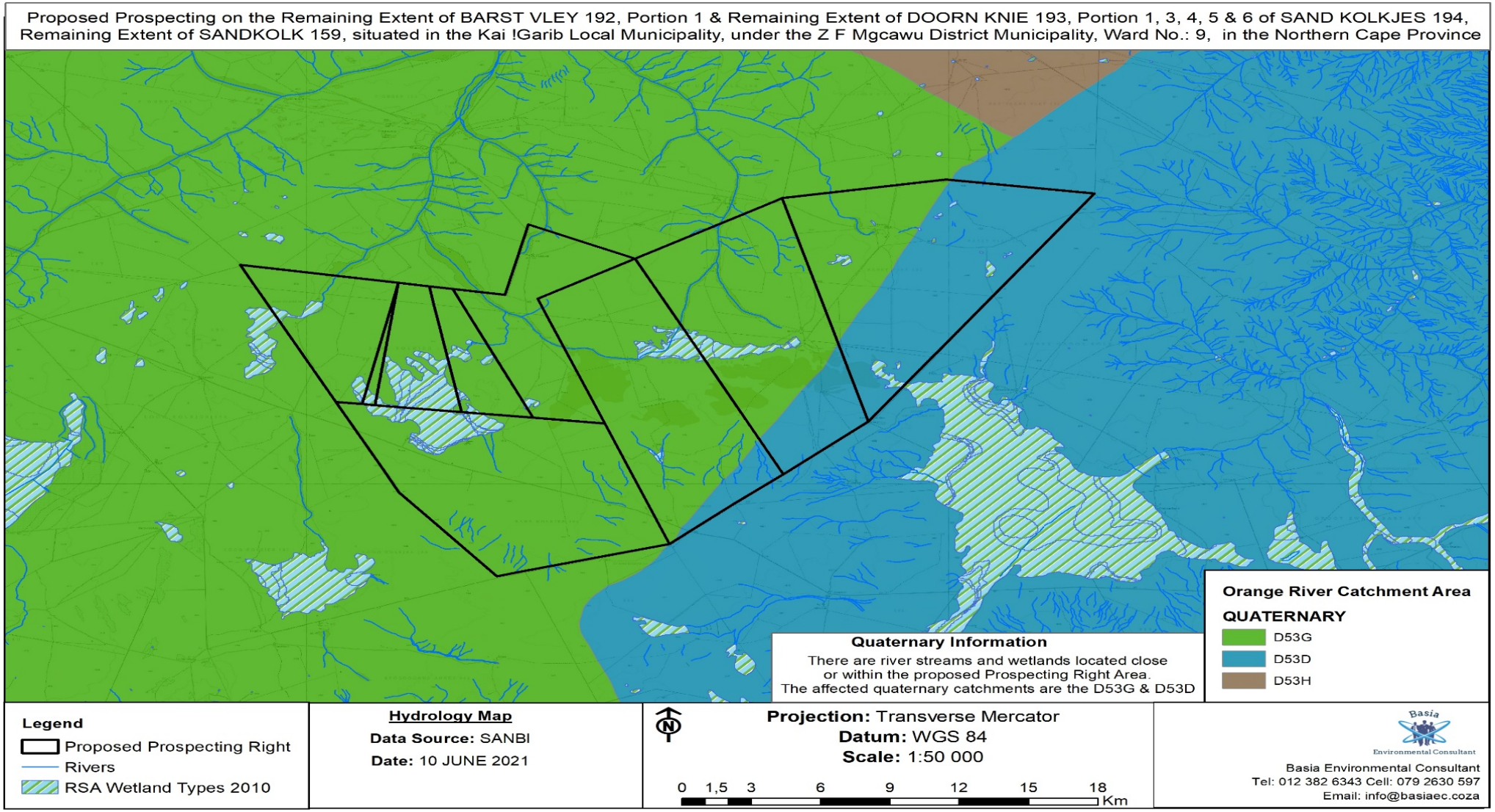


Figure 6: Hydrology of the proposed site

Biodiversity

The mining and biodiversity guideline were developed by the Department of Mineral resources, Chamber of Mines, South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector. In identifying biodiversity priority areas which have different levels of risk against mining, the Guidelines categorize biodiversity priority areas into 4 classes with the following levels of risk for mining attached to them.

A. Legally protected areas, where mining is prohibited.

B. Areas of highest biodiversity importance, which are at a highest risk for mining.

C. Areas of high biodiversity importance, which are at a high risk for mining.

D. Areas of moderate biodiversity importance, which are at a moderate risk for mining.

Figure 7 below indicates that a large portion of the proposed Prospecting Site falls under the unranked level of risk.

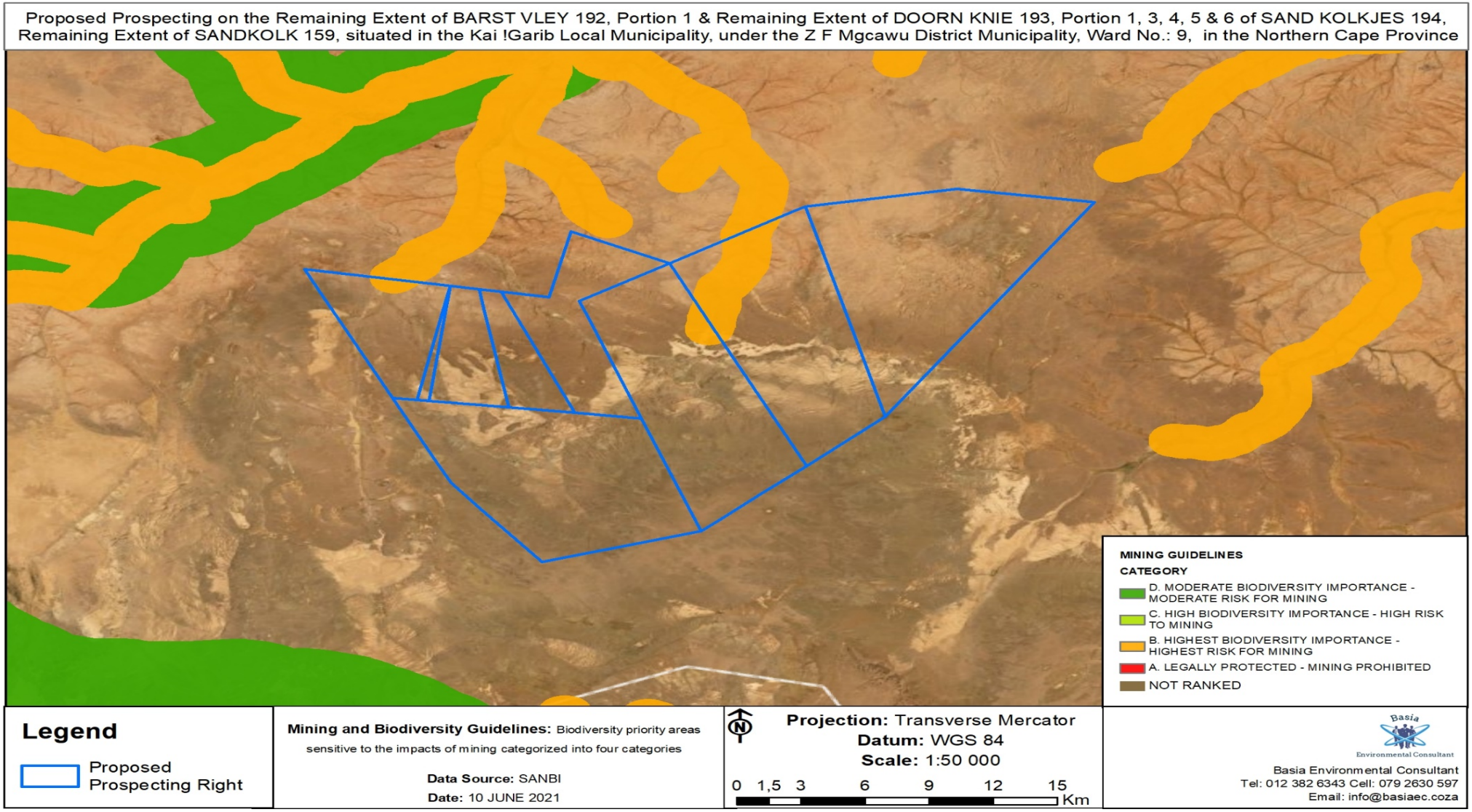


Figure 7: Biodiversity of the proposed site

Climate and rainfall

Kai !Garib has a desert climate, there is virtually no rainfall all year long. The climate here is classified as BWh by KÖppen- Geiger system. The average annual temperature is 21.7 ^{o}C about 191 mm of precipitation falls annually. The driest month is August, within 3 mm of rainfall. The greatest amount of precipitation occurs in January, with an average of 32 mm.

At average temperature of 28.8°c, January is the hottest month of the year and July the coldest with an average temperature of 13.3°c. Between the driest and the wettest months, the difference in precipitation is 29 mm. During the year, the average temperatures vary by 15.5 $^{\circ}C$. Temperature fluctuations generally correspond with those of the rainfall patterns of the proposed area. Rainfall is highly seasonal with about 90% of the annual precipitation recorded during the summer months between October and April as mostly isolated rainfall events that rarely exceed 50 rainfall days per year. Rainfall gradually decreases to less than 10 mm for the three winter months June, July and August including spring month September.

Table 3: Monthly temperatures and precipitation of Kenhardt

	January	February	March	April	May	June	July	August	Septem-ber	October	November	Decembe
Avg. Temperature °C (°F)	28.8 °C (83.8) °F	28.5 °C (83.2) °F	26.4 °C (79.5) °F	21.4 °C (70.6) °F	17.3 °C (63.1) °F	13.4 °C (56.1) °F	13.3 °C (55.9) °F	15.3 °C (59.5) °F	19.1 °C (66.5) °F	23.2 °C (73.8) °F	25.6 °C (78.1) °F	27.8 °C (82) °F
Min. Temperature °C (°F)	21.2 °C (70.2) °F	21.4 °C (70.5) °F	19.5 °C (67.1) °F	15.2 °C (59.4) °F	11.2 °C (52.2) °F	7.4 °C (45.3) °F	7 °C (44.6) °F	8 °C (46.5) °F	11.1 °C (51.9) °F	15 °C (59) °F	17.2 °C (62.9) °F	19.5 °C (67.2) °F
Max. Temperature °C (°F)	35.5 °C (96) °F	35.1 °C (95.2) °F	32.9 °C (91.3) °F	27.8 °C (82.1) °F	24 °C (75.2) °F	20.1 °C (68.3) °F	20.2 °C (68.4) °F	22.7 °C (72.8) °F	26.8 °C (80.3) °F	30.6 °C (87.2) °F	32.9 °C (91.2) °F	34.9 °C (94.9) °F
Precipitation / Rainfall mm (in)	32 (1.3)	27 (1.1)	32 (1.3)	24 (0.9)	12 (0.5)	6 (0.2)	4 (0.2)	3 (0.1)	4 (0.2)	12 (0.5)	13 (0.5)	22 (0.9)
Humidity(%)	27%	29%	33%	40%	41%	44%	38%	31%	24%	22%	21%	23%

Geology

The underlying geology of the proposed site is underlain by Mbizane Formation which is characterized by Diamictite, Sandstone, Siltstone and mud rock.

Mbizane Formation is the northern facies and is considered to represent fore bulge deposits of the Karoo foreland system. This portion of the formation is restricted to the northern and northeastern sections of the Karoo Basin. It is composed of thinly bedded mudstones and clay stones, stratified conglomerates, pebbly sandstones, and diamictites.

Types of Rocks that are found in the proposed site are:

- SOUTPUTS – siliceous-calc- silicates rocks with lenses and layers of amphibolites, quartzite and conglomerate
- DE BANKEN GNEISIS- Grey, medium- grained biotite gneiss with lenses of fine- grained psammitic gneiss and calc-silicates rocks in places
- BASJAN GRANITE-medium- to coarse-grained leucocratic granite gneiss

- KOESIE SE DAM TONALITE- black weathering, coarse-grained tonalite
- WITPAD GRANODIORITE- grey weathering, medium-grained, moderately foliated granodiorite

The proposed site is underlined by Sandy Soil- Sandy soil is a type of soil that consists of tiny, fine particles formed due to weathering, breakdown, and fragmentation of rocks such as limestone, granite, and quartz. Sandy soils are often dry, nutrient deficient and fast-draining. They have little (or no) ability to transport water from deeper layers through capillary transport.

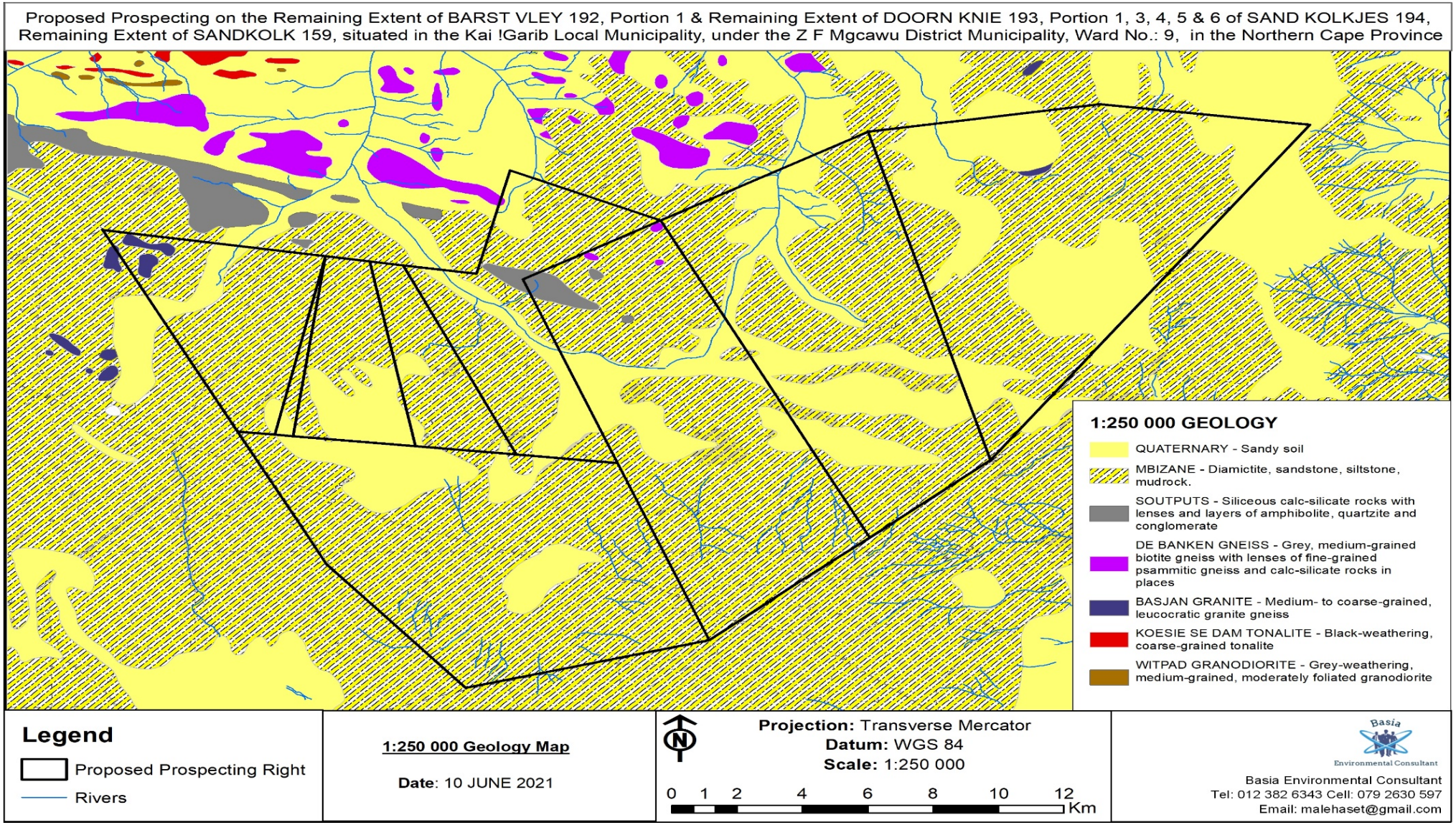


Figure 8: Geology map of the proposed site

Sensitivity

There are river streams cutting through the proposed area, there are also dry pans within the proposed area. The River Buffer Zone is 50m.There are CBAs located within the remainder of Farm DOORN KNIE 193.There are no ESAs and protected areas located within the proposed area.

It should be noted that legislation dictates (as per the National Water Act No. 36 of 1998) that wetland areas are protected and therefore development within 30 metres of the wetland is prohibited.

The pan and stream bufferzone must be 100m and there are no protected areas within or close by the proposed site. The vegetation type in the area is not considered sensitive or threatened.

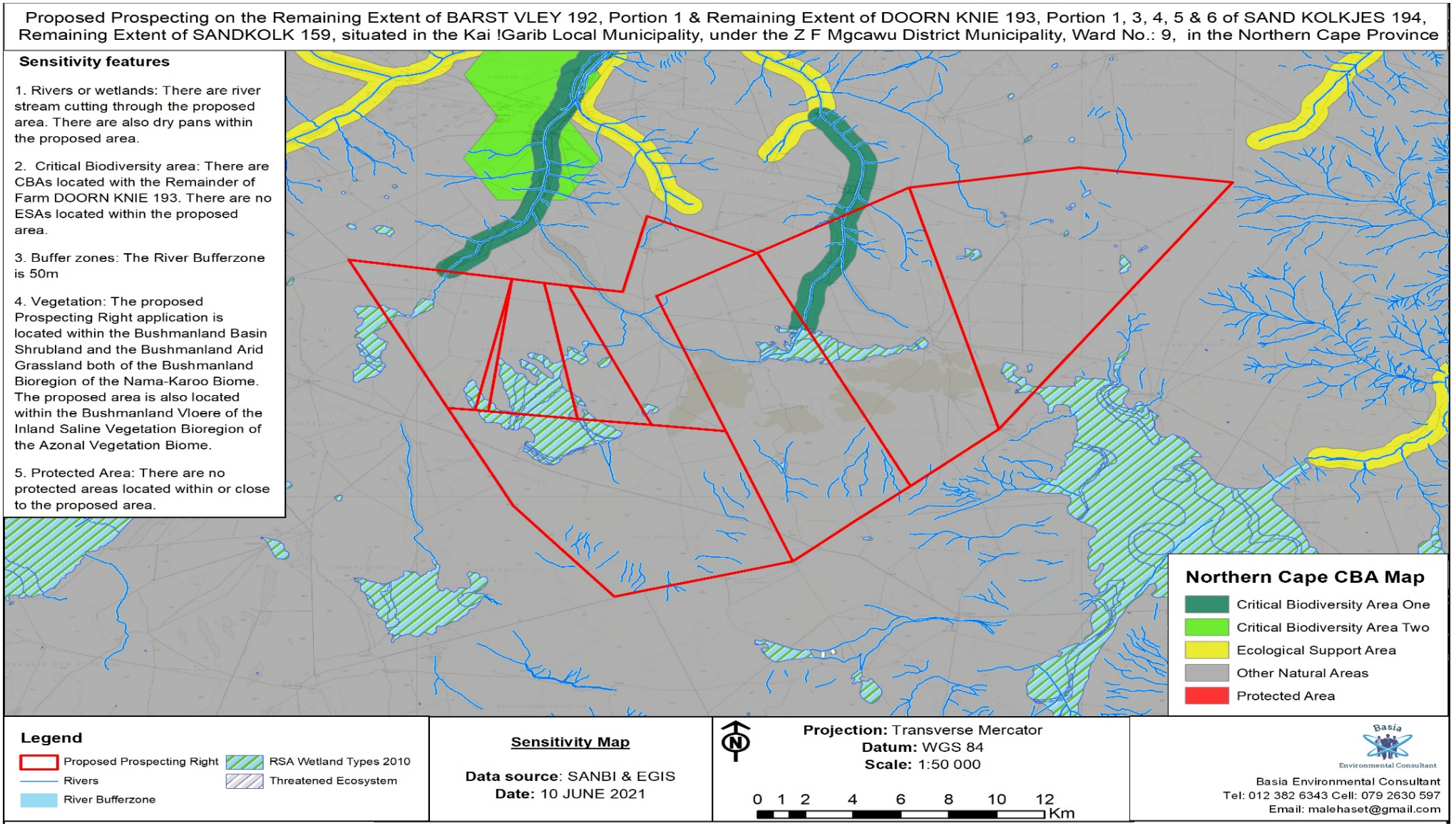


Figure 9: sensitivity features of the proposed site

9. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

9.1. Prospecting work to be performed (Invasive)

- **Diamond/core drilling**

Diamond/core drilling operations will be carried out for the purpose of retrieving core samples and laboratory analyses will be performed on the core samples to establish the quality of dolerite rock properties. No pits or trenches will be created during this activity. **Fifteen (15)** exploration boreholes will be executed over the period of 3 years, however, drilling will be done as quick as possible to avoid prolonged stay on the farms. Each borehole will be drilled up to a depth of approximately 200 m for the current application. The rate per meter is R300 on average a borehole takes approximately one (1) to five (5) days to complete. There will be no additional drilling, exceeding the number stipulated above.

- **Required Equipment**

A truck mounted with a drill rig of about 4 tons will access the site and drive to the pre-determined position where drilling will be undertaken (see figure 10 for the positions of the boreholes, please note that the borehole positions might change due to geological findings). A bukkie will be used to collect and transport the samples to the laboratory. All equipment that are required for prospecting will cover only 0.06 ha. Drill rig of about 4 tons, water storage tank of about 160 litters, Equipment storage 50 m^2, Security offices 40 m^2, Ablution facilities 10 m^2 and Sample storage 40 m^2.

Table 4: Equipment's to be used or needed

Equipment and/or Technology to be used	1 drill rig mounted on a 10-tonne truck or trailer
	2X (4X4) Bakkies
Materials required	Diesel
	Grease
	Hydraulic Oil
	One 50 kg Bag of cement/ Expansion foam per borehole, 50m PVC pipes
	Picks, shovels,
Spillage control	Dip trays

Sanitation Facility	Chemical toilets
Waste Management	Waste skip and Bins
Safety	Safety Boards

Image 81

Image 82

Images showing typical activities during prospecting works, before rehabilitation.

- **Summary of precautions and measures taken;**

The proposed position of the boreholes have taken into account the following aspects:

- Geology of the area “” preferred
- Sensitive area biophysical (such as watercourses and critical biodiversity)

- No borehole is positioned within 100 m from the above sensitive areas. Where it cannot be avoided mitigation measures outlined in the EMP will be strictly adhered to.

Boreholes

15 boreholes will be drilled across the proposed Prospecting Right application area, the first borehole denoted BH01 will be drilled 0.33 km southwest of an access road.BH02 within a plantation will be drilled 1.38 km northeast of an access road.BH03 within a plantation will be drilled 0.49km west of Doringknie Se Vloer(pan). BH04 within a plantation will be drilled 3.4 km southwest of Doringknie Se Vloer. BH05 will be drilled 4.86 km northeast of Doringknie Se Vloer(pan).BH06 will be drilled 0.94km northeast of Ondersite Doornknie Farm. BH07 will be drilled 4,31km southwest of access road. BH08 will be drilled 4.44km west of Southriver.BH09 will be drilled 1.7km west of access road. BH10 will be drilled 0.1km south west of access road.BH11 will be drilled 4.06km north of Southriver.BH12 will be drilled 1.51km northeast of South river. BH13 will be drilled 1.59km south of Southriver.BH14 will be drilled 2.04km northeast of an access road.BH15 will be drilled 1.72km east of an access road.

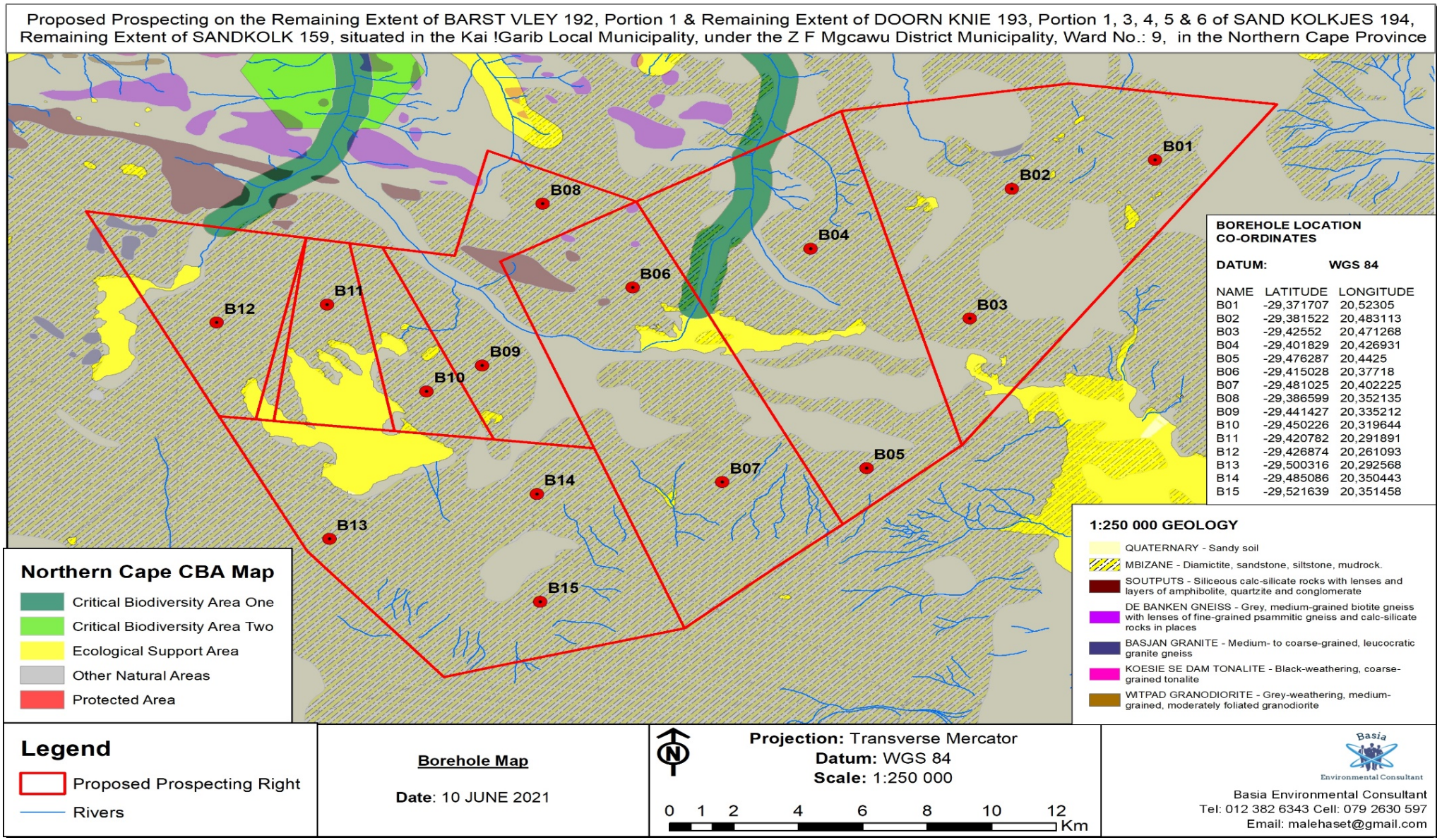


Figure 10: Proposed borehole location and the sensitive features on borehole locations

Table 4: Estimated cost for prospecting 15 boreholes

Activity	**Year 1**	**Year 2**
	Expenditure	**Expenditure**
Phase 1 (5 boreholes with the depth of 200m within 12 months)		
Drilling (diamond/core)	R 300 000	
Rehabilitation costs	R 60 000	
Analytical cost	R 20 000	
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and associated infrastructure.	R 20 000	
Owner compensation	R 5 000	
Phase 2 (10 boreholes with the depth of 200m from 12-24 months)		
Drilling (diamond/core)		R 600 000
Rehabilitation costs		R 100 000
Analytical cost		R 40 000
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and		R 20 000
Owner compensation		R 5 000
Owner compensation		
Annual total	**R 405 000**	**R 765 000**
Grand total		**R 1 117 000**

Please note that the phases can be split into three or four phases depending on the results obtained.

9.2. DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

Data collection methods

Several studies outlined below will be conducted to supported and inform the economic and environmental and economic feasibility of the proposed projects.

- **Laboratory analysis**

Material obtained from drilling will be surveyed and sampled. Samples will be transported to an accredited laboratory for analysis of the quality of chrome, nickel, iron, manganese, lead and zinc.

- **Geophysical survey work to be undertaken**

Down-hole geophysical methods using wire-line geophysical instruments will be used to gather geological and rock quality information of boreholes. Ad hoc down-hole geophysical investigation will be timeously conducted to verify lithological and structural properties of the subsurface in relation to the copper, chrome, iron, manganese, lead and zinc reserve areas.

- **Geohydrological survey**

The boreholes will also be used to gather geohydrological information with specific reference to aquifer yield testing and gathering of water samples for analytical purposes. Baseline preliminary conceptual groundwater flow models to estimate inflow rates into a probable underground mining operation using hydraulic aquifer parameters obtained during aquifer yield-testing will also be conducted in order to inform the type of mining to be applied for.

- **Rock distribution and reserve estimation**

Rock distribution and reserve estimation relate to computerized desk studies which encompass the following main actions:

- **Data processing and validation**

Data obtained during the drilling project needs to be processed and validated versus stratigraphic, structural and analytical data received and correlated with surrounding boreholes in the reserve area.

Lithofacies and rock quality modelling

Variations in a stratigraphic unit across the reserve area are illustrated by contoured maps showing lateral trends of most significant properties. This is done by the utilization of computerized geological software. Detailed in situ reserve and quality determinations will then be possible through computer based modelling, and qualitative and quantitative calculations.

- **Consultation with landowners**

The database of I&AP's collected during the consultation process will be used to inform parties about the activities that will be conducted prior to execution and the timeframes. This will be a responsibility of the Prospecting Rights Officer. All issues relating to the prospecting programme such as dates, access routes, availability of water, and rehabilitation of the drill sites and any other items of mutual concern. The discussion and agreement between the parties will be captured in writing.

Table 5: Proposed expertise, prospecting phases and time frames

Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	Technical expert to sign off on the outcome.
Invasive Prospecting works					
Diamond/core drilling (15 boreholes)	Geologist	1 Week to 1-36 months	Positions and depth of chrome, lead and zinc, etc reserves. Positions and type of rock	Month 1-36	Geologist Engineering Laboratory analyst
Non-invasive Prospecting works					
Ecologist assessment	Ecologist	1 Week to 1-36 months	Assess, prevent and mitigate ecological risks	Month 1-36	Ecologist Environmentalist
Laboratory analysis	Analytical chemistry	1 Week to 1-36 months	Quality of chrome, lead and zinc, etc reserves	Month 1-36	Geologist
Geophysical survey Rock distribution and reserve estimation Lithofacies and rock quality modelling	Geophysicist Geologist	1 Week to 1-36 months	Geological and structural formation of the proposed area	Month 1-2	Geophysicist
Geohydrological survey	Geohydrologist	1 Week to 1-36 months	Geohydrological data of the proposed area.	Month 1-12	Geohydrologist
Consultation with I&AP's and landowners	Environmentalist	1 Week to 1-36 months	Understanding and consensus between prospecting activities and affected parties.	1 Week to 1-36 months	

10. Site layout

The main operational site layout will be established depending on the location of the boreholes and have to be taken into account the sensitivity of the environment in the area and have to avoided impeding biodiversity and water resources in the area. A layout plan is shown below. Liaising with landowner will continue to determine where equipment's and samples will be stored before transportation. Sensitivity of the area must be considered before a decision can be made.

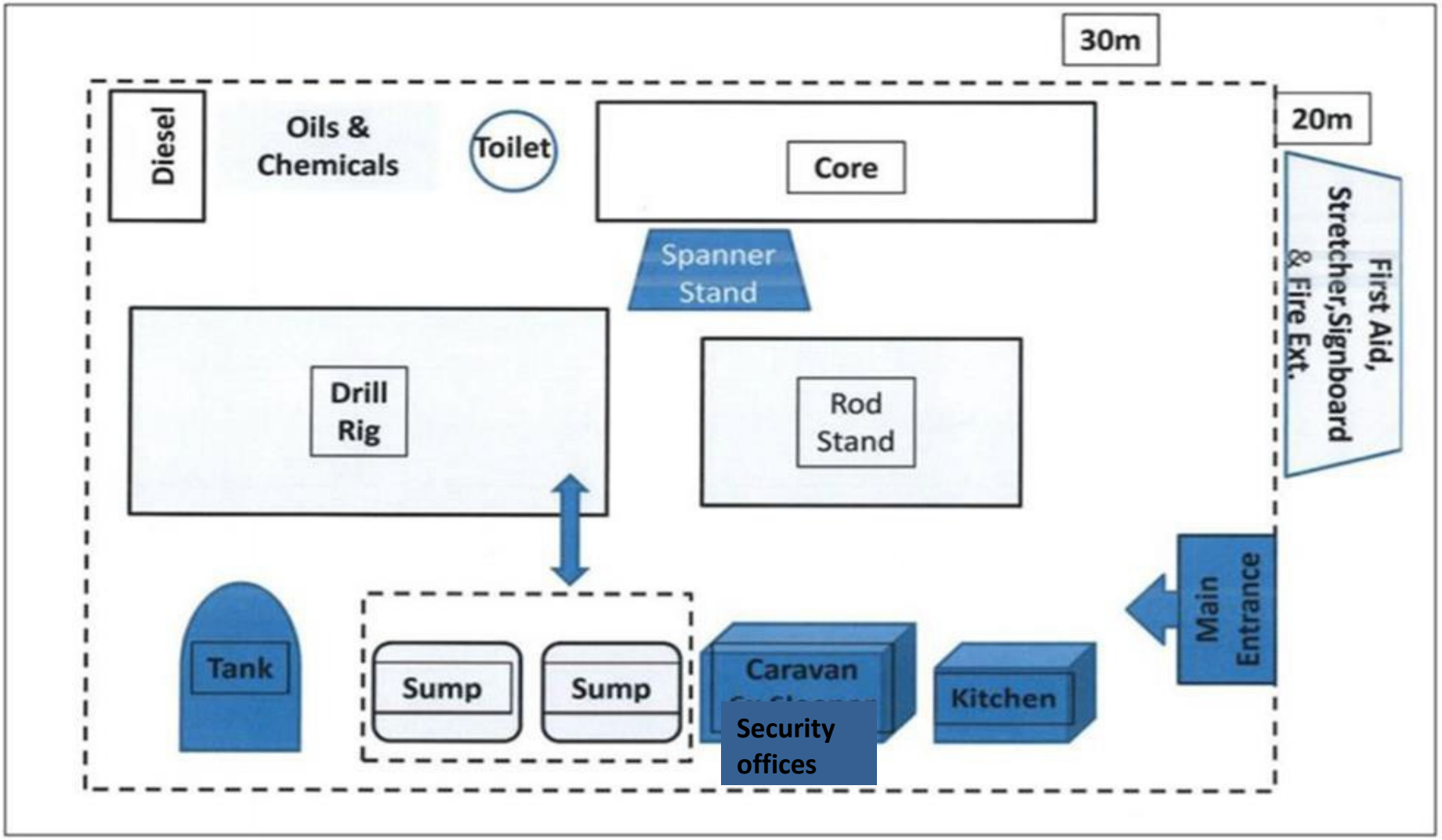


Figure 11.1: Layout plan showing the facilities to be placed on the proposed site

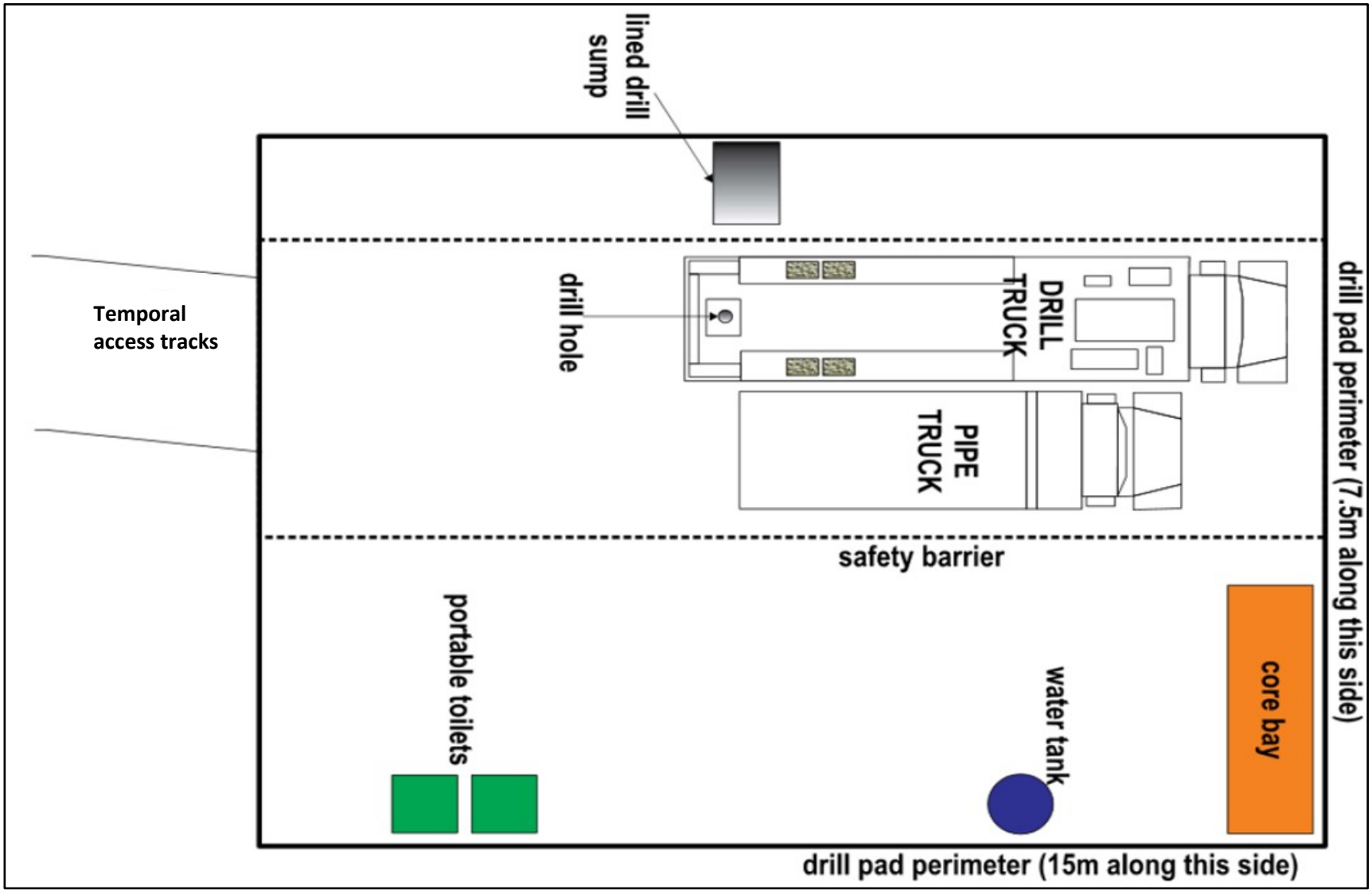


Figure 11.2: Showing equipment's and space that will be utilized on the drilling site

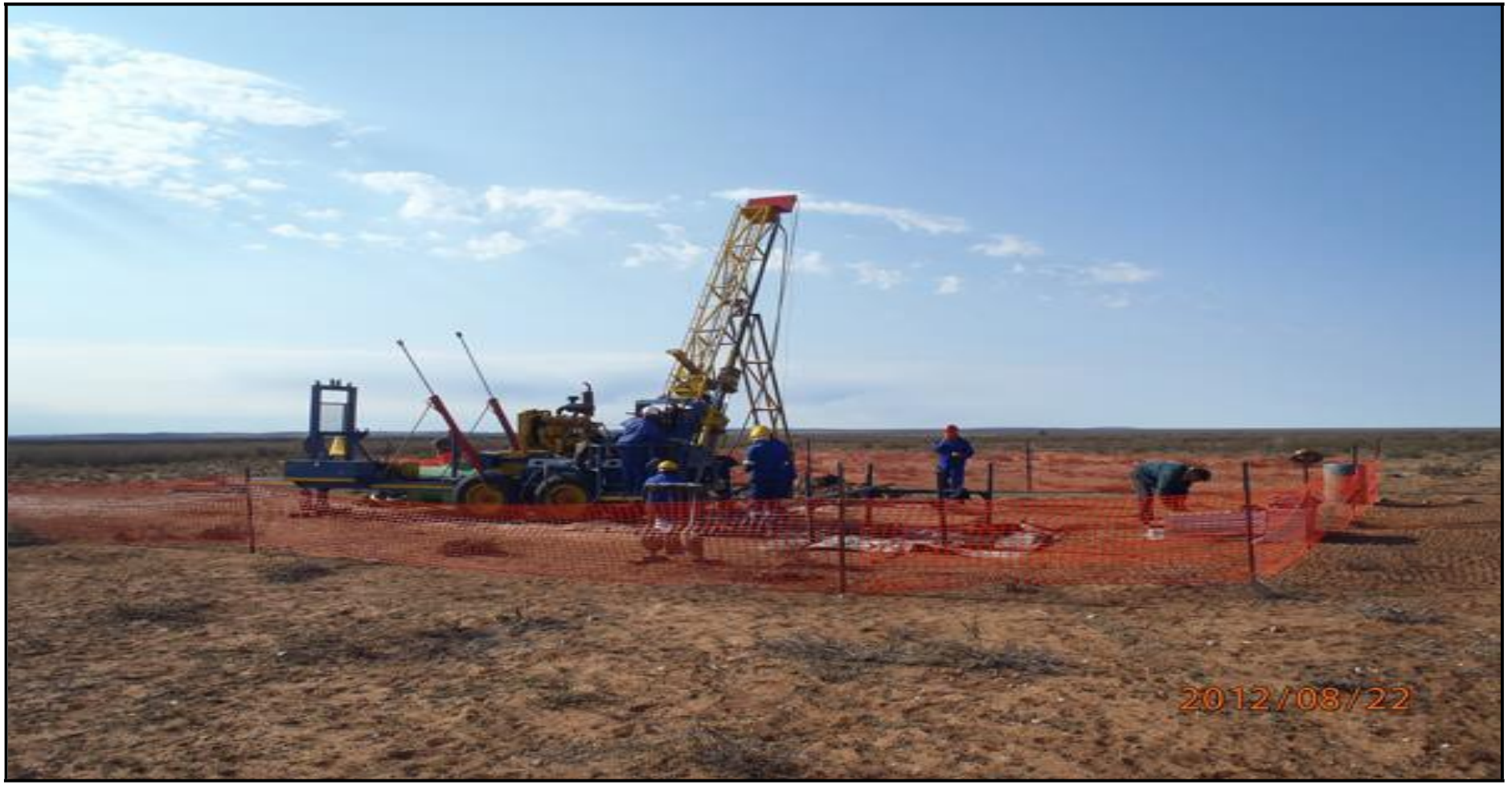


Figure 11.3: Shows a typical drilling site, drilling equipment's and personnel

11. LISTED AND SPECIFIED ACTIVITIES

The proposed prospecting activity triggers activities listed in NEMA: EIA Regulations 327 as amended in 2017 (Listing Notice 1) which read as follows:

Activity 20: "*Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including associate infrastructure, structures and earthworks, directly related to prospecting of a mineral resource*".

Table 5: Summary of NEMA listed activities being applied for

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Area applied for	2022,1974293 ha	Activity 20	GNR 327 Listing Notice 1
Drilling area (boreholes)	0.002 Ha	Activity 20	GNR 327 Listing Notice 1
Security offices	40m^2	Activity 20	GNR 327 Listing Notice 1
Ablution facilities	10m^2	Activity 20	GNR 327 Listing Notice 1
Equipment storage	50m^2	Activity 20	GNR 327 Listing Notice 1
Sample storage	40m^2	Activity 20	GNR 327 Listing Notice 1
Access roads (tracks)	40m^2	Activity 20	GNR 327 Listing Notice 1

7. Required expertise

7.1. Engineering personnel*:* An engineer with at least 5 years of experience must be responsible to ensure that drilling and rehabilitation program is implemented as outlined. The engineer must also enforce the following;

- confirming that workers are trained and competent for the task undertaken
- providing clear work instructions
- inspecting and monitoring workplace conditions
- continuously evaluating worker performance and correcting unsafe acts

- reporting and rectifying hazards
- assuring implementation of the company's safety systems
- demanding compliance with safety rules and procedures
- conducting meaningful observations, consultation and interventions

7.2. Environmental, Health and safety personnel: with at least 5 years' experience in relevant fields of environmental assessment, monitoring and rehabilitation.

- Monitor and report the potential environmental, health and safety risk
- Identify priorities for replacing or modifying the rehabilitation plan.
- Develop an action plan with due dates and responsibilities for the rehabilitation process
- Conduct an audit of rehabilitation to ensure that all practical measures have been taken to control risk associated
- Produce and environmental, health and safety report monthly and quarterly

7.3. Geologist with at least 5 years' experience on exploration of chrome or relevant work.

- Will be responsible for identifying and assessing the location, quantity and quality of mineral deposits.
- Planning programmes for drilling and taking samples
- Collecting and recording samples and data from test sites
- Analysing geological data using specialist computer applications
- Produce a report on quantity, quality and depth of chrome reserves

7.4. Ecologist with at least 5 years minimum experience

- Responsible for assessing the site specific ecological risk by walking around the area to be prospected and ensure that plants and animals are not harmed or affected by the activities.
- Keep a register of identified species.
- Recommend alternatives and mitigation measures.

12. DESCRIPTION OF ASSOCIATED ACTIVITIES TO BE UNDERTAKEN

The following section presents detailed description of all the activities associated with the proposed prospecting application.

Fencing the office and storage site

Fencing of the site for temporal offices and storage site will be required as a means of ensuring safety and restricting trespassers. The fencing however will be ecologically sensitive to ensure that species habitat is not divided. Fences will be clearly demarcated and appropriate signage will be displayed, similar to the signs in the images below. The necessary signage will also be erected in the vicinity of the sites to ensure visitors can easily and safely access the premises.

Temporary site and security offices

The site offices for the project, including a small security hut at the entrance of the office and storage site will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal degradation footprint. Keeping the disturbance area minimal and ensuring ease of closure and rehabilitation after life of prospecting make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices. The visual impact associated with the structures will also be considered and natural colour paint will be applied to the structures to blend in with the background features.

Storm water management around the facilities must be considered. No housing facilities will be required as personnel will not be allowed to reside on site for the duration of the project but instead live off site from the area. The security will however be present 24 hours a day on the area for the duration of the project and even longer during the closure and rehabilitation period.

Image 1: A temporal security office

Image 2: A temporary site office

Temporary sanitation (Ablution facilities) and change house

Similar to the structure indicated in the section above, the temporal sanitation and change house will be some container type facilities which can easily be brought to site and also removed after life of prospecting. A two change rooms must be provided, one for designated for male and the other for females. Four temporal toilets must be provided, two for females and two for males. The mining area will not constitute or host more than 15 people/personnel at the same time. Temporal toilets will be supplied and serviced by an independent contractor whom will be responsible for the management and disposal of waste.

This ensures no major construction and approval is required for a full scale sewage treatment facility. Water requirements relating to ablutions and drinking water are expected to be minimal and will be brought to the site by a tanker. The current expectation is that 15 employees will require 45 liters per person per day (liter pp/day) amounting to 1350 liters per day.

Image 3: A temporal toilet

Drilling (Prospecting):

Please refer above section for a detailed description of the prospecting activities to be undertaken.

Access Roads

The site can be accessed via the R27 and the well establised gravel access route to the site. Where site cannot be accessed via existing roads, the area will be access by tracks, no new roads will be established, and no vegetation will be removed or uprooted for the purpose of accessing the area.

Power

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

Water Supply

RC drilling in general does not require water while a continuous water supply is needed during core drilling.

The water will be purchased from local contractors and brought onto the site by water tank truck to the identified drill sites. Portable on-site storage tanks (water bowsers) will be installed for the water supply. Water bowsers with the capacity of 500 gallons will be deployed to the sites and filled with water that will be used during the operational phase such as for dust suppression or core drilling.

Consumable water for personnel will be purchased from local stores.

Volumes and rate of water use required for the operation

The rate of water use required for the operation is about 150 liters a day which is;

- 100 liters for drilling equipment's;
- 50 liters for drinking and sanitation.

Has a water use license has been applied for?

There will be no abstraction of water from the watercourses nor working on the river bed. No listed activity on Section 21 of the Water Act has been triggered.

Waste management

The necessary waste receptacles will be in place for general domestic waste separation and management. Two mobile Waste Skips (one for hazardous waste and one for non-hazardous waste) and four mobile waste bins (two for hazardous waste and two for non-hazardous waste) to be clearly labeled and place in strategic area on site to ensure easy access. These waste bins will be used for collection of different types of waste and will be removed from the site to a licensed waste facility by a registered and approved contractor. The diagram below shows the mobile waste skips and waste bins. Mobile waste skips ensure minimal impact on the environment they are placed on.

Image 85: Mobile waste skips

Image 86: Mobile waste skips

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing

and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill. The overall aim of the project is to keep the carbon footprint of the entire project as small as possible. This will include the use of “green” products as far as possible. Several waste streams are likely to originate from the activities associated with day to day activities in the workplace. Some of these waste streams may not be hazardous, but the majority may contain a component(s) that may need special treatment. The nature of these waste streams may also vary due to composition and physical form. In order to make informed decisions on determining the appropriate waste management options to handle, treat and dispose of waste, the different waste streams must be identified in terms of hazardous and non-hazardous wastes.

Waste streams can be categorized into 6 (six) different streams, based on similar health and environmental concerns namely:

- ***Inorganic wastes*** – acids, alkalis and other solid residues.
- ***Oily wastes*** – primarily from the processing, storage and use of mineral oils.
- ***Organic wastes*** – halogenated solvents residues, non-halogenated solvent residues, polycarbon based (PCB) wastes from paint and resin wastes.
- ***Putrescible Organic Waste*** – wastes from production of edible oils, slaughter houses, tanneries and other *animal based products.*
- ***High Volume/Low Hazard Wastes*** – waste based on their intrinsic properties present relatively low hazards but may pose problems due to high volumes such as plastics
- ***Miscellaneous Wastes*** – infectious waste from diseased human/animal tissue, redundant chemicals, laboratory wastes and explosive wastes from manufacturing operations or redundant munitions.

General waste to be generated from the proposed project area will include domestic waste which includes old food, polystyrene, old stationary, discarded Personal Protective Equipment (PPE) and old clothing generated from the drilling and campsites. ***Hazardous waste*** hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Mineral residue will include cores, muds and drilling chips generated during the drilling of the exploration boreholes. The mineral residue will be removed from the site and disposed of at a registered waste disposal site.

The following shall apply to the temporary storage of waste at source:

- The employer shall provide adequate and appropriate containers/receptacles for the temporary storage of waste at source;
- Adequate containers must be available to store different types of waste separately to allow for recycling and disposal according to the integrated waste management plan;
- Dedicated storage areas for various types of waste must be allocated and clearly demarcated;
- Waste collected at source shall be collected on a daily basis;
- Waste must be stored in such a manner that it can be safely accessed and loaded;
- Should waste be stored in containers, drums or skips care must be taken that:
    - Waste types (special vs. controlled vs. general waste) are not mixed.
    - Waste is not kept in a corroded or worn container.
    - The container is secure so as to prevent accidental spillage or leakage.
    - All waste skips and containers are labelled with their contents.
    - Skips or containers do not overflow.
    - Skips for special waste is always covered.
    - Skips for controlled waste is covered skips wherever possible.
- Waste must be kept in such a way as to prevent it falling while in storage or while it is being transported;
- Waste must be protected from scavenging by people and animals;
- Do not dispose of (burn, bury or treat) waste on site;
- Collection of waste must be scheduled and the site/location manager must be notified beforehand of collection times and type of waste to be collected; and
- Implement dust suppression measures, such as wetting of access routes and accumulated controller waste.

Mineral residue will include cores, muds and drilling chips generated during the drilling of the exploration boreholes. The mineral residue will be removed from the site and disposed of at a registered waste disposal site. During the drilling activities, limited quantities of diesel fuel, oil and lubricants will be stored on site. The only dangerous good that will be stored in any significant amount will be the diesel fuel. No more than 30 m3 will be stored above ground in diesel storage tank

13. Policy and Legislative Context

Table 6: *Policy and legislative context*

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT?
Constitution of South Africa (Act 108 of 1996)	Everyone has the right to a safe environment	Social and environmental impact assessment were conducted, and potential measures are being outlined in
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)	The department of Mineral Resources is a custodian of minerals in South Africa. An Application for Prospecting has been logged and accepted.	A prospecting right application was submitted to the DMR and due processes are followed.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)	There are graveyards within the proposed area.	Cultural and heritage resources in the proposed site were assessed. The South African heritage resources agency will be consulted.

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	EIA regulations and guidelines are being followed throughout the application process.	This BA is being undertaken in terms of NEMA in order to determine any possible impacts on the environment and to undertake mitigation measures that reduce any potential harm to the environment. An application for an Environmental Authorisation is submitted to the DMR with supporting documents. The EDTEA Northern Cape has been consulted for comments.
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)	Waste will be generated during prospecting activities	The EDTEA Northern Cape has been consulted for comments.
Municipal Integrated Development Plans (IDPs) Environmental Management Framework (EMF)	The proposed activity is within the Kai !Garib Local Municipality	One of the key issues identified by the IDPs is to facilitate the land claims. Municipal plans were used to identify relevant socio- economic information and spatial development information within which the area falls under.
Occupational Health and Safety Act: Act (No 85 of 1993)	The health of personnel and surrounding community have to be safeguarded	Health and Safety are key components of any mining activity. Health and Safe measured are provided. Measures included are in accordance with this Act
Conservation of Agricultural Resources Act (No 43 of 1983)	Conservation of forests and critical biodiversity in the area is important.	It is located within the low CBA and area, measures has been put in place in accordance with the act.
National Environmental Management: biodiversity Act (No 10 of 2004)	Conservation of critical biodiversity in the area is important.	It is located within the low CBA and Agricultural area, measures has been put in place in accordance with the act not to affect the agricultural resources.

Environmental Conservation Act (No 73 of 1989)	Conservation of critical biodiversity in the area is important.	Elements of this Act were used as a guideline for best practice

14. Need and Desirability of the proposed activities

Environmental desirability

The area is classified as BSh climate, having an arid, dry and hot climate, which are convenient to prospect throughout the year, hence even future mining will be favored. The proposed area is located within the Bushmanland Basin Shrubland of the Bushmanland Bioregion of the Karoo Biome and the Bushman land vioere of the inland Saline Vegetation Bioregion of the Azonal Vegetation Biome. The vegetation found in these biome are classified as Least Threatened (Mucina and Rutherford (2006).

Socio-economic desirability

Although prospecting activities are not labour intensive, few people will be hired to assist with general activities. The services required can also be sourced locally depending on their availability thus growing the economy of the area.

Additionally, the mineral prospecting activities will stimulate an income for the local minority that will be involved in the activity.

The result will provide a gateway for the stimulation of sustainable income for local community at the operational stage of mining.

The mining industry is of great importance to the South African economy and it is currently ranked 5th internationally in terms of mining contribution to GDP. Mining is an important economic sector, accounting for 21.3% of total employment (2007) in the Northern Cape. In 2018, the mining industry contributed R93bn to fixed investment, which constituted 17% of private sector investment and 10.5% of total fixed investment.

Overall desirability

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

A prospecting right allows a company to survey or investigate the area of land for the purpose of identifying an actual or probable mineral deposit. The data that will be obtained from the prospecting of the minerals being applied for will be necessary to determine how and where the minerals will be extracted and how much economically viable mineral reserves are available within the proposed prospecting area.

Motivation for the overall preferred site, activities and technology alternatives

Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. Pre-feasibility and desktop study was conducted before the application was lodged.

The preferred site was chosen, as it will result in minimal adverse socio-economic impacts and a level of environmental impacts that can be managed and rehabilitated through effective EMPr and rehabilitation plan implementation. The technology to be used, involve using a drill rig. Minimal infrastructure will result in cheaper and more effective rehabilitation.

The methods to be used have been determined in the design phase and have considered potential environmental impacts when identifying the preferred methods.

15. DESCRIPTION OF TECHNOLOGICAL ALTERNATIVES

- **Diamond drilling:**

This is a drilling method whereby a solid core is extracted from depth, for examination on the surface. The key technology of the diamond drill is the actual diamond bit itself. It is composed of industrial diamonds set into a soft metallic matrix. As shown in the figure, the diamonds are scattered throughout the matrix, and the action relies on the matrix to slowly wear during the drilling, so as to expose more diamonds. The bit is mounted onto a drill stem, which is connected to a rotary drill. Water is injected into the drill pipe, so as to wash out the rock cuttings produced by the bit and also to reduce the heat produced due to friction which causes less wear and tear of the bits.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. A truck fitted with a water tank is used to provide the water supply for the drilling process. The drill site is not larger than 30 m x 30 m (900 m²) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes with be 20 cm and the average depth is estimated to be 200 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill will concrete cement and capped.

- **Core drilling:**

Merely advancing the drill by rotary action (and washing) causes a core to be extracted inside the barrel. The core is then retrieved and taken to the surface. Constantly withdrawing the entire heavy drill pipe is impractical, so methods were developed to pull up the core inside the barrel. If the rock would always be solid granite, and the core would always break at the drill bit, then it would be a simple matter to stop the drilling, and lower a simple grabbing device by a wire and pull up the core. Unfortunately, many applications require an undisturbed core in fractured rock, which calls for elaborate wire-line devices.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. The drill site is not larger than 30 m x 30 m (900 m²) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes with be 30 cm and the average depth is to be 200 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill will concrete cement and capped.

<u>Other options could might be employed</u>

- **Percussion drilling:**

The drill site is not larger than 30 m x 30 m (900 m²) and consists of a diesel powered truck mounted drill rig, a truck transporting drill rods and other equipment, a compressor and portable chemical toilet. Rock fragments are blown out the top of the hole and are collected at 1m depth intervals and arranged on the ground to

enable continuous detailed lithological descriptions of the stratigraphic horizons to be made. Percussion holes will either be cemented if not further utilized, or will be fitted with a cap and be used for water levels and water quality monitoring.

- **Directional drilling:**

The drill site is not larger than 150 m x 150 m (22 500 m²) and consists of a drilling water sumps, a diesel powered drill rig, a truck transporting drill rods and various other equipment, a generator, portable offices and chemical toilets. There are access control and a security fence around the site. On completion, the site will be rehabilitated to acceptable standards.

Rock fragments are washed out the top of the hole and are sampled at 10m depth intervals and collected on small bottles and sent to the laboratory for rock analysis. All percussion holes are sealed with cement up to the depth of start of rock. Full description of the process followed to reach the proposed preferred alternatives within the site

Pre-feasibility study was conducted before the application was lodged. The site has deemed desirable for prospecting due to its geological and logistical location. Hence, there is no alternatives.

16. The operational aspects of the activity

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. Temporary access track will be used to access the site on areas where there are no existing access routes. The activities commenced on different phases which includes desktop studies, geological mapping and environmental assessment was undertaken. This phases forms an integral part of the intended prospecting work.

Phase 2 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined and the geological continuity of the geological continuity of the mineralised zone will be determined. The drilling information will also be used to construct ore thickness, overburden thickness and basement elevation contour

plans.

17. The option of not implementing the activity

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

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

Pre-feasibility study was conducted before the application was lodged. The site has deemed desirable for prospecting and future mining. Hence, there is no alternatives.

The operational aspects of the activity

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken to ensure that all the targets with the minerals outcrop identified during the desktop study are not cultural features. This phase will also include planning for the drilling survey.
Phase 2 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined and the geological continuity of the mineralised zone will be determined. The drilling information will also be used to construct ore thickness, overburden thickness and basement elevation contour plans.

Phase 3 of the process will entail core sampling to establish the grade and viability of the minerals for mining.

The option of not implementing the activity

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

to prospect, the opportunity to utilize the reserves will be lost and contribute to the growth of the country's economy.

19. DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

The Public Participation Process (PPP) has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concern at various stages throughout the EIA process. This process includes all I&AP's (e.g. directly affected landowners, national-, provincial- and local authorities, and local communities etc.). The Public Participation Process (PPP) was conducted in terms of Chapter 6 of the National Environmental Management Act, 1998 (Act 107 of 1998).

The Public Participation Process conducted to date is summarised below, please refer to Appendix B for a detailed Stakeholder Engagement Report.

TABLE 7*: SUMMARY OF THE PPP UNDERTAKEN*

Task	**Details**	**Date**
I&AP notification		
I&AP identification	An I&AP database was developed for the project by establishing the jurisdiction of organisations, individuals and businesses in proximity to the project site or within an interest in the proposed development. The database of I&APs includes the landowner, the adjacent landowners, relevant district and local municipal officials, relevant national and provincial government officials, and organisations. This database is being augmented via chain referral during the BA process and will be continually updated as new I&AP's are identified throughout the project	Continuous process

	lifecycle.	
Site notices	A2 Site notices were placed at strategic points to inform the general public of the proposed project and the PPP.	14 June 2021
Comments received	Comments are to be received from the landowners and I&APs to date	Up until July 2021
Comment on DBAR	All the relevant stakeholders were notified of the availability of the DBAR to provide their comments.	14 June 2021 to 15 July 2021
Public participation meeting	The community meeting will announced to all registered I&AP's	24 July 2021

Table 8: List of registered and comments from stakeholders

LIST OF REGISTERED AND COMMENTS FROM STAKEHOLDERS			
Name of Department	**Contact person**	**Comments**	**Response**
Department of Mineral Resources NC	Tel No: 053 807 1700 Email:pieter.swart@dmr.gov.za Address: 65 Phakamile Mabija Street Perm building Kimberly 8300	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
(PHRA) - Northern Cape	Tel: 053 831 2537 Address: P.O. Box 1950 Kimberly 8300	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.

Department of Water & Sanitation	Tel No: 053 830 8851/053 830 8800 Address: 28 Central Road Beaconsfield Kimberly 8301 Postal: Private Bag x 610 Kimberly 8300	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
Department of agriculture, Forestry and Fisheries	Tel No: 053 838 9100/ 027 712 1315/ 082 560 8686 Address: 162 George Street Kimberlite building Kimberly 8301	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
ZF Mgcawu District Municipality	Tel No: 054 337 2800 Email:admin@zfm.gov.za Address: Private bag X6039 Upington 880	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
Kai !Garib Local Municipality	Tel: 054 431 6300/073 257 0024 Email: dewaali@kaigarib.gov.za Address: Private Bag X6 Kakamas 8870	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
Department of Rural Development and Land Reform	Tel No: 053 838 9100 Address:102 George Street Kimberlite building 8301	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
Department of Economic Development, Tourism and Environmental Affairs (EDTEA) NC	Tel: 053 839 4000 Address: Metlife Towers 13th floor Cnr Stead & Knight Street Kimberly	No comments	A copy of the BAR & EMPr has been sent to the stakeholder.
Transnet	Tel : 053 383 2162/053 3410 Address: Robinson St Upington	No comments	A copy of the BAR & EMPr has been

	8801 Postal: 876 Keimoes 8860		sent to the stakeholder.

(i) Summary of issues raised by I&AP's

Not available

20. METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

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

TABLE 9: SEVERITY

How severe does the aspects impact on resource quality (flow regime, water quality, geomorphology, biota, habitat)?

Insignificant / non –harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great/ harmful	4
Disastrous / extremely harmful and /or wetland(s) involved	5
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.	

TABLE 10: SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas	3
National	4
Global (impacting beyond SA boundary)	5

TABLE 11: DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and /or REC not impacted	1
One month to one year, PES, EIS and /or REC impacted but no change in status	2
One year to 10 years, PES, EIS and /or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and /or REC permanently lowered	4
More than life of the organisation /facility, PES and EIS scores, a E or F	5

PES and EIS (sensitivity) must be considered.	

TABLE 12: FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 13: FREQUENCY OF THE INCIDENT/ IMPACT

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly/ likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 14: LEGAL ISSUES

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation	5
Located within the regulated areas	

TABLE 15: DETECTION

How quickly can the impacts/risks of the activity be observed on the resource quality, people or property?

Immediately	1

Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

TABLE 16: RATING CLASSES

Rating	Class	Management description
1-55	(L) Low risk	Acceptable as is or consider requirements for mitigation. Impact to watercourses and resource quality small and easily mitigated
56-169	(M) Moderate risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
170-300	(H) High risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 17: CALCULATION

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance \Risk = Consequence X Likelihood

TABLE 18: RATING CLASSES

Rating	Risk Class	Management Description
1-55	Low (L)	Acceptable as is or consider requirement for mitigation impact
56-169	Moderate (M)	Risk and impact on notably are required and mitigation measures on a higher level

170-300	High (H)	Impact on the environment has a long term impact.

TABLE 19: CALCULATION

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance \Risk = Consequence X Likelihood

TABLE 20: RATING CLASSES

Rating	Risk Class	Management Description
1-55	Low (L)	Acceptable as is or consider requirement for mitigation impact
56-169	Moderate (M)	Risk and impact on notably are required and mitigation measures on a higher level
170-300	High (H)	Impact on the environment has a long term impact.

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

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

- Desktop studies were initially conducted with a greater focus on sensitive phenomenon in the area.
- Site assessment was undertaken on the ground as well as verifying the finding of the desktop study.
- The consultant process was undertaken in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any

potential concerns they may have. All comments and responses provide are collated in the Comments and Responses Register are attached.

A detailed desktop study was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

- The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
- The Department of Environmental Affairs 2015 Land cover and Land use Mapping Database;
- Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) and Groundwater Vulnerability Reports
- Municipal Integrated Development Plans for Local and district Municipalities; and
- The Provincial Spatial Development Framework for the Northern Cape Province.

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

22. Findings of risk assessment and risk rating

The following table present the identified impacts associated with the proposed activity. The impacts have been rated based on the method outlined below. As it can be seen in the table, all risks identified are moderate before the implementation of mitigation and prevention measures.

TABLE 21: IMPACT ASSESSMENT TABLE FOR THE CONSTRUCTION PHASE

Environmental Aspect	**Nature of potential impact/risk**	**Environmental Impact Significance Before Mitigation**										
		Severity	Spatial Scale	Dura-tion	**Conseq-uence**	Frequ-ency of Activity	Freque-ncy of impact	Legal issues	Detection	**Likeli-hood**	Signif-icance/risk	Risk Rating
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the land owners and land occupiers.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate

	The influx of job seekers in the area may result in an increase in petty crimes.	2	1	3		**6**		4	2	5	2		**13**		78		Moderate
	Possible boost in short term local small business opportunities.	3	3	3		**9**		4	2	5	1		**12**		108		Moderate
Ground water	Localised spillages of oils from machinery leaching to groundwater contamination.	2	1	3		6		4	2	5	1		**12**		78		Moderate
	Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	2	1	3		**6**		4	2	5	1		**12**		78		Moderate
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated within the drill sites and associated infrastructure.	2	3	1		**6**		4	2	5	1		**12**		78		Moderate
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2				4	2	5	1		12		78		Moderate

	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2											
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2		6		4	2	5	1		12		78		Moderate
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	2	2	2		6		4	2	5	1		12		78		Moderate
Wetlands and Aquatic Ecosystems	Localised changes to the riparian areas as a result of the impact to vegetation.	3	3	3		9		4	2	5	1		12		108		Moderate
	Loss of habitat and wetland ecological structure as a result of site activities and leading to wetland degradation.	3	3	3		9		4	2	5	1		12		108		Moderate
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	3	3	3		9		4	2	5	1		12		108		Moderate
	Increased runoff due to topsoil removal and																

	vegetation effect leading to possible erosion and sedimentation of wetland and riparian resources.													
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.	3	3	3		**9**	4	2	5	1		12	108	Moderate
	Impact on the hydrological functioning of the wetland systems.	3	3	3		**9**	4	2	5	1		12	108	Moderate
Flora	Loss of localised biodiversity habitats within sensitive areas due to drilling activities and establishment of drill sites.	2	1	2		5	4	2	5	1		12	60	Moderate
	Loss of localised floral species diversity including RDL and medicinal protected species due to site activities and establishment of drill sites.	2	1	2		5	4	2	5	1		12	60	Moderate
	Potential spreading of alien invasive species as	2	1	2		5	4	2	5	1		12	60	Moderate

	indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.													
Fauna	Tracks of vegetation may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	5	4	2	5	1	12	60	Moderate		
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	2	1	2	5	4	2	5	1	12	60	Moderate		
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	1	2	5	4	2	5	1	12	60	Moderate		
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	1	2	5	4	2	5	1	12	60	Moderate		
Air Quality	Possible increase in dust generation, PM10 and PM2.5 as	2	1	2	5	4	2	5	1	12	60	Moderate		

	a result of bulk earthworks, operation of heavy machinery, and material movement.													
	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	6	4	2	5	1	12	78			Moderate
Visual	Scaring of the landscape as a result of the effects on vegetation.	2	1	2	5	4	2	5	1	12	60			Moderate
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	2	2	6	4	2	5	1	12	78			Moderate
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	2	2	6	4	2	5	1	12	78			Moderate
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	6	4	2	5	1	12	78			Moderate

Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2		6		4	2	5	1		12		78		Moderate
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2		6		4	2	5	1		12		78		Moderate
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2		6		4	2	5	1		12		78		Moderate
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to drilling footprint areas.	2	1	2		6		4	2	5	1		12		78		Moderate
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the roads as well as the farm roads around the prospecting area.	2	3	2		7		4	2	5	1		12		84		Moderate

Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2		6		4	2	5	1		12		78		Moderate
Waste Manag ement	Potential water and soil pollution as a result of inappropriate waste management practices.	2	3	2		6		4	2	5	1		12		78		Moderate

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

Several potential impacts of the activity are highlighted above. The impacts of the proposed activity have no alternative, but to be mitigated. The only available option is to keep required bufferzone from sensitive environments such as watercourses.

The positive impacts of the activities are the creation of employment, which is required in the region. Should the minerals be found in the project area, Barzani Mining (Pty) Ltd will be able to mine the available reserves. This will result in job creation and support to local businesses is continued. Barzani Mining (Pty) Ltd expect that substantial benefits from the project (should minerals be found) will accrue to the immediate project area, the sub-region and the province of Northern Cape. This prospecting activity has a potential to decrease level of unemployment rate in proposed areas and surroundings. This prospecting activity will bring revenue into the city and the province which will in turn boost the economy of the country.

The proposed activities have medium to low significance impacts, which will be short term activities in nature. The probability of occurrence of an impact was determined and most of the activities can be controlled and impacts can be reduced or avoided. The probability was also determined based on other prospecting activities of similar nature. It was found that generally prospecting activities have low impact on the environment.

PART B: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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

It is confirmed that the requirements for the provision of the details and expertise of the EAP are already included in Part A section 1(a).

a) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein required)

The EAP hereby confirms that the requirement to describe the aspects of the activity that are covered by the Environmental Management Programme is already included in Part A, Section (1)(h) of this report as required.

b) Composition Map

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

Please refer to Appendix for the Composite Map

23. ENVIRONMENTAL MANAGEMENT

This section outlines how the identified environmental and social impact will be prevented, mitigated and eradicated through the application and adherence to the outlined measures below. The management plan is a leaving document that will be improved whenever necessary.

TABLE 22: The possible mitigation measures that could be applied and the level of risk

Potential Impact	Significance Rating (before mitigation)	Proposed Mitigation	Significance Rating (after Mitigation)
Socio-Economic	Moderate	-A complaints register must be kept on site, with records of complaints received and manner in which the complaint was addressed. -Employment of local people, unless the skills and expertise required are not available locally. -Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public;	Low
	Moderate	-Security and safety must be emphasized; -No workers shall be allowed to access private properties without the owner's knowledge and consent; -Access to private property and areas outside the designated operation areas shall be strictly prohibited. -The use of roads that are not specified in this report is strictly prohibited.	Low

	Moderate	-Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; -The transportation of materials and samples shall be undertaken outside traffic peak hours to minimize inconveniencing residents; -The number of vehicles on the roads shall be kept to a minimum; Materials transported on public roads must be covered.	Low
	Moderate	-Liaise with the SAPS and existing forums in order to implement effective crime prevention strategies; and -The applicant will ensure that as far as possible local business must be used for required services during the operation of the mining project. -Recruitment must not be undertaken on site. -Employees must by all times carry the identification cards	Low
Impact on health, and safety of workers.	Moderate	-Training of workers in the correct use of the machinery and/or equipment so as to avoid incidents. - Workers to wear Personal Protective Equipment (PPE). - Hazardous material must be correctly labelled and handled	Low

		in a safe manner.	
Flora (Biodiversity and alien vegetation).	Moderate	-Pre- prospecting walk through the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions. -No species of conservation importance was observed on the site, however if there is a need to remove them a permit must be obtained from the competent authority. -Prior to prospecting any critical and medicinally important floral specimens that may occur within the site layout must be collected and replanted in the surrounding areas. -An ecologist must be onsite before any virgin land can be touched.	Low
	Moderate	-Keep the footprint of the disturbed area to the minimum and designated areas only. -Vegetate and irrigate open areas to limit erosion, but take care not to cause erosion by irrigating. -Removal of vegetation during prospecting activities must be minimised to reduce the risk of excessive open areas occurring. -Adhere to existing roads -Implement an alien and	Low

		invasive plant management plan. The plan must include details of monitoring and removing or controlling the recruitment of alien and invasive species within the disturbed areas. -Plant native species on the borders of the mining area and road sideways to prevent erosion and air pollution. -Where practical possibly rehabilitation must be undertaken progressively.	
Air quality	Moderate	-Dust suppression must be conducted during the operational phase of the project. -Correct speed must be maintained at the proposed project site. -Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. -Exposed areas must be revegetated with locally indigenous flora. If the soil is compacted, it must be ripped, and fertilised. Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting of the entrance road. -Plant native species on the borders of the mining area and	Low

		road sideways to prevent erosion and air pollution. -Where practical possibly rehabilitation must be undertaken progressively.	
Noise disturbances	Moderate	-Noise reduction measures must be implemented in compliance with Noise standards and Regulations. -No sound amplification equipment to be used on site, -Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment. -Limit prospecting activities to day time hours. -Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective. -Activities that will generate the most noise must be limited to during the day, where viable, in order minimise disturbance. Equipment that is not in use must be switched off.	
Visual alteration	Moderate	-Limit the footprint area of the prospecting where possible. Topsoil must be vegetated and positioned to reduce visual disturbance where possible.	Low

		-Re-slope and reinstate the bank topography correctly during decommissioning. -Use colours of infrastructure that blend with the natural environment.	
Generation of waste.	Moderate	-Any waste generated must be stored in such a manner that it prevents pollution and amenity impacts. -Bins must be provided for waste and removed regularly from the site. -Waste to be disposed of at a licenced landfill site. -Hazardous waste to be correctly stored and disposed of in terms of relevant legislation and guidelines.	Low
Groundwater and soil contamination.	Moderate	-Storm water design must limit any uncontrolled runoff through disturbed areas on the bank. -Design and implement sand erosion sediment control management measures. -Prevent any spills from occurring; If a spill occurs it is to be cleaned up immediately and Reported to the appropriate authorities. - All vehicles are to be serviced in a correctly bunded area or at an off-site location.	Low

		-Ensure that spillage control kits are available during transport and on storage sites in case of any accidental leakages of spillages, which can then be cleared immediately. -The temporary storage facilities of fuel, lubricants and explosives must be a hard park, roofed and bunded facility. This will prevent contamination of soils and the possibility of contamination of the surface water resources. -Machinery must be maintained properly. -Diesel and other chemicals must be handled appropriately. --Refuelling protocols must be followed to ensure no diesel is spilled during filling. The temporary stockpile and Toilet area must be constructed on open areas or where there is a presence of alien invasive plant species. -The Engineer or Contractor must ensure that only clean stormwater/runoff enters the environment.	
Heritage resources (Fossils)	Moderate	Should any features of heritage be identified on site, these must not be disturbed. They must be safeguarded,	Low

		preferably in situ, and immediately reported to a Heritage specialist and/or SAHRA.	
Soils Land use and Land Capability	Moderate	-Ensure that topsoil is properly stored, away from the streams and drainage areas. -The soils must be used for the backfilling and rehabilitation -The rehabilitated sump must be seeded with recommended seed mix consisting of indigenous species -Tarpaulins must be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs.	Low
Climate	Moderate	-The number of prospecting vehicles and trips shall be kept to a minimum. -All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	Low
Traffic	Moderate	-Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads -The transportation of prospecting materials and rubbish shall be undertaken outside traffic peak hours to minimize inconveniencing residents.	Low

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

TABLE 23: PROPOSED MITIGATION

Potential Impact	**Significance Rating (before mitigation)**	**Proposed Mitigation**	**Significance Rating (after Mitigation)**
Socio-Economic	Moderate	-Employment of local people, unless the skills and expertise required are not available locally. -Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving prospecting vehicles to ensure the safety of the public;	Low
	Moderate	-Security and safety must be emphasized; -No prospecting workers shall be allowed to access private properties without the owner's knowledge and consent; -Access to private property and areas outside the designated operation areas shall be strictly prohibited.	Low

	Moderate	-Local speed limits and traffic laws shall apply at all times to minimize the occurrences of accidents on public roads, -Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents. -The number of vehicles on the roads shall be kept to a minimum. -Materials transported on public roads must be covered.	Low

	Moderate	-Liaise with the SAPD and existing forums in order to implement effective crime prevention strategies; and -The applicant must ensure that as far as possible locals must be used during the operation of the mining project. -Recruitment must not be undertaken on site.	Low
Impact on health, and safety of workers.	Moderate	-Training of workers in the correct use of the machinery and/or equipment so as to avoid incidents. 1. Workers to wear Personal Protective Equipment (PPE). 2. Hazardous material must be correctly labelled and handled in a safe manner.	Low
Flora	Moderate	-Pre-execution walk through the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions. -No species of conservation importance was observed on the site, however if there was a need to remove them a permit must have to be achieved from the competent authority. -Prior to prospecting any CI and medicinally important floral specimens that may occur within	Low

		the site layout must be collected and replanted in the surrounding areas.	
Flora (Biodiversity and alien vegetation).	Moderate	-Keep the footprint of the disturbed area to the minimum and designated areas only. -Vegetate and irrigate open areas to limit erosion, but take care not to cause erosion by irrigating. -Removal of vegetation during prospecting activities must be minimised to reduce the risk of excessive open areas occurring. -Limit the extent of vegetation disturbance to the absolute minimum. -Adhere to existing roads, and if new tracks are established they must not cross sensitive areas such as the ridges or drainage lines. -Implement an alien and invasive plant management plan. The plan must include details of monitoring and removing or controlling the recruitment of alien and invasive species within the disturbed areas. Note that alien and invasive plant control must extend further than the footprint boundaries.	Low

Air quality	Moderate	-Dust suppression must be conducted during the operational phase of the project. -Correct speed must be maintained at the proposed project site. -Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. -Where practical rehabilitation must be undertaken progressively. -Exposed areas must be revegetated with locally indigenous flora. If the soil is compacted, it must be ripped, and fertilised. Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting of the entrance road. - A complaints register must be kept on site with records of complaints received and the manner in which the complaint was addressed.	Low

Noise disturbances	Moderate	-The noise created by the proposed development is not expected to be problematic. If required, noise reduction measures must be implemented in compliance with Noise standards and Regulations. - No sound amplification equipment to be used on site, except in emergency situations. -Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment. -Limit activities to day time hours. - Prospecting related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective. -Activities that will generate the most noise must be limited to during the day, where viable, in order to minimise disturbance. -Equipment that is not in use must be switched off.	

visual alteration	Moderate	-Limit the footprint area of the prospecting where possible.	Low
Generation of waste.	Moderate	-Any waste generated must be stored in such a manner that it prevents pollution and amenity impacts. -Bins must be provided for waste and removed regularly from the site. -Waste to be disposed of at a licenced landfill site. -Hazardous waste to be correctly stored and disposed of in terms of relevant legislation and guidelines.	Low
Soil contamination.	Moderate	-Prevent any spills from occurring; If a spill occurs it is to be cleaned up immediately and Reported to the appropriate authorities. - All vehicles are to be serviced	Low

		in a correctly bunded area or at an off-site location. - Ensure that spillage control kits are available during transport and on storage sites in case of any accidental leakages of spillages, which can then be cleared immediately. Machinery must be maintained properly. Diesel and other chemicals must be handled appropriately. -Re-fueling protocols must be followed to ensure no diesel is spilled during filling.	
Soils Land use and Land Capability	Moderate	-Ensure that topsoil and samples are properly stored, away from the streams and drainage areas. -The soils must be used for the backfilling and rehabilitation of the boreholes. -The rehabilitated area must be seeded with recommended seed mix consisting of indigenous species. -Tarpaulins must be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. -Will be using existing roads and routes	Low

Climate	Moderate	-The number of prospecting vehicles and trips shall be kept to a minimum. -All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	Low
Traffic	Moderate	-Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and Where possible the transportation of prospecting materials and rubbish shall be undertaken outside traffic peak hours to minimize inconveniencing residents.	Low

24. Impacts to be mitigated in their respective phases

Table 24: Measure to rehabilitate the environment affected by the undertaking of any listed activity

Impact	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Socio-economic	Disturbance on the existing socio-economic routines of the communities	Social and economic	ALL	Moderate	Education and environmental awareness on issues related to mining. Ensure local community members are given first priority during employment, service delivery and communication must be enhance through	Low

					the election of community liaising person. Fence the proposed mining area and adhere to prevention and mitigate measures. Develop the aera and uplift local people and business.	
Ground water through soil contaminati on	Spillages of chemicals during the operation	Environment al	ALL	Moderate	Prevent by properly storing fuel on site and re-fuelling to be done from a bowser that do not drip.	Low
Surface Water through soil	Erosion of contaminants and	Environment al	All	Moderate	Dust suppression measures	Low

contaminati on	soil to nearby streams				Erosion control measures	
Biodiversity (Flora and fauna)	Affecting flora and fauna during the execution of proposed activities	Environment al	All	Moderate	Revegetation of indigenous species Avoid killing species. If after two years, vegetation has not established sufficiently, taking into account environmental conditions, such as droughts, re-vegetation or other alternative remediation measures must to be undertaken. If any invasive alien vegetation is noted, it must be removed immediately. Alien	Low

					vegetation clearing to be undertaken if non-invasive alien species increase to over 5% of the area	
Air Quality	Dust and emission of greenhouse gases from the equipment's and vehicles	Environment	All	Moderate	Control dust by wetting during dry, dusty conditions. Dust suppression Using less vehicles	
Visual	Prospecting associated activities will result in changes on the landscape	Social	All	Moderate	The visual impact would be addressed by means of: • Re-vegetation with grasses • Removal of any infrastructure, scrap, waste that would contribute to a negative impact	

Noise	Noise from trucks and equipment used	Social	All	Moderate		
Soil, Land use and Land Capability	Excavations will results in change on the surface	Environmental	All	Moderate	Prevent erosion by placing of berms Restoration of the landform and removal of infrastructure to reinstate land use potential Ensure rehabilitation plan is followed Implement erosion control measures Monitor erosion and remediate where necessary	
Traffic	Traffic on the affected roads will be affected.	Social	All	Moderate	Control impact on roads by properly	

					servicing the operating trucks Speed limit must be 40 km per hr on gravel roads.	
Climate	Release of greenhouse gases	Environmental	All	Moderate	Service equipment and vehicles regularly. Minimise the use of equipment where is not necessary. Avoid burning of waste material	Low
Waste Management	Waste will be generated from offices, employers and other proposed activities				Effective solid waste management Sufficient housekeeping Appropriate materials management	Low

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

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

- The stakeholder consultant process has been undertaken in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any potential concerns they may have. All comments and responses provide have been recorded in this document (refer to Appendix B).
- A detailed desktop study was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

➢ The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
➢ The Department of Environmental Affairs 2015 Land cover and Land use Mapping Database;
➢ Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) for the Vaal River and Groundwater Vulnerability Reports
➢ Municipal Integrated Development Plans for Kai !Garib; and
➢ The Provincial Spatial Development Framework for the Northern Cape Province.

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

Motivation where no alternatives sites were considered

As discussed above, the site is located in an area where the geology is known for having high dolerite, quartzite deposits. The site is therefore regarded as the preferred site and there are no alternatives sites. The alternative drill sites and prospecting site will be identified based on the location of sensitive environments such as wetlands, riparian zones, watercourses. Changes in the layout plan will be discussed and agreed on with the affected landowners.

Statement motivating the alternative development location within the overall site

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

Summary of specialist reports

No specialist studies were conducted as part of this application. Site assessment and desktop information was used to compile the report and to conduct the impact assessment

Environmental Impact statement

(i) Summary of the key findings of the environmental impact assessment;

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

Barzani Mining (Pty) Ltd must undertake measures to ensure that the identified impacts are minimised. Assessment of the impacts with the proposed mitigation measures has shown the significance of the impacts on all affected environmental aspects to be reduced from medium and low to low and negligible significance.

Land use must not be changed. Several landowners and land occupiers within the proposed project area may be affected although on a temporary basis due to the need to access the sites and the establishment and use of the campsite. Measures such as

safety along the roads and dust suppression must be undertaken to ensure that the impacts on the land owners and land occupiers are minimised.

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

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

Key findings of the environmental impact assessment include:

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

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

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

- Increased ambient noise levels resulting from drilling activities and increased traffic movement;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on the water resources utilised by the communities and landowners;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning;
- Influx of job seekers to site may result in increased opportunistic crimes;
- Potential visual impacts by drilling activities as well as vegetation effects;
- Prospecting will be undertaken by special sub-contractors and it is not anticipated that employment opportunities for local and/or regional communities result from prospecting activities; and
- Short term boost for local businesses.

25. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The following conditions should be included in the Environmental Authorisation:

- A minimum distance of 100 m from any dwellings or infrastructure must be kept;
- Landowners as well as land occupiers must be re-consulted at least 30 days prior to any prospecting activities undertaken on their properties;
- A map detailing the drilling locations should be submitted to the relevant landowners, prior to the commencement of the prospecting activities;
- No activities may be undertaken within 100m of watercourses

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

There are no assumptions, uncertainties or gaps on the proposed project.

27. 14. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORIZED

Reasons why the activity should be authorized or not

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

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

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

The stakeholders will also be requested for their comments. All comments to be received during Public Participation Process will be included in this BAR and EMPr. These comments will be addressed the as far as possible to the satisfaction of the interested and affected parties.

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

Period for which the Environmental Authorisation is required

The prospecting right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for 5 years of prospecting and associated activities.

28. FINANCIAL PROVISION

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

Table 25: COSTS WERE CALCULATED AS SHOWN IN TABLE BELOW

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	18	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	256	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	377	1	1	0
3	**Rehabilitation of access roads**	**m2**	**0,1**	**46**	**1**	**1**	**4,6**
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	444	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	242	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	512	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha		268200	1	1	0
7	Sealing of shafts adits and inclines	m3	0,01	137	1	1	1,37
8 (A)	Rehabilitation of overburden and spoils	ha	0	178800	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	222692	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	646804	1	1	0
9	Rehabilitation of subsided areas	ha	0	149718	1	1	0
10	**General surface rehabilitation**	**ha**	**0,01**	**141640**	**1**	**1**	**1416,4**
11	River diversions	ha	0	141640	1	1	0
12	Fencing	m	0	162	1	1	0
13	Water management	ha	0	53855	1	1	0
14	**2 to 3 years of maintenance and aftercare**	**ha**	**0,4**	**18849**	**0,5**	**1**	**3769,8**
15 (A)	Specialist study	Sum	0	100000	1	1	0
15 (B)	Specialist study	Sum	0	100000	1	1	0
					Sub Total 1		5192,17

1	Preliminary and General	623,0604	**weighting factor 2** 1	623,0604
2	Contingencies	519,217		519,217
			Subtotal 2	6334,45
			VAT (14%)	886,82
			Grand Total	**7221**

Explain how the aforesaid amount was derived

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

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure of mining sites. With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

Confirm that this amount can be provided for operating expenditure

The amount required to cover the prospecting operation, including rehabilitation and closure is estimated to be **R 306 000.00** this stage. Barzani Mining (Pty) Ltd will fund the operation. The applicant hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

29. CLOSURE AND DECOMMISSIONING

Determination of closure objectives.

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phases namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure.

Concurrent rehabilitation objectives include:

- Backfilling, sealing and capping of drilled boreholes

- Clean up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area

Final decommissioning and rehabilitation objectives:

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

The closure objectives are to:

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession
- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite

- Use approved sites for safe disposal of all wastes from the drilling sites
- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements
- Report on the progress of the rehabilitation process

PART C:

30. Rehabilitation plan

Rehabilitation involves restoring a drilled borehole on completion of the prospecting activity including the surrounding affected area where the activity was undertaken back to its initial state and sometimes improving it by using various reconstruction methods and treatments. This document supplies the Department of Mineral Resources (DMR) with information pertaining to rehabilitation and closure plan for the proposed prospecting as required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Mineral and Petroleum Resources Development Act 28 of 2002.

The proposed prospecting activities will be conducted in the following phases:

- Site Preparation
- Invasive drilling and concurrent rehabilitation
- Final decommissioning, rehabilitation and closure

The aim of rehabilitation is to return the disturbed prospecting target areas to their natural state. It is important to rehabilitate disturbed areas to ensure a safe and stable land use after prospecting for humans, wild animals and livestock.

- **Summary of rehabilitation and closure actions**

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phases namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure. **Concurrent rehabilitation would include:**

- Backfilling, sealing and capping of drilled boreholes
- Clean up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area

Final decommissioning and rehabilitation:

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

The importance of rehabilitation

There are a variety of reasons for rehabilitating the prospected area. Below we provide some of the reasons.

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession
- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite
- Use approved sites for safe disposal of all wastes from the drilling sites

- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements
- Report on the progress of the rehabilitation process

Capping and plugging of drilled boreholes

- PVC drill hole collar of the same size “diameter & length” with the drill hole must be readily available, with a temporal and permanent cap/plug. The temporal cap can be pushed into the PVC collar to the bottom of the collar with the backfilling “un-contaminated soil” material. Thus, is to eliminate the movement of the backfilled material within the PVC collar to the outlet environment. See the figure below.

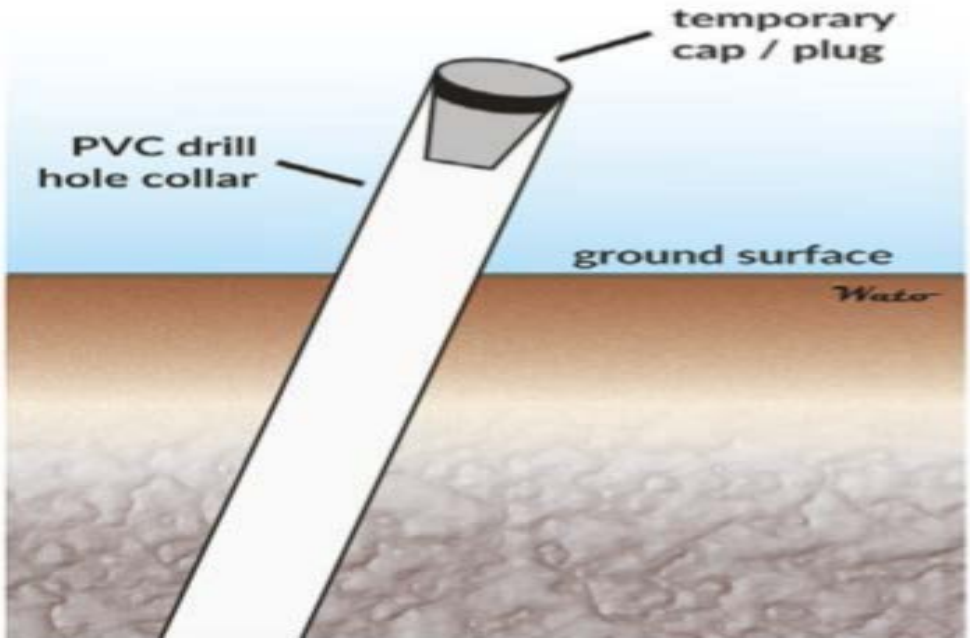


Figure 12: Showing the PVC drill hole collar of the same size “diameter & length” with the drill hole inserted.

- The PVC collars backfilling material must leave a space of 1 m below the surface, then a permanent cap/plug (non-degradable/metal plate) can be placed which can take up to 10 cm. The plug is to be at least 50 mm larger

than the diameter of the drill hole, but depending on the nature of the ground, must be of sufficient size as to remain firmly in position.

- The remaining portion of a metre left on the PVC collar must be cut below ground level to a minimum depth of 1 m. See the figure below.

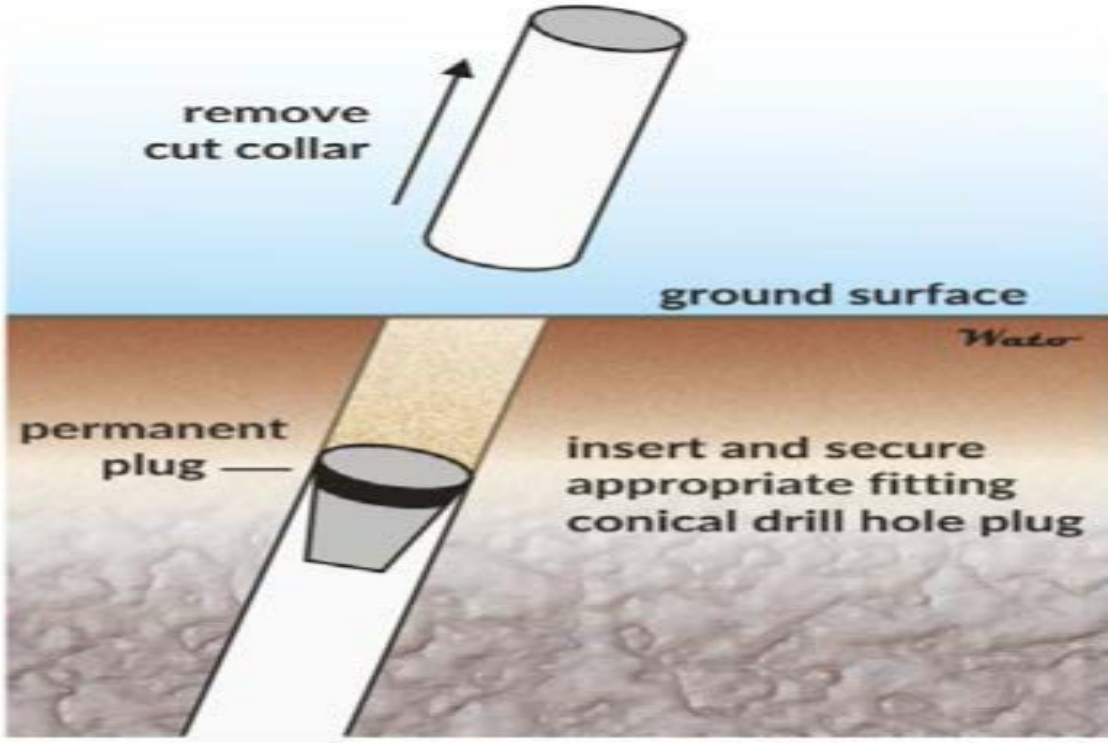


Figure 13: Showing the PVC collar cut at 1 m below the earth surface, the cap is then installed.

- After capping has stabilized, backfilling the remaining 1 m above the PVC collar with topsoil. The soil backfill should be compacted and mounded over the hole to allow for subsidence and to limit the pooling of surface water. The intention is that water shall not ingress the hole, causing erosion. Particular care is required to ensure the long term effectiveness of the plugging procedure.

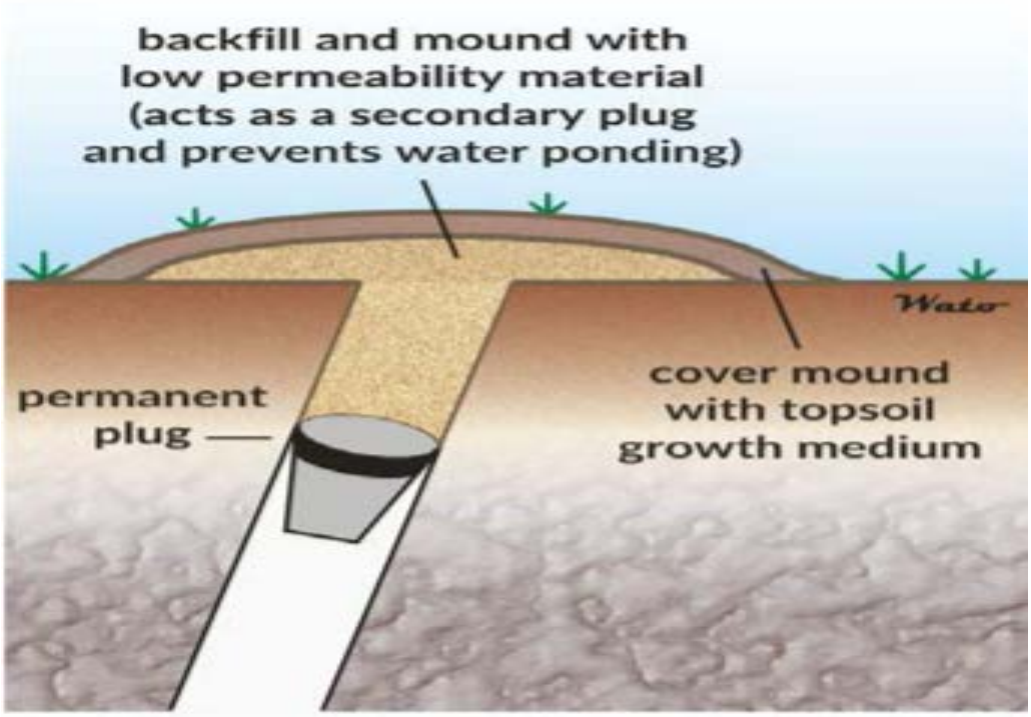


Figure 14: The remaining 1 m above the PVC collar with filled with topsoil

- **Capping and plugging of drill holes intersecting a single confined aquifer**

The main objectives of sealing drill holes in single confined aquifers is to contain water in the aquifer. Drill holes must be plugged across the aquifer confining bed interface for a thickness of about 4 m (2 m above the interface and 2 m below); and then backfilled or plugged as outlined previously.

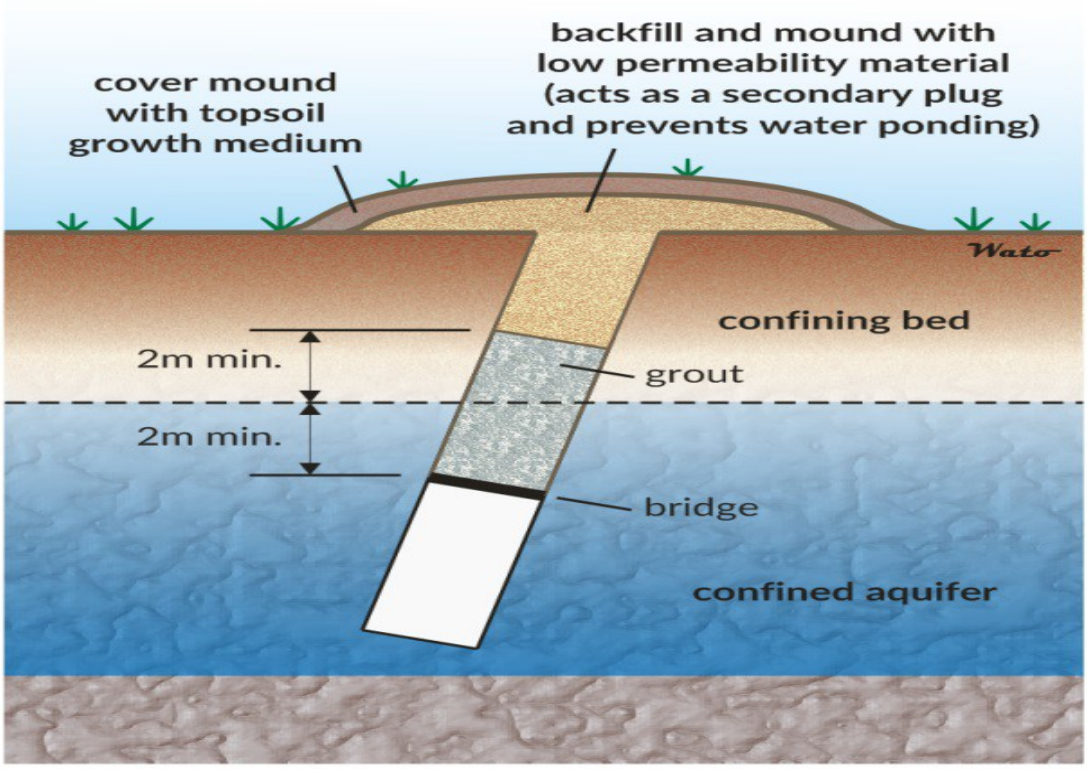


Figure 15: Sealing drill holes in single confined aquifers

Capping and plugging of drill holes intersecting multiple aquifers

- Major aquifers should be sealed to prevent inter-aquifer flow. Concrete plugs must be positioned at the interfaces between aquifers and the overlying confining beds. The concrete should be at least 4 m thick, with 2 m above and 2 m below the interface. Holes should then be backfilled or plugged as outlined previously, with compaction and mounding of backfilled material. Shallow drill holes can be backfilled from the base of the hole to the surface with concrete.

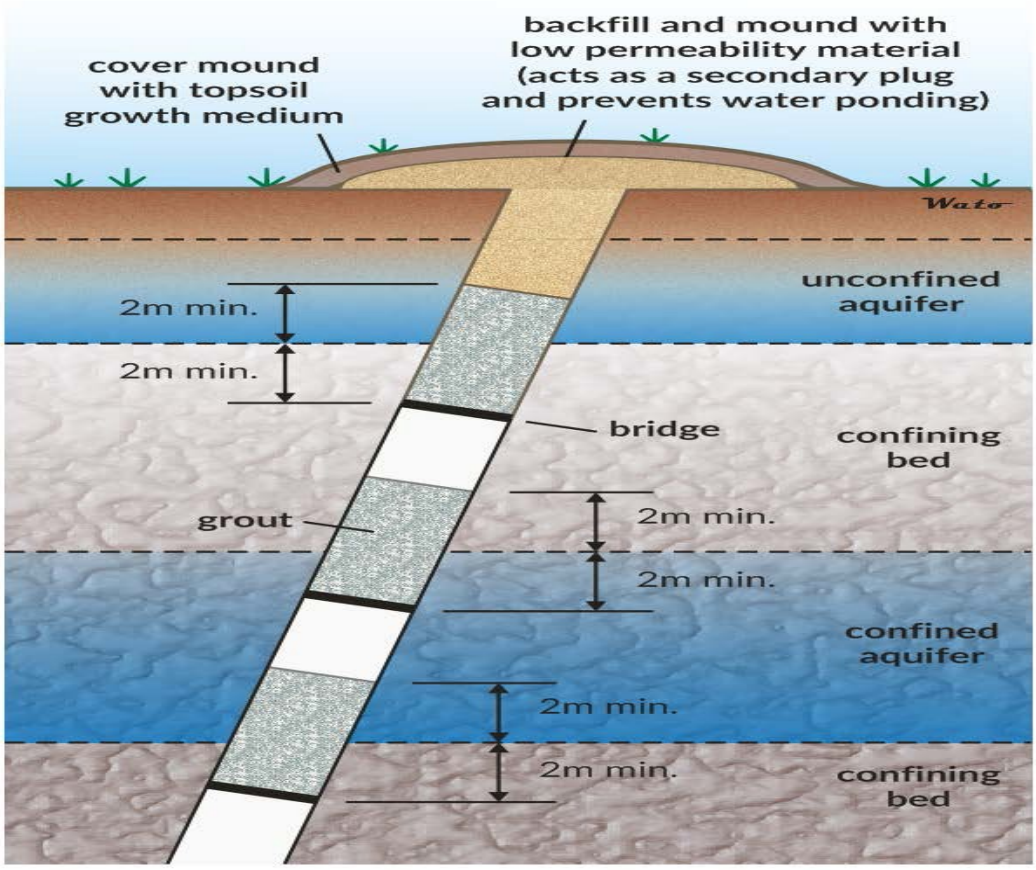


Figure 16: Showing how Interfaces between aquifers and the overlying confining beds must be placed

Rehabilitation of the surrounding area of the drill site

- Dependent on site conditions and surrounding landscape, it may be necessary to conduct earthworks to stabilise and reshape the site. The site is required to be remediated to as near original condition as possible, following the completion of the drilling program.
- Ground which has become compacted by the use of heavy machinery and traffic is to be ripped along contour, not down slope, to loosen soil, promote water infiltration, aid revegetation and minimise soil erosion.
- Earth and overburden that was excavated from the pads and benches is required to be pushed, raked or pulled back over. The stockpiled topsoil and vegetation should be re-spread over the site.
- All sample bags, waste materials and contaminants must be removed from site and disposed of in an appropriate manner, following the completion of the drilling program.

- Drill cuttings that are acidic, radioactive or of a substantially different colour to the surface soil must be backfilled in the drill hole, sump or other excavation. All other cuttings are required to be dispersed around the site or raked over.
- Drill sumps must be backfilled with the excavated material and re-spread with stored topsoil.
- Permanent survey markers should be kept to a minimum and wooden pegs should be used in preference to steel pegs.
- Tracks constructed to access the drill site must be remediated, they must be ripped or ploughed, and where necessary fertiliser (based on soil analysis) applied to ensure the regrowth of vegetation.
- If reasonable assessment indicates that re-establishment of vegetation is unacceptably slow the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the prospecting operation, be correct and the area be seeded with seed mix to Regional Managers specification;

Decommissioning phase

- All bores that are to be permanently decommissioned must be sealed completely and filled in a manner that prevents vertical movement of water within the bore.
- The sealing material must not pose any potential human or environmental health risk and should be more impervious than the material through which the bore was drilled. Concrete cement should be used as the primary sealing material and should be placed from the base of the hole upwards.
- Fill material should consist of clean or disinfected sand, coarse stone, clay or drill cuttings.
- Boreholes with high flows and pressure should be sealed exclusively with concrete cement to a depth of the hole.
- All bores should be sealed with an approved sealing material from a depth of 1 m to around 30 c below the ground surface. Topsoil should be placed above this to assist in full rehabilitation. Surface casings may be left in place if they

have been pressure cemented or if they have been determined to be sound, in which case they must be bridged with concrete cement.

- Concrete bridges may be used where it is not practicable to fill the entire PVC drill hole collar. A minimum of 10 m is required for a bridge (20 m for a flowing bore). These will be set in impermeable strata immediately above and below each aquifer formation in the bore.
- Records should be complete and accurate regarding the location of borehole and the procedure used for decommissioning and rehabilitating the site.

Closure Period and Post Closure Requirements

The closure period is the period between stopping of prospecting activities and the completion of active rehabilitation processes on the disturbed areas. The nature of borehole and drill site rehabilitation is of such that closure may be implemented for individual boreholes as and when analysis ends.

The closure options together with monitoring must be undertaken for the period of 2 years post final decommission. Thereafter a closure can be achieved. This closure should be in line with the requirements of the MPRDA Regulations. Following successful completion of the closure actions it is suggested that a further post closure period of 2 years be assigned to monitor the success of closure. The post closure monitoring will include:

- Inspection of drill hole caps;
- Inspect and remedy any erosion around rehabilitated drill sites
- Inspect rehabilitated areas re-vegetation rate
- Remove alien invader species

Required expertise

Engineering personnel: An engineer with at least 5 years of experience must be responsible to ensure that the rehabilitation program is implemented as outlined. The engineer must also enforce the following;

- confirming that workers are trained and competent for the task undertaken
- providing clear work instructions
- inspecting and monitoring workplace conditions
- continuously evaluating worker performance and correcting unsafe acts
- reporting and rectifying hazards
- assuring implementation of the company's safety systems
- demanding compliance with safety rules and procedures
- conducting meaningful observations, consultation and interventions

Environmental, Health and safety personnel: with at least 3 years' experience in relevant fields of rehabilitation.

- Monitor and report the potential environmental, health and safety risk
- Identify priorities for replacing or modifying the rehabilitation plan.
- Develop an action plan with due dates and responsibilities for the rehabilitation process
- Conduct an audit of rehabilitation to ensure that all practical measures have been taken to control risk associated
- Produce and environmental, health and safety report monthly and quarterly

Recommendations

Compliance with Closure Plan

The closure objectives can only be achieved by fore filling the responsibilities as set out in this rehabilitation plan. Closure objectives cannot be achieved if the actions of the rehabilitation plan are not complied with resulting in an unsuccessful closure plan.

Annual update requirements of the plan

The rehabilitation and closure plan must be reviewed annually and updated as and when major changes are effected to the Prospecting Works Programme.

On-site documents

The closure plan must be available onsite as per the requirements of Regulation 26 (h) of NEMA EIA Regulations of 2014.

EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES.

Care and adherence to environmental issues is a priority. Most recent and sustainable technology will be used to restore the environment close to its initial state. Please refer to the rehabilitation plan above.

CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE.

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

The Guideline document for the evaluation of financial provision made by the Mining Industry was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites.

Confirm that the financial provision will be provided as determined.

Barzani Mining (Pty) Ltd have finances allocated for the proposed project, a deposit

will be made to the DMR trust fund account and proof of payment will be submitted.

MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON INCLUDING

- The environmental Officer be employed on daily basis of the operation for monitoring of impact Management Actions
- The environmental Officer will generate daily and monthly monitoring reports, external audits will be conducted on quarterly basis
- The environmental officer is responsible for monitoring compliance
- Impacts should be immediately managed with urgency.
- Mechanism for monitoring compliance should be reviewed and updated.

Indicate the frequency of the submission of the performance assessment/ environmental audit report

Annual environmental audits must be undertaken to ensure compliance with the authorization conditions and EMPr.

31. ENVIRONMENTAL AWARENESS PLAN

MANNER IN WHICH THE APPLICANT INTENDS TO INFORM HIS OR HER EMPLOYEES OF ANY ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK.

Before the proposed project of prospecting commence, all the employees whom will be responsible for identifying environmental risks will go to training to get the insight information on how they will compile environmental risk study. It is a standard practice for all employees to attend induction training where environmental course will be explained in more detail related to the project. The training should cover the relevant part of the EMP which is formed as a guide to contractors and employees regarding environmental related issues and how to mitigate such issues

MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT.

The Applicant Barzani Mining (Pty) Ltd and contractors will be responsible for the implementation section 28 of NEMA at all times “duty of care” to mitigate any impacts

in order to avoid pollution or degradation of the environment appropriate implementation of the recommended mitigation measures specified in the EMPr will be monitored through monthly site audits by an EAP and annual EMP audits undertaken by a third party.

The Following Documents Will be Used as Reference For Identifying and Managing Impacts:

- Approved EMPr;
- Approved EA; and
- Adoption and implementation Environmental Management Systems.

SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information was required by the competent authority.

PART D:

32. PROSPECTING HEALTH AND SAFETY ISSUES

In the event of contractual agreements with service providers to such that if enhances health and safety. Owner or employer remains responsible for compliance

Hazard Identification and Risk Assessment

a) Task analysis for every operation to be conducted, and bigger to be broken down to smaller tasks.
b) Hazards to be identified on each and every task.
    - Drilling hazards

Drilling in any environment is potentially hazardous, but when risks are identified prior execution and mitigation measure are put in place. The risk of drilling becomes low on both the environment and human health.

There are hazards associated with the preparation of camps, work sites and drill pads, as well as those specific to the operation of drill rigs.

Western Australia's code of practice for mineral exploration drilling encourages operators to develop site-specific solutions for the major hazard categories identified for the remote exploration environment, including:

- rotating and moving parts
- hazardous substances and dangerous good
- manual tasks
- working in hot environments
- fatigue and mental wellbeing
- dust
- noise
- ionising radiation
- hot work
- extreme weather and bushfire

c) Risk assessment to be conducted for every identified hazard.

The EMP provides measures to be used when dealing with impacts. However, hazard specific assessment will be conducted based on the urgency of the identified hazard.

d) Effective measures to be put in place to deal with risks associated with identified hazards.

A standard operating procedure (SOP) that addresses the use of correct personal protective equipment, safe handling, safe use, and proper disposal should be established. Thorough training and drills should be conducted regarding the company's spill response plans and chemical hygiene plans.

Where there is a possibility of heat stress occurring, companies need to carry out a risk assessment that considers the work rate, working climate and worker clothing and respiratory protective equipment. Where possible, control the temperature using engineering solutions, provide mechanical aids where possible to reduce the work rate, and regulate the length of exposure to hot environments. Furthermore, personal protective equipment should be provided, such as specialised protective clothing that incorporates personal cooling systems or breathable fabrics. Furthermore, companies should provide training for workers, especially new and young employees, and monitor the health of workers at risk.

To protect workers against noise, the companies should evaluate working conditions and noise exposure through risk assessments. Avoiding and reducing exposure can be achieved by applying engineering controls at the noise source or along the noise path to reduce exposures, such as vibration dampeners or absorptive panels. Regular maintenance of machines is also essential to reducing noise. Employer must ensure proper use of personal hearing protection amongst.

Noise-exposed employees, while providing necessary health and safety training and maintaining up-to-date health surveillance records.

Standard Working Procedures and COP's

a) Compilation of all mandatory COP's prior to commencement of prospecting.

The purpose of this schedule is to ensure that employees are not only trained but that the principles are continuously re enforced.

Table 25: Working procedures

Activity	**Time allocation and frequency**	**Objective**
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects. Establish a basic knowledge of the environmental legal framework and consequences of non-compliance. Clarify the content and required actions for the implementation of the Environmental Management Plan. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents
Monthly Awareness Talks (all staff and workers	30-minute awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of

		mitigation and/or management practices.
Risk Assessments (Environmental officer, supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures daily as part of daily tool box talks.

Figure 17: Typical example of meeting before commencing with work

b) Based on the proposed effective measures and mandatory COP's safe and healthy working procedures must be formulated and documented.

c) Contents of the COP's must be properly communicated to different levels of the organization and effectively implemented.

Development of procedures and checklists

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

- **Emergency preparedness and response**

The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically

include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with all potentially affected landowners. In the event that risks are identified which may affect adjacent landowners (or other persons), the procedure will include the appropriate communication strategy to inform such persons and provide response measures to minimise the impact.

- **Incident reporting procedure**

Incident reporting will be undertaken in accordance with an established incident reporting procedure to (including but not limited to):

Provide details of the responsible person including any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control when the incident occurred

- Provide details of the incident (time, date, location)
- The details of the cause of the incident
- Identify the aspects of the environment impacted
- The details corrective action taken
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed

- **Environmental and social audit checklist**

An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the Environmental Management Plan. Non-conformances will be identified and corrective action taken where required.

- **Health and Safety Equipment and Personal Protective Equipment**

Ensure necessary and appropriate tools, fit for the purposes are provided for employees perform work.

Figure 18: Typical PPE

Use respiratory protection when needed. The controls cited in this report may greatly reduce worker exposure to dust; however, respirators may still be necessary to reduce exposure to crystalline silica below the NIOSH REL of 50µg/m3. Due to the health risk related to exposure to crystalline silica, proper personal respiratory masks are needed when drilling, and should continue to be used even after dust suppressive methods are established. Necessary personal protective equipment to be provided.

Figure 19: Health and safety sign

c) All necessary adequate hygiene facilities to be provided.

Provision of potable and palatable water

The employer must ensure that sufficient potable and palatable water, which comply with the requirements set out, is readily available to all employees and clearly identified as drinkable.

Table 26: Categorisation and minimum standards for strenuous work

Very Heavy	Manual Material Handling: Consists of 34-66% of the work shift (daily exposure). Work Environment: Manual material handling takes place in restricted work environments (ceiling heights of 0.850m - 1.5m). Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift.

	Production / Non-production Related: Work tasks are imposed by a process (directly linked to production).
Heavy	Manual Material Handling: Consists of 34-66% of the work shift (daily exposure). Work Environment: Manual material handling takes place in unrestricted work environments. Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift. Production / No-production Related: Work tasks are imposed by a process (directly or indirectly linked to production).
Moderate	Manual Material Handling: Load handling consists of less than 34% of the work shift on a daily basis or more than 34% of the work shift on an occasional basis. Work Environment: Unrestricted work environments or supervisory work in restricted environments. Heat Exposure: Occasional exposure or daily exposure in case of supervisory work. Production / Non-production Related: Work tasks indirectly linked to production.
Light	Manual Material Handling: Load handling consists of less than 34% of the work shift – occasional load handling. Work Environment: Unrestricted work environments and/or occasional exposure to restricted work areas. Heat Exposure: Occasional exposure.

	Production / Non-production Related: Work tasks indirectly linked to production.
Sedentary	Manual Material Handling: Load handling limited to loads of up to 10kg, occasional exposure only. Work Environment: Unrestricted. Work tasks take place in a seated/standing work position for at least 50% of the work shift. Heat Exposure: Not exposed to heat.
Roaming	Manual Material Handling: None. No external workloads required other than wearing PPE. Work Environment: Unrestricted. Heat Exposure: Low exposure to heat. Production / Non-production Related: Not linked to production.

➢ 2.4. UNDERTAKING

The EAP herewith confirms

a) The correctness of the information provided in the reports **X**
b) The inclusion of comments and inputs from stakeholders and I&APs **X**
c) The inclusion of inputs and recommendations from the specialist reports where relevant **X**
d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein **X**

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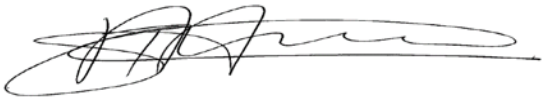

Signature of the Environmental Impact Practitioner

BASIA ENVIRONMENTAL CONSULTING

Name of Company

12 June 2021

Date